WEST BENGAL MEDICAL SERVICES CORPORATION LTD.

(Wholly owned by the Government of West Bengal)

Swasthya Sathi, GN-29, Sector-V, Salt Lake, Kolkata-700 091.

NOTICE INVITING TENDER DOCUMENTS FOR

CONSTRUCTION OF INTEGRATED AYUSH HOSPITAL AT PASCHIM MEDINIPUR

(NIT Reference No. : WBMSCL/NIT-96 /2018, Dated – 24.05.2018)

WEST BENGAL MEDICAL SERVICES CORPORATION LIMITED

(Wholly Owned by the Government of West Bengal)
Registered Office: Swasthya Sathi, GN-29, Sector-V, Salt Lake, Kolkata– 700091
Phone: 033-4034-0300 ◊ Email: info@wbmsc.gov.in ◊ website: www.wbmsc.gov.in

I.T.B. No. : WBMSCL/NIT- 96 /2018 **Dated: 24.05.2018**

Managing Director, WBMSCL invites sealed bids through electronic tendering (e- Tendering) **'Construction of integrated AYUSH hospital at Paschim Medinipur'** from the bonafied, resourceful and reliable experienced Contractor in West Bengal.

Sl. No.	Name of the Work	Estimated Amount (`)	Earnest Money (`)	Cost of Tender documents (`) (Non-refundable)	Period of Completion	Name & address of the office
01.	Construction of integrated AYUSH hospital at Paschim Medinipur	8,52,31,547.00	17,04,650.00	NIL	365 days	Managing Director, West Bengal Medical Services Corporation Limited, Swasthya Sathi Building, GN-29, Sector –V, Saltlake,

1. In the event of e-filling intending bidder may download the tender documents from the websites ***https:// etender.wb.nic.in*** directly with the help of Digital Signature Certificate and ***www.wbmsc.gov.in***. The necessary earnest money may be submitted as per **Clause no 17.A** of this NIT. **The bidders should produce all the credential in original to the office of undersigned for verification at West Bengal Medical Services Corporation Limited, Swasthya Sathi Building, GN-29, Sector –V, Saltlake, Kolkata-700091**
2. Eligibility criteria for participation in tender:

2.1. Requirement of Credentials:(Credential criteria should satisfy both Civil & Electrical part separately)

3.1.1. **For 1st Call of NIeT:**

2.1.1.1. Intending tenderers should produce credentials of a similar nature of completed work of the minimum value of 40% (forty percent) of the estimated amount during 5 (five) years prior to the date of issue of the tender notice; or,

2.1.1.2. Intending tenderers should produce credentials of 2 (two) similar nature of completed work, each of the minimum value of 30% (thirty percent) of the estimated amount during 5 (five) years prior to the date of issue of the tender notice; or,

2.1.1.3. Intending tenderers should produce credentials of one single running work of similar nature which has been completed to the extent of 80% (eighty percent) or more and value of which is not less than the desired value at (3.1.1.1.) above;

In case of running works, only those tenderers who will submit the

certificate of satisfactory running work from the concerned Executive Engineer, or equivalent competent authority will be eligible for the tender. In the required certificate it should be clearly stated that the work is in progress satisfactorily and also that no penal action has been initiated against the executed agency, i.e., the tenderer.

2.1.2. **For 2nd Call of NIeT:**

2.1.2.1. Intending tenderers should produce credentials of a similar nature of completed work of the minimum value of 30% (thirty percent) of the estimated amount during 5 (five) years prior to the date of issue of the tender notice; or,

2.1.2.2. Intending tenderers should produce credentials of 2 (two) similar nature of completed work, each of the minimum value of 25% (twenty five percent) of the estimated amount during 5 (five) years prior to the date of issue of the tender notice; or,

3.1.2.3. Intending tenderers should produce credentials of one single running work of similar nature which has been completed to the extent of 75% (seventy five percent) or more and value of which is not less than the desired value at (3.1.2.1.) above;

In case of running works, only those tenderers who will submit the certificate of satisfactory running work from the concerned Executive Engineer, or equivalent competent authority will be eligible for the tender. In the required certificate it should be clearly stated that the work is in progress satisfactorily and also that no penal action has been initiated against the executed agency, i.e., the tenderer.

3.1.3. **For 3rd Call of NIeT:**

3.1.3.1. Intending tenderers should produce credentials of a similar nature of completed work of the minimum value of 20% (twenty percent) of the estimated amount during 5 (five) years prior to the date of issue of the tender notice; or,

3.1.3.2. Intending tenderers should produce credentials of one single running work of similar nature which has been completed to the extent of 70% (seventy percent) or more and value of which is not less than the desired value at (3.1.3.1.) above,

In case of running works, only those tenderers who will submit the certificate of satisfactory running work from the concerned Executive Engineer, or equivalent competent authority will be eligible for the tender. In the required certificate it should be clearly stated that the work is in progress satisfactorily and also that no penal action has been initiated against

the executed agency, i.e., the tenderer.

3.2. Other terms and conditions of the credentials:

3.2.1. Payment certificate will not be treated as credential;

3.2.2. Credential certificate issued by the Executive Engineer or equivalent or competent authority of a State / Central Government, State / Central Government undertaking, Statutory / Autonomous bodies constituted under the Central / State statute/ Any reputed company, on the executed value of completed / running work will be taken as credential.

No credential will be considered as valid unless it is supported by work order, price schedule or BOQ of work and completion certificate mentioning the date of completion issued by the competent authority not below the rank of Executive Engineer or equivalent or competent authority of a State / Central Government, State / Central Government undertakings, Statutory / Autonomous bodies constituted under the Central / State Statute/ Any reputed company. The completion certificate should indicate the value of the work (equal to booked expenditure).

N.B. The credential certificate for completed works should contain (a) Name of work (b) Estimated Amount(c) Tendered amount, (d) Value of executed work (e)Date of Completion of project along with telephone number &detail address for communication of client must be indicated in the Credential Certificate.

[Non Statutory Documents]

3.2.3. The prospective bidders will have in their full time engagement experienced technical personnel, the minimum being one Civil Engineering Degree holder, one Civil Engineering Diploma holder.

(Authenticated documents in respect of qualification and engagement for this work will have to be furnished for Technical Evaluation);

[Non Statutory Documents]

3.2.4. PAN Card, Professional Tax Deposit Challan for the year 2017-2018, valid 15-digit Goods and Service Tax payer Identification Number (GSTIN) under GST Act. 2017 with relevant document(s) and any other(s) if applicable to be accompanied with the Technical Bid document.

[Non Statutory Documents]

3.2.5. The prospective bidders or any of their constituent partner(s) should not have U abandoned more than one work. Not more than one of their contracts should have been rescinded during the last 3 (three) years from the date of publishing of this NIeT. Such abandonment or rescission will be considered as disqualification towards eligibility (a declaration in this respect through Affidavit will have to be furnished by the prospective bidders without which

the technical bid will be treated as non-responsive. Neither prospective bidder nor any of constituent partner(s) should have been debarred to participate in tender(s) by the P.W. & P.W. (Roads) Department, Government of West Bengal during the last 2 (two) years prior to the date of this NIeT. Such debarment will be considered as disqualification towards eligibility. (A declaration in this respect has to be furnished by the prospective bidders as per prescribed format without which the Technical Bid shall be treated non-responsive).

3.2.6. The Bidder's Net Worth for the last year calculated on the basis of capital, profit and free reserve available to the firm should be positive.

3.2.7. The available **Financial Capacity** (to be calculated on the basis of prescribed format) of the prospective applicant at the expected time of bidding should be more than the Estimated Amount put to Tender.

3.2.8. In case of Proprietorship and Partnership Firms and Company the Tax Audited Report in 3CD Form to be furnished along with Balance Sheet and Profit and Loss Account and all schedules forming the part of Balance Sheet and Profit & Loss Account. Tax Audited Report, Balance Sheet and Profit & Loss Account including all schedules forming the part of Balance Sheet and Profit & Loss Account should be in favour of application

3.2.9. Requirement of Machineries:

Following criteria regarding machineries and equipment to be used in different types of works should be adhered to:

3.2.9.1. Plant Machineries and Equipment should be owned or arranged through lease hold agreements by the bidders. For Leased Plant & Machineries, scanned copy of registered / notarised lease agreement is to be submitted.

3.2.9.2. Conclusive proof of ownership (Tax Invoice, Way Bill, Delivery Challan) for each plant and machinery in working condition shall have to be submitted.

3.2.9.3. In case of advance payment for purchase of Batch type Mixing Plant, proof of advance payment receipt from the manufacturer should be produced and in that case at least 25% (twenty five percent) payment against the total cost of the plant / machineries have to be made by the bidders.

3.2.9.4. If the machineries have been engaged in other works, then name of client along with his contact number and email address should be furnished in the declaration by the intended tenderer and the present location (working place) should also be given with tentative date of release of plant & machineries.

3.2.9.5. In case of Building Works:

Initially for concrete batching and mixing plant, concrete mixer with integral weigh batching facility maximum age of the plants, machineries

will be 5 (five) years as on the date of publication of NIeT. It may be extended up to 7 (seven) years after getting fit certificate from the manufacturer and this certificate should be produced at the time of submission of bid. All other machineries and equipment should be in running condition.

All plants, machineries and equipment will be verified by the competent authority before execution of the work.

3.2.9.6. In case of Road Works:

Initially for Hot Mix Plant both in batch type and Drum Type, Paver Finisher, Concrete Batching and Mixing Plant, Concrete Mixture with integral weigh batching facility, Concrete Paver, Vibratory Roller maximum age of the plants, machineries will be 5 (five) years as on the date of publication of NIeT. It may be extended up to 7 (seven) years after getting fit certificate from the manufacturer and this certificate should be produced at the time of submission of bid. All other machineries and equipment should be in running condition.

All plants, machineries and equipment will be verified by the competent authority before execution of the work.

3.2.9.7. In case of Bridge Works:

Initially for concrete batching and mixing plant, Concrete mixer with integral weigh batching facility maximum age of the plants, machineries will be 5 (five) years as on the date of publication of NIeT. It may be extended upto 7 (seven) years after getting fit certificate from the manufacturer and this certificate should be produced at the time of submission of bid. All other machineries and equipment should be in running condition.

All plants, machineries and equipment will be verified by the competent authority before execution of the work.

The prospective bidders should own or arrange through lease hold agreement the required plant and machineries of prescribed specifications as shown and mentioned in format [Section- B]. A statement should be submitted mentioning present location of installation of the said main Plant and machinery, as mentioned, in specified format in Section B, Form-IV. If necessary, authority / Bid Evaluation Committee may inspect Plant and Machineries physically or call for the original documents as proof of Ownership in favour of owner / lessor of the same.

[Non Statutory Documents]

3.2.10. Registered Unemployed Engineers' Co-operative Societies / Unemployed Labour Co-operative Societies are required to furnish valid Bye Law, Current Audit Report, Certificate of Registration and Valid Clearance Certificate from A.R.C.S. for the year 2016/2017 Professional Tax Deposit Challan for the Financial Year 2017-2018, PAN Card,Valid 15-digit Goods & Service Tax Payer Identification Number (GSTIN) under GST Act, 2017 with relevant document with up-to-date return along with other relevant supporting papers.

[Non Statutory Documents]

3.2.11. Joint Ventures will not be allowed for works upto 25 Crores. For work more than 25 Crores in case of a joint venture, Lead Member of such joint venture will be required to meet 60% (sixty percent) of required Bid Capacity and each of the Joint Venture Members will be required to meet at least 30% (thirty percent) of

requirement of Financial Capacity. Financial Capacity of all the members in total should be at least 100% (one hundred percent) of required Bid Capacity.

3.2.12. As per memorandum no. 311-W(c)/1M-132/15 dated.28.03.2018 of PWD, for building works worth value less than Rs. 25 crore & which are predominantly Civil work in nature with electrical components less than 25% of the estimated amount put to tender, the Civil contractor is allowed to submit an agreement in non-judicial stamp paper of requisite value with an electrical contractor for execution of the electrical components of the work. In that case the electrical contractor will have to qualify for all requirements set forth in the NIeT for electrical works including credential, electrical supervisor's certificate of competency (SCC) etc. The Civil contractor will have to qualify for all requirements set forth in the NIeT including requisite credential for Civil component of such works but excluding credential and SCC requirements for electrical works. However the onus and full responsibility of execution of the total work (Civil & Electrical) will be on the civil contractor who will execute the agreement with the Department. Payment will also be made to the civil contractor only.

3.2.13. A prospective bidder shall be allowed to participate in the particular Job either in the capacity of individual or as a partner of a firm. If found to have applied severally for a single job, all his applications will be rejected for that job, without assigning any reason thereof.

3.2.14. A prospective bidder (including his participation in partnership) will be allowed to participate in 2 (two) works anywhere for each set of prescribed machinery and equipment owned U41TU/ arranged through lease hold agreement U41TUby the bidder. In no case a bidder will be allowed to participate in bid for more than 2 (two) works anywhere per set of required machineries. As per G.O. no. 542-W(C)/1M-24/15 dated 06/11/2015 of PWD, in a particular NIeT having multiple work, a bidder can participate in more than one work provided the bid capacity permits and the bidder is capable to arrange and deploy separate set of required machineries for multiple works and complete the work in specified time.

3.2.15. A partnership firm will have to furnish the registered partnership deed and a company will have to furnish the Article of Association and Memorandum.

Where an individual person hold a digital certificate in his / her own name duly issued to him / her against the company or the firm of which he / she happens to be a director or partner, such individual person shall, while uploading any tender for and on behalf of such company or firm, invariably upload a copy of registered power of attorney showing clear authorization in his / her favour, by the rest of the directors of such company or the partner of such firm, to upload such tender. The power of attorney shall have to be registered in accordance with the provision of the Registration Act.1908 as per G.O. no. 61/SPW/12 dated 08/06/2012.

3.2.16. Partnership Firm, Company Limited Firm, Private Company Limited Firm shall be registered by the respective competent authority from the Registrar of Firms, Society, Non-Trading Corporation, Registrar of Companies etc. & copy of Registration Certificate (*with allotment of Registration No.*) will have be submitted, otherwise the Technical Bid will not be considered for qualification & Financial Bid shall not be opened.

4. The successful bidder will have to establish field testing laboratory equipped with requisite instruments in conformity with relevant code of practice and technical staff according to the requirements of works to be executed. The executing agency will have to produce satisfactory test report of all the materials of the work as well as on samples collection jointly by him and concerned authority of the Engineer-in-Charge from all completed / ongoing items of works as per relevant codes of practice at his own cost from any Govt. approved / Govt. testing laboratory during execution of works. The successful bidder will have to bring all requisite plants and mechanical equipment and / or technical personnel and / or laboratory and field testing machineries and equipment for all the items of work as per BOQ and / or as per relevant IS / IRC Codes of practice and / or as per direction of the Engineer-in-Charge and / or as per relevant PWD Schedule of Rates at the time of execution of work at site even if upon technical evaluation he is declared as "qualified" without having all the requisite plants and mechanical equipment and / or technical personnel and / or laboratory and field testing machineries and equipment at the time of submission of tender.

5. The executing agency (successful bidder) may not get a running payment unless the gross amount of running bill is 50 (fifty) lakh or 30% (thirty percent) of the tendered amount whichever is less. Provisions in Clause(s) 7, 8, & 9 contained in West Bengal Form No. 2911(ii) so far as they relate to quantum and frequencies of payment are to be treated as superseded. The payment will be made as and when fund is available from the concerned source. No claim whatsoever for delay in payment, if any, will be entertained. Retention money towards performance Security amount to 10% (ten percent) of the value of the work will be deducted from the running account bill of the tender as per prevailing order. No interest will be paid on security deposit.

   All bills should be raised to the concerned Treasury or Pay & Accounts Officers within a fortnight of receipt in the Divisional Office(s) and the Sub-Divisional Office(s) should be required to submit bill(s) to the Divisional Office(s) with 15 (fifteen) days of receipt from Section Office(s) if they are reserved for check measurement and within 7 (seven) days says if not so reserved. The Section Office(s) should be required to submit bills to the Sub-Divisional Office(s) within 7 (seven) days after submission / claim of the bills by the Contractor / Agency.

6. Constructional Labour Welfare CESS @ 1% (one percent) of cost of construction will be deducted from the bill(s) of the contractor(s) on all contracts awarded on or after 01/11/2006 in pursuance with G.O. no. 599A/4M-28/06 dated 27/09/2006. GST, Royalty & all other Statutory levy / CESS will have to be borne by the contractor & the rate in the schedule of rates are inclusive of all the taxes & CESS stated above.

   Successful Tenderers will be required to obtain valid Registration Certificate & Labor License from respective Regional Labour Offices where construction work by them are proposed to be carried out as per Clauses U/S 7 of West Bengal Building & other Construction Works' Act, 1996 and U/S 12 of Contract Labour Act.

   Successful tenderers will be required to observe the following conditions strictly:

   6.1. Employees' Provident Fund and Miscellaneous Provisions Act, 1952 and Employees State Insurance Act, 1948 should be strictly adhered to wherever such Acts become applicable.

   6.2. Minimum wages to the workers shall be paid according to the rates notified and / or revised by the State Government from time-to-time under the Minimum Wages Act, 1948 in respect of scheduled employments, within the specified time as per law. Payment of bonus, wherever applicable, has to be made.

   6.3. Adequate safety and welfare measures must be provided as per the provisions of the Building and other Construction Workers' (Regulation of Employment & Conditions of Service) Act, 1996 read with West Bengal Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Rules, 2004.

   6.4. All liabilities arising out of engagement of workers are duly met before submission of bills

for payment.

If there is any violation of any or all the relevant above criteria during execution of the job, it will render the concerned agencies ineligible for the work then and there or at any subsequent stage as may be found convenient.

7. Adjustment of Price (increase or decrease) Vide Notification No.23-CRC/2M-61/2008 dated 13/03/2009 & Notification No. 38-CRC/2M-61/2008 dated 20/04/2009 shall not be applicable. Since BOQ for the works under this NIeT is based upon the schedule of rates of Public Works Directorate, Government of West Bengal with Addendum & Corrigendum as mentioned hereinafter, the bidders shall quote their rate (percentage above / below / at par) accordingly considering that no escalation and / or price adjustment will be allowed by the Department thereto under any circumstances.

8. No Mobilisation Advance and Secured Advance will be allowed.

9. Agencies shall have to arrange required land for installation of Plant & Machineries, (specified for each awarded work, storing of materials, labour shed, laboratory etc. at their own cost and responsibility nearest to the work site. The agencies will have to install the above machineries on the site within 45 (forty five) days from this end positively with application of Tender.

10. Bids shall remain valid for a period not less than 120 (one hundred twenty) days from the last date of submission of Financial Bid / Sealed Bid. In case of inadvertent typographical mistake found in the specified schedule of rates / BOQ, the same will be treated to be so corrected as to conform with the relevant schedule of rates prevailing at the time of floating of tender and / or technically sanctioned estimate. No claim whatsoever for such inadvertent typographical mistake will be entertained.

11. All materials required for the proposed scheme as mentioned in Sl. including bitumen (all grade), bitumen emulsion, cement & steel will have be of specified grade & approved brand in conformity with relevant code of practice (latest revision) & manufactured accordingly & will have to be procured & supplied by the agency at his / their own cost including all taxes. Authenticated evidence for purchase of bitumen, bitumen emulsion, cement and steel are to be submitted along with challan and test certificate. In the event of further testing opted by the Engineer-in-Charge, such testing from any Government approved / Government Testing Laboratory outside the jurisdiction of the SE/NABC/PWD Testing Laboratory will have to be conducted by the agency at his/their own cost. VG 30 / VG 40 grade paving bitumen, as the case may be, of I.O.C.L/ B.P.C.L/ H.P.C.L will be permitted as Straight run Bitumen. All steel materials to be used for the work should be SAIL / TATA / RINL unless otherwise mentioned specifically in the BOQ.

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10. IMPORTANT INFORMATION

A. DATE & TIME SCHEDULE

Sl. No.	PARTICULAR	DATE & TIME
i)	Date of uploading of N.I.T and Tender Documents (online)	29.05.2018
ii)	Documents Sell / download start date (online)	30.05.2018 at 09.00 A.M.
iii)	Bid Submission Upload Start date (online)	08.06.2018 at 09.00 P.M.
iv)	Date of pre-bid meeting	06.06.2018 at 1.00 P.M.
v)	Bid Submission Upload End date (online)	20.06.2018 upto 05.00 P.M.
vi)	Date of submission of hard copy	22.06.2018 upto 05.00 P.M.
vi)	Date & Place for Opening of Technical bid (online) for the Bidders	To be notified later
vii)	Date & place for opening of financial proposal	To be notified later

C: LOCATION OF CRITICAL EVENTS

Bid Opening: "West Bengal Medical Services Corporation Limited, Swasthya Sathi Building, GN-29, Sector –V, Saltlake, Kolkata-700091" Interested bidder may be presented at West Bengal Medical Services Corporation Limited, Swasthya Sathi Building, GN-29, Sector –V, Saltlake, Kolkata-700091 during opening of bid. Managing Director, West Bengal Medical Services Corporation Limited may call open bid /sealed bid after opening of the said bid to obtain the suitable rate further, if it is required. No objection in this respect will be entertained if raised by any bidder present or absent during opening of tender.

11. In case of any unscheduled holiday on the aforesaid dates [Sl. (v)], the next working day will be treated as schedule / prescribed date for the same purpose.

12. (A) The process of deposit of earnest money through offline instruments like Bank Draft, Pay Order etc. will be stopped for e–tender procurement of this office **wef. 01.09.2016. Necessary Earnest Money will be deposited by the bidder electronically: online – through his net banking enabled bank account, maintained at any bank or: offline – through any bank by generating NEFT/ RTGS challan from the e–tendering portal**. Intending Bidder will get the Beneficiary details from e– tender portal with the help of Digital Signature Certificate and may transfer the EMD from their respective Bank as per the Beneficiary Name & Account No., Amount, Beneficiary Bank name (ICICI Bank) & IFSC Code and e–Proc Ref No. Earnest Money @2.00% of the estimated amount put to tender have to be submitted. The earnest money of the successful bidder (being converted to security deposit) deposited, will remain under the custody of the department till satisfactory completion of the work in full including extended quantity if ordered for. Besides this, necessary percentages shall be deducted from the progressive bids so as to make it 10% (Ten percent) of the value of work billed for.

(B) Intending bidder who wants to transfer EMD through NEFT/RTGS must read the instruction of the Challan generated from E–Procurement site.

(C) Bidders are also advised to submit EMD of their bid, at least 3 working days before the bid submission closing date as it requires time for processing of Payment of EMD. Bidders eligible for exemption of EMD as per Govt. rule may avail the same and necessary documents regarding the exemption of EMD must be uploaded in the EMD folder of Statuary bid documents.

13. The successful Bidder shall have to execute Formal Agreement with Managing Director, West Bengal Medical Services Corporation Limited within 7(Seven) days from the issuance of Provisional Work order.

14. Bank guarantee shall be accepted for the purpose of the security.

15. Agency shall have to arrange required land for installation of Plant & machineries (Specified for the

awarded work), storing materials, labour shade etc. at their own cost and responsibility nearest to the work site.

16. The intending bidder(s) required to quote the rate **(percentage above/below/at par)** over the total estimated cost put to tender online considering that no escalation and / or price adjustment will be allowed by the department under any circumstances.

17. The Bidder has to visit and examine the site of works and its surroundings and obtained all information that may be necessary for preparing Bid and entering into an agreement for the work / works as mentioned in the NIT. The costs for visiting the working site shall be at the bidders own expense.

18. The Working Capital shall not be less than 15% (fifteen) percent of the amount put to tender out of which minimum10% (ten) percent shall be of the applicant's own resource. [Non Statutory Documents (Financial Statement)]

19. Prospective Bidder shall have to execute the work in such manner so that appropriate service level of the Building under improvement is to be maintained during progress of the work and during ***Defect Liability Period of 1(one) Year*** for the works from the date of successful completion of the work up to the entire satisfaction of the Engineer in Charge. If any defect / damage is detected during this period as mentioned above the contractor shall make the same good at his own expense to the satisfaction of the Engineer in Charge or in default the Engineer in Charge may cause the same to be made good by other agency and deduct the cost (of which the certificate of the Engineer in Charge shall be final) from his security deposit or any sums that may be then, or at any time thereafter become due to the contractor. Security Deposit shall become payable only after expiry of the ***Defect Liability Period*** after making necessary deduction if applicable.

20. If more than one Bidder quoted same rate and which are found lowest at the time of opening, such similar multiple rates will not be entertained / accepted. Lowest offer will be ascertained by sealed bid amongst the lowest bidder.

21. At any stage during scrutiny, if it is found that the credential or any other papers which the Bidder uploaded during Bidding process, found incorrect / manufactured / fabricated, that bid will be considered as non- responsive and outright rejected with forfeiture of Earnest Money and action will be taken as per stipulation of IT Rules in force.

22. List of "Technically Qualified Bidders" will be published in the web portal only. Financial Bid will be opened within a short period after such publication. Therefore, Bidders are requested to view the tender status on a regular basis. In case of there be any objection regarding Pre-qualification / list of "Technically Qualified Bidders", that objection should be lodged to the Managing Director, WBMSCL within 48 hours from the date of publication of list of qualified Agency and beyond that time schedule no objection will be entertained by the Tender Evaluation Committee

23. Before issuance of Letter of Acceptance / Provisional Work order, the tender accepting authority may verify the credential & other documents of the lowest bidder so uploaded online if found necessary. If it is found such document incorrect/ manufactured / fabricated, Letter of Acceptance / Provisional Work order will not be issued in favour of the bidder under any circumstances and action will be taken accordingly.

24. In case of Ascertaining of Authority at any stage of application or execution of work, necessary registered Power of Attorney is to be produced.

25. The Earnest Money may be forfeited if;-
    a) If the Bidder withdraws the Bid during the period of Bid validity.
    b) In case of successful Bidder, if the Bidder fails to execute formal agreement within the stipulated time period.
    c) During scrutiny, if it is come to the notice of tender inviting authority that the credential or any other document which were uploaded & digitally signed by the Bidder are incorrect / manufactured / fabricated.

26. If any discrepancy arises between two similar clauses on different notifications, the clause as stated in later notification will supersede former one in following sequence;-
    a) Notice Inviting Tender
    b) Special Terms and Conditions
    c) Financial Bid
    d) Schedule of Works (as per Annexure 'A', 'B', 'C', 'D', 'E' & 'F')

All works covered in the clause appearing hereinafter shall be deemed to form a part of the

appropriate item or items of works appearing in the work schedule whether specifically mentioned in any clause or not and the rates quoted shall include all such works unless it is otherwise mentioned that extra payment will be made for particular works.

27. The bidders must have valid Electrical Contractors' License with full time engagement of an Electrical Supervisor Competency on the parts 1, 2, 3, 4, 5, 6(A), 6(B), 7(A), 7(B), 11 & 12 or equivalent National Supervisors' Certificate of competency (Self Attested scan copy of valid "Electrical Contractors' License," "Supervisors' Certificate of Competency" and authentic Notarized document regarding engagement of Electrical Supervisors as submitted to the licensing board, "Govt. of West Bengal" require in Non-Statutory document).

28. Prospective bidders must have sufficient credentials to participate in the tender (Electrical, civil) as per notification of Clause No 2.

29. For any typographical mistake in case of Unit, Rate, Quantity, Amount, any type of nomenclature in items of works/item itself including description etc. whatsoever as stated in BOQ, that can't be claimed during agreement or so. In that case sanctioned estimate will be binding criteria.

The eligibility of the Bidder will be ascertained on the basis of document submitted / uploaded & digitally signed in support of the minimum criterion as mentioned above. If any document submitted / uploaded by the Bidder is either manufactured or false the eligibility of Bidder will be out rightly rejected at any stage without prejudice and action will be taken as per stipulation of IT Rules in force.

Sd/-
Managing Director
West Bengal Medical Services Corporation Limited

Payment Schedule

Payment will be made according to Annexure ‘A’ , ‘B’, ‘C’, ‘D’, ‘E’ & ‘F’.

INSTRUCTION TO BIDDERS

SECTION – A

General guidance for e-Tendering

Instructions/ Guidelines for tenders for electronic submission of the tenders online have been annexed for assisting the contractors to participate in e-Tendering.

1. Registration of Contractor Any contractor willing to take part in the process of e-Tendering will have to be enrolled & registered with the Government e-Procurement system, through logging on to ***https://etender.wb.nic.in.*** The contractor is to click on the link for e-Tendering site as given on the web portal.
2. Digital Signature certificate (DSC) Each contractor is required to obtain a class-II or Class-III Digital Signature Certificate (DSC) for submission of tenders, from the approved service provider of the National Information's Centre (NIC) on payment of requisite amount details are available at the Web Site stated in Clause-2 of Guideline to Bidder DSC is given as a USB e-Token.
3. The contractor can search & download NIT & Tender Documents electronically from computer once he logs on to the website mentioned in Clause 2 using the Digital Signature Certificate. This is the only mode of collection of Tender Documents.
4. Participation in more than one work a prospective bidder shall be allowed to participate in the job either in the capacity of individual or as a partner of a firm. If found to have applied severally in a single job, all his applications will be rejected for that job.
5. **Submission of Tenders/General process of submission:** Tenders are to be submitted through online to the website stated in Cl. 2 in two folders at a time for each work, one in Technical Proposal & the other in Financial Proposal before the prescribed date & time using the Digital Signature Certificate (DSC) The documents are to be uploaded (virus scanned copy) duly Digitally Signed. The documents will get encrypted (transformed into non readable formats). A. Technical & Financial proposal: The proposal should contain scanned copies of the following in two covers (folders).

A-1. Statutory Cover file Containing.

Technical Bid:

i) Earnest money (EMD) as prescribed in the NIT
ii) NIT
iii) Forms (As mentioned in the NIT, Section-B)

Financial Bid:

iv) The rate will be quoted in the BOQ quoted rate (as per schedule of works in the form of annexure) will be encrypted in the B.O.Q. under Financial Bid.
v) Annexure 'A', 'B, 'C', 'D', 'E'& 'F' (Schedule of works)

A-2. Non statutory / Technical Documents

i. Current Income Tax return (for the assessment year as applicable) ,Contractor License, Supervisory License, PAN, GST Registration Certificate & Professional Tax receipt challan
ii. Valid enlistment renewal certificate
iii. Registered Deed of partnership Firm
iv. Trade License from the respective Municipality/Panchayet etc. (in case of S & P Contractors only)
v. Certificate of Registration' from the respective Assistant Registrar of Co – operative Societies (for Regd. Unemployed Engineer's Co – Operative Society Ltd.)
vi. Requisite Credential Certificate as mention in Clause [2(i)] of this N.I.T.

Note: Failure of submission of any of the above mentioned documents will render the tender liable to be rejected for both statutory & non statutory cover.

THE ABOVE STATED NON-STATUTORY/TECHNICAL DOCUMENTS SHOULD BE ARRANGED IN THE FOLLOWING MANNER

Click the check boxes beside the necessary documents in the My Document list and then click the tab "Submit Non Statutory Documents' to send the selected documents to Non-Statutory folder. Next Click the tab "Click to Encrypt and upload" and then click the "Technical" Folder to upload the Technical Documents.

Sl. No.	Category Name	Sub-Category Description	Detail(s)
A.	Certificate(s)	Certificate(s)	1. Valid 15-digit Goods and Service Tax payer Identification Number (GSTIN) under GST Act. 2017 with relevant document(s) and any other(s) if applicable. 2. PAN Card. 3. P. Tax Deposit Challan for the year 2017-2018.
B.	Company Detail(s)	Company Detail - 1	1. Proprietorship Firm (Trade License) 2. Partnership Firm (Partnership Deed, Trade License) 3. Ltd. Company (Incorporation Certificate, Trade License) 4. Co-Operative Society (Society Registration Certificate Copy, Trade License) 5. Registered Power of Attorney.
C.	Credential	Credential – 1 Credential – 2	Similar nature of work done and completion certificate with Price Schedule or BOQ which is applicable for eligibility in this NIeT.
D.	Equipment	Laboratory Equipments Machineries – 1 Machineries – 2	1. Authenticated copy of Tax Invoice, Delivery Challan and Waybill (Plant / Machinery) 2. Authenticated copy of Tax Invoice, Delivery Challan and Waybill (laboratory)
E.	Financial Information	Work in hand	1. Financial Statement (Section – B, Form – II) duly filled up. 2. Affidavits – X and Declaration – Y. 3. Certificate of revolving line of credit by the Bank.
		Payment certificate – 1 Payment certificate - 2	Only Payment Certificate not the TDS Certificate. (Issued by an Officer not below the rank of Executive Engineer).
		Profit & Loss A/c. and Balance Sheet for the financial year 2017-2018.	Profit & Loss A/c. and Balance Sheet (with Annexure and 3CD form in case of Tax Audit)
		Profit & Loss A/c. and Balance Sheet for the financial year 2016-2017.	Profit & Loss A/c. and Balance Sheet (with Annexure and 3CD form in case of Tax Audit)
		Profit & Loss A/c. and Balance Sheet for the financial year 2015-2016.	Profit & Loss A/c. and Balance Sheet (with Annexure and 3CD form in case of Tax Audit)

		Profit & Loss A/c. and Balance Sheet for the financial year 2014 - 2015.	Profit & Loss A/c. and Balance Sheet (with Annexure and 3CD form in case of Tax Audit)
		Profit & Loss A/c. and Balance Sheet for the financial year 2013- 2014.	Profit & Loss A/c. and Balance Sheet (with Annexure and 3CD form in case of Tax Audit)
L.	Man Power	Technical Personnel	List of Technical Staffs along with Structures & Organization (as per NIeT.)
		Technical Personnel on Contract	List of Technical Staffs along with Structures & Organization (as per NIeT.)

B.Technical proposal

i. Opening of Technical proposal: - Technical proposals will be opened by the Managing Director, West Bengal Medical Services Corporation Limited and his authorized representative electronically from the web site stated using their Digital Signature Certificate.

ii. Intending bidders may remain present if they so desire.

C.Financial proposal

i) The financial proposal should contain the following documents in one cover (folder) i.e. Bill of quantities (BOQ). The contractor is to quote the rate **(Offering Above/ Below/ At per)** online through Computer in the space marked for quoting rate in the BOQ and also digitally signed and upload the Schedule of works given in the format of Annexure)

ii) Only downloaded copies of the above documents are to be uploaded virus scanned & Digitally Signed by the contractor.

iii) Financial capacity of a bidder will be judged on the basis of net worth and available financial capacity as mentioned in the NIeT to be obtained from the information furnished in Form – V (Section–B), i.e., Financial Statement.

The Audited Balance Sheet for the last 5 (five) years, Net Worth, Bid Capacity etc. are to be submitted which must demonstrate the soundness of Bidder's financial position, showing longterm profitability including an estimated financial projection for the next 2 (two) years.

Location of Site

ABASH, Medinipur, Paschim Medinipur, Kuikota- Amchhata- Tantigeria Rd, Medinipur, West Bengal 721102 (Near SBSTC Bus depo). Intending bidders requested to visit the site before bidding.

PENALTY FOR SUPPRESSION / DISTORTION OF FACTS OR SUBMISSION OF INCORRECT INFORMATION:

If any tenderer fails to produce the original hard copies of the documents (specially Completion Certificates and audited balance sheets), or any other documents on demand of the Tender Opening Authority within a specified time frame or if any deviation is detected in the hard copies from the uploaded soft copies or if there is any suppression of facts, the Tenderer will be suspended from participating in the tenders on e-Tender platform for 3 (three) years. In addition, his user ID will be deactivated and Earnest Money Deposit will stand forfeited. Besides, WEST BENGAL MEDICAL SERVICES CORPORATION LIMITED may take appropriate legal action against such tenderer.

AWARD OF CONTRACT

The Tender Inviting Authority reserves the right to accept or reject any Tender and to cancel the Tendering process and reject all Tenders at any time and prior to the Award of Contract without therby incurring any liability to the affected Tenderer or Tenderers or any obligation to inform the affected Bidder or Bidders of the ground for Employer's action.

The Bidder whose Bid has been accepted will be notified by the Tender Inviting & Accepting Authority through acceptance letter/email..

The notification of award will initiate the execution of agreement.

The Agreement in prescribed composite Tender Form will incorporate all agreements between the Tender Accepting Authority and the successful Bidder. All the tender documents including NIT B.O.Q, STC & TF. will be the part of the Contract Documents.

SECTION – B

FORM –I

B.1. PRE-QUALIFICATION APPLICATION.

To
Managing Director,
West Bengal Medical Services Corporation Limited

Ref: - Tender for _____
_____work_____
_____
_____

N.I.T. No: WBMSCL/ NIT-96/2018 dated- 24.05.2018 of West Bengal Medical Services Corporation Limited

Dear Sir,
Having examined the Statutory, Non statutory, Instruction to Bidders & NIT documents along with its Agenda & corrigendum, I /we hereby submit all the necessary information and relevant documents for evaluation

The application is made by me / us on behalf of _____

In the Capacity _____ duly authorized to submit the order.

The necessary evidence admissible by law in respect of authority assigned to us on behalf of the group of firms for Application and for completion of the contract documents is attached herewith. We are interested in bidding for the work(s) given in Enclosure to this letter.

We understand that:

(a) Tender Inviting & Accepting Authority/Engineer-in-Charge can amend the scope & value of the contract bid under this project.
(b) Tender Inviting & Accepting Authority/Engineer-in-Charge reserve the right to reject any application without assigning any reason.

(c) Enclo:- e-Filling:-
(d) 1. Statutory Documents.
(e) 2. Non Statutory Documents.

_____

Date: -

Signature of applicant including title
and capacity in which application is made.

SECTION – B

FORM - II

B.2. AFFIDAVIT – "X"

(To be furnished in Non – Judicial Stamp paper of appropriate value duly notarized)

Work in progress.

Sl.	Name of the work.	Tender No.	Tendered Amount.	% of work Executed.

Work order issued but work not started.

Sl.	Name of the work.	Tender No.	Tendered Amount.	Status.

_____

Signature

Date: ----------

_____

Name of the Firm with Seal.

SECTION – B

FORM- III

B.3. STRUCTURE AND ORGANISATION.

B.3.1. Name of applicant::_____

B.3.2. Office Address:: _____

_____

Telephone No.::_____

Fax No. **::**_____

B.3.3. Name & address of Bankers::_____

_____

_____

B.3.4. Attach an organization chart showing the structure of the company with names of Key personnel and technical staff with Bio-data.

Note: Application covers Proprietary Firm, Partnership, Limited Company or Corporation,

Date:

_____

Signature of applicant.
including title and capacity in which application is made.

Form PER-1: Proposed Personnel

1.	Title of position*
	Name
2.	Title of position*
	Name
3.	Title of position*
	Name
4.	Title of position*
	Name

Form PER-2: Resume of Proposed Personnel

Position		
Personnel information	Name	Date of birth
	Professional qualifications	
Present employment	Name of employer	
	Address of employer	
	Telephone	Contact (manager/ personnel officer)
	Fax	E-mail
	Job title	Years with present employer

Summarize professional experience in reverse chronological order. Indicate particular technical and managerial experience relevant to the project.

From	To	Company/Project/Position/ Relevant Technical and management experience

FORM – IV

B.4. EXPERIENCE PROFILE.

B.4.1. Name of the Firm:_____

_____

B.4.2. LIST OF PROJECTS COMPLETED THAT ARE SIMILAR IN NATURE TO THE WORKS HAVING MORE THAN 40% OF THE PROJECT COST EXECUTED DURING THE LAST FIVE YEARS.

Name, Location & nature of work	Deptt. Concern	Engineer-in-Charge	Contract price in Indian Rs.	% of Participation of company	Original Time Schedule		Actual Time Schedule		Reasons for delay in completion (if any)
					Start Date	Completion Date	Start Date	Completion Date	

Note: a) Certificate from the Employers to be attached

b) Non-disclosure of any information in the Schedule will result in disqualification of the firm.

_____

Date: **Signature of applicant**

including title and capacity in which application is made.

FORM – v

FINANCIAL CAPACITY OF BIDDER

(On the letterhead of a Chartered Accountant)

Dated: [●]

Certificate of Financial Capacity

I/ We certify that M/s _____ , which is a company within the meaning of the Companies Act, 2013/ a registered partnership firm within the meaning of Partnership Act, 1932/ a limited liability partnership within the meaning of Limited Liability Partnership Act, 2008/ an individual carrying on business under the name and style of M/s ....., as per its audited books of accounts, has the following turnover in the last three financial years:

Financial Year	Turn Over
2017-2018	
2016-2017	
2015-2016	

I/ We further certify that the said turnover have been calculated as per standard practice.

I/ We further certify that the bidder has a positive net worth, as on the date of submission of the bid.

Name of Chartered Accountant:
Seal of Chartered Accountant:

[Signature]
[Name of Chartered Accountant]
{Registration No.]

FORM –VI

FINANCIAL SITUATION

Each bidder must fill in this form

		Financial Data		
		Year 1 (2015-2016)	Year 2 (2016-2017)	Year 3 (2017-2018)
		Information from Balance Sheet		
1.	Total Assets			
2.	Total Liabilities (secured loans, unsecured loans and current liabilities)			
3.	Misc. expenditure to the extent not written off			
4.	**Net worth (1-2—3)**			
A.	**Investments**[1]			
B.	**Current Assets**			
i.	Inventories			
ii.	Sundry debtors			
iii.	Cash & Bank and other current assets[2]			
iv.	Loans & Advances[3]			
	Total Current Assets			
C.	**Current liabilities and provisions**			
i.	Current liabilities and provisions			
ii.	Provisions			
iii.	Unsecured loans[4]			
	Total Current liabilities and provisions			
		Information from Income Statement		
	Total Revenue			
	Profit before taxes			
	Profits after taxes			

1.		Investments shall include only those investments which are unencumbered as certified by the Statutory Auditor.
2.		Cash & Bank and other current assets will not include margin money deposit, earnest money deposit, retention money, money lying in any escrow account, unbilled revenue.
3.		Loans and advances shall not include tax deducted at source and advance tax, deposits lying with statutory authorities or deposits lying under any judicial order.
4.		Amounts repayable within one year shall be included.
		Attached are copies of financial statements (balance sheets including all related notes and income statements) for the financial years as indicated above, complying with the following conditions.
		All such documents reflect the financial situation of the

		bidder
i)		Historical statements must be audited by a certified accountant
ii)		Historical statements must be complete, including all notes to the Financial Statements.
iii)		Historical financial statements must correspond to accounting periods already completed and audited (no statements for partial periods shall be requested or accepted).

FORM – VII

EQUIPMENT (In favour of owner / lessee)

(Original document of own possession and / or arranged through lease deed to be annexed)
(If already engaged anticipated date of release of such machineries to be annexed with an undertaking)

Name of Machine / Instrument	Make	Type	Capacity	Motor / Engine No.	Machine No.	Owned/ leased/ on hire	Possession Status		Date of release if Engaged
							Idle	Engaged	
1	2	3	4	5	6	7	8	9	10

For each item of equipment the application should attach copies of

(i) Document showing proof of full payment
(ii) Receipt of Delivery
(iii) Road Challan from Factory to delivery spot is to be furnished.

For.....(name of bidder)
(Signature)
.....(name of authorized signatory)
.....(designation)

FORM – VIII

PERFORMANCE SECURITY BANK GUARANTEE

In consideration of the Employer having agreed under the terms and conditions of contract made vide his Notification of Award No.--------dated ------ between West Bengal Medical Services Corporation Ltd. (WBMSCL) (the Employer) represented by its Managing Director and _____(hereinafter called "the said Contractor) of the tender for **Construction of integrated AYUSH hospital at Paschim Medinipur** (herein after called the said Agreement") the Contractor having agreed to production of a irrevocable Bank Guarantee for Rs. ---------- (Rupees ---------- Only) as a Security/Guarantee for compliance of his obligations in accordance with the terms and conditions in the said Agreement:

1. We ---------- (indicate the name of the Bank) (hereinafter referred to as "the Bank" hereby undertake to pay to the WEST BENGAL MEDICAL SERVICES CORPORATION LTD., an amount not exceeding Rs. ---------- (Rupees ----------only) on demand by WBMSCL.
2. We ----------(indicate the name of the Bank) do hereby undertake to pay the amounts due and payable under this Guarantee without any demur, merely on a demand from WBMSCL for and on behalf of the Employer as an Agent/Power of Attorney Holder stating that the amount claimed is required to meet the recoveries due or likely to be due from the said Contractor. Any such demand made on the Bank shall be conclusive as regards the amount due and payable by the Bank under this Guarantee. However, our liability under this Guarantee shall be restricted to an amount not exceeding Rs .---------- (Rupees ----------only).
3. We, the said Bank further under take to pay to the Employer represented by WBMSCL for and on behalf of the Employer as an Agent/Power of Attorney Holder any money so demanded notwithstanding any dispute or disputes raised by the Contractor in any suit or proceeding pending before any court or Tribunal relating thereto, our liabilities under this present being absolute and unequivocal. The payment so made by us under this Guarantee shall be a valid discharge of our liability for payment thereunder and the Contractor shall have no claim against us for making such payment.
4. We ---------- (Indicate the name of the Bank) further agree that the Guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said Agreement and that it shall continue to be enforceable till all dues of the Employer under or by virtue of the said Agreement have been fully paid and its claims satisfied or discharged or till the Employer's Representative on behalf of the Employer certifies that the terms and conditions of the said Agreement have been fully and properly carried out by the said Contractor and accordingly discharges this Guarantee.

5. We ---------- (indicate the name of the Bank) further agree with the Employer, that the Employer shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said Agreement or to extend time of performance by the said Contractor from time to time or to postpone for any time or from time to time any of the powers exercisable by the Employer against the said Contractor(s) and to forbear from or enforce any of the terms and conditions relating to the said Agreement and we shall not be relieved from our liability by reason of any such variation, or extension being granted to the said Contractor or for any forbearance, act of omission on the part of the Employer or any indulgence by the Employer to the said Contractor or by any such matter or thing whatsoever which under the law relating to sureties would, but for this provision, have effect of so relieving us.

6. This Guarantee will not be discharged due to the change in the constitution of the Bank or the Contractor.

7. This Guarantee will neither be cancelled nor revoked by the Bank without the written authorization of WBMSCL. For this purpose, the beneficiary WBMSCL would inform the Bank of their authorized signatories together with the specimen signatures.

8. This Guarantee shall be valid up to ----------unless extended on demand by the Employer. Notwithstanding anything mentioned above, our liability against this guarantee is restricted to Rs.---------- (Rupees ---------- Only) and unless a claim in writing is lodged with us within six months of the date of expiry or the extended date of expiry of this Guarantee, all our liabilities under this Guarantee shall stand discharged.

Dated the ---------- day of ---------- for ---------- (indicate the name of the Bank).

Note : To be put in sealed cover by Bank and addressed to the concerned officer of WBMSCL.

[Print out in Agency's Letter head & upload the filled proforma with digitally signed as stated below]

DECLARATION BY THE TENDERER

I/We have inspected the site of work and have made myself/ourselves fully acquainted with local conditions in and around the site of work. I /We have carefully gone through the Notice Inviting Tender and other tender documents mentioned therein along with the drawing attached. I/We have also carefully gone through the 'Priced schedule of Probable Items and Quantities'.

My/Our tender is offered taking due consideration of all factors regarding the local site conditions stated in this Detailed Notice Inviting Tender to complete the proposed work referred to above in all respects.

I/We promise to abide by all the stipulations of the contract documents and carry out and complete the work to the satisfaction of the department.

I/We declare that I/We in the capacity of individual/ as a partner of a firm not debarred in the last financial year.

I/We also agree to procure tools, plants and others as per requirement, at my/our cost required for the work.

Signature of Tenderer

Date :

Postal address of the Tenderer

Name of the Firm with Seal

SECTION – C

C. 1. Definitions

In these Conditions, the following words and expressions shall have the meanings stated. Words indicating persons or parties include corporations and other legal entities, except where the context requires otherwise.

1.1 **"Consignor"** shall refer to all the hospitals/ facilities details of which are listed in Package -1 to Package-12 of the Tender Documents.

1.2 **"Contract"** means the these Conditions, the Price Schedules, the Notice inviting e-Tender and the Instructions to Bidders and the further documents (if any) which are listed in the Contract.

1.3 **"Contractor"** shall refer to the Selected Bidder(s).

1.4 **"Contract Price"** shall unless indicated otherwise, refer to the total sum being paid by the Corporation to the Contractor in consideration of the carrying out the civil construction works for all the hospitals comprising the package over which the Contractor has been awarded the Contract and includes adjustments (if any) in accordance with the Contract.

1.5 **"Corporation"** means West Bengal Medical Services Corporation Limited.

1.6 **"Project/ Works"** shall unless otherwise indicated, mean carrying out the civil construction works in respect of all the hospitals comprising the package over which the Contractor has been awarded the Contract and which is being undertaken by the Selected Bidder/ Contractor.

C. 2. Definition of "Engineer-in-Charge" and commencement of work:

The word "Engineer-in-Charge" means the Engineer who will be nominated by WBMSCL for the Works. The word "approved" appearing anywhere in the documents means

approved by the Engineer-in-Charge. The Works will have to be taken up within specified time as mentioned in the Work Order. Failure to do so will constitute a violation of the contract stipulation as regards to proportionate progress and timely completion of work and the Contractor will thereby make himself liable to pay compensation or other penal action as per stipulation.

C. 3. **Terms & Conditions in extended period:**

When an extension of time for completion of work is granted for valid reasons over which the Contractor have no control, it will be taken as granted by the Contractor that the validity of the Contract is extended automatically up to the extended period with all terms and conditions, rates etc. remaining unaltered, i.e., the tender is revalidated up to the extended period.

C. 4. **Co-operation with other agencies and damages and safety of road users:**

All Works are to be carried out in close co-operation with the local hospital authority and other contract(s) that may be working in the area of work. The Works should also be carried out with due regard to the convenience of the road users and occupants of the adjacent locality, *if any*. All arrangements and programme of work must be adjusted accordingly. All precautions must be taken to guard against chances of injury or accidents to workers, road users, occupants of the adjacent locality etc. The Contractor must see that all damages to any property which, in the opinion of the Engineer-in-Charge are due to the negligence of the Contractor are promptly rectified by the Contractor at his/ its own cost and expenses and according to the direction and satisfaction of the Engineer-in-Charge.

C. 5. **Transportation arrangement:**

The Contractor will arrange for all means of transport including railways wagons required for carriage and supply of materials and also the materials required for the construction work. The Corporation may however, at their own discretion grant necessary certificates, *if required*, for booking of railways wagons etc. But, in case of failure of the Corporation to help the Contractor in this respect, the Contractor will have to arrange at his own initiative so that progress of work is not hampered and no claim whatsoever on this ground will be entertained under any circumstances. If railways facilities are not available, the Contractor will have to depend on transport of materials by road as necessary to complete the work without claiming any extra payment from the Corporation in this regard.

C. 6. **Contractor's Site Office:**

The Contractor will have to set up an office adjacent to the Works as may be approved by the Engineer-in-Charge where all directions and notice of any kind whatsoever, which the Engineer-in-Charge or his representative may desire to give to the Contractor in connection with the Contract, may be left or sent by post to such office or delivered to the Contractor's authorised agent or representative. For such intimation to the Contractor's site office, it will be deemed to be sufficient enough to be served upon the Contractor.

C. 7. **Incidental and other charges:**

The cost of all materials, hire charges of tools and plants, labour, municipal charges for water supply, Royalty or road materials (*if any*), electricity and other charges of Municipalities or statutory local bodies, ferry charges, toll charges, loading and unloading charges, handling chargers, overhead charges etc. will be deemed to have been covered by the rates quoted by the Contractor inclusive of all taxes, all other charges for the execution of the specified works, including supply of materials and related carriage, complete or finished in all respect up to the entire satisfaction of the Engineer-in-charge of the Works. No extra claim in this regard beyond the specified rate as per Price Schedule in this respect will be entertained.

C. 8. **Authorised Representative of Contractor:**

The Contractor should not assign the Contract or sublet any portion of the Works. The Contractor, may however, appoint and authorise representatives in respect of one or more of the following purposes only.

C. 8.1. General day to day management of work.

C. 8.2. To attend measurements when taken by the officers of the Corporation and sign the records of such measurements which will be taken as accepted by the Contractor.

The selection of the authorised representatives will be subject to the prior approval of the Engineer-in-Charge concerned and the Contractor will in writing seek such approval of the Engineer-in-Charge giving therein the name of work, Tender No., the Name, Address and the attested specimen signature of the representative he/it wants to appoint and the specific purposes as specified here-in-above, which the representative will be authorised for. Even after first approval, the Engineer-in-Charge may issue at any subsequent date, revised directions about such authorised representatives and the Contractor will be bound to abide

by such directions. The Engineer-in-Charge will not be bound to assign any reason for his revised directions. Any notice correspondence etc. issued to the authorised representative or left at his address, will be deemed to have been issued to the Contractor.

C. 9. **Power of Attorney:**

Provision of acting through Power of Attorney, *if any*, during execution of the Works, shall be subject to the approval of the Corporation. Otherwise, the Corporation will not be bound to take cognizance of such of Attorney.

C. 10. **Extension of time:**

For cogent reasons over which the Contractor will have no control and which will retard the progress, extension of time for the period lost may be granted, under exceptional circumstances, on receipt of application from the Contractor before the time of completion of Contract. No claim whatsoever for idle labour, additional establishment, enhanced cost of materials and labour and hire charges of tools and plants etc. will be entertained under any circumstances. Applications for such extension of time should be submitted by the Contractor well in advance of the expiry of scheduled time of completion of the Works.

C. 11. **Contractor's Godown:**

The Contractor must provide suitable godowns for cement and other materials at the sites. The cement godown should be sufficient in capacity and it must be water tight with either an elevated floor with proper ventilation arrangement underneath the floor or if solid raised flooring is made, cement is to be stored on bamboo or timber dunnage to the satisfaction of the Engineer-in-Charge. No separate payment will be made for these godowns or for the store yard. Any cement, which is found at the time of use to have been damaged, shall be rejected and must immediately be removed from the site by the Contractor as per directions of the Engineer-in-Charge.

C. 12. **Arrangement of Land:**

The Contractor will arrange land for installation of his Plants and Machineries, his godown, store yard, labour camp etc. at his own cost for the execution of the Works. Land, if available and if applied for, may be spared for the purpose on usual charges, if any, as fixed by the Competent Authority.

C. 13. **Use of Government Land:**

Before using any space in Government land for any purpose whatsoever, approval of the Engineer-in-Charge will be required. Land, if available and if applied for, may be spared for the purpose on usual charges as fixed by the Competent Authority. The Contractor will have to make his own arrangements for storage of tools, plants, equipment, materials etc. of adequate capacity and will clear and remove on completion of work and will also remove the shed, huts etc. which he/it might have erected in Government land. If after such use, the Contractor fails to clear the land, the Corporation through the Department of Health & Family Welfare (DoHFW) or by itself, will arrange to remove those installations and adequate recovery will be made from the dues of the Contractor.

C. 14. **Work Order Book:**

The Contractor will within 7 (*seven*) days of receipt of the order to take up the work, supply at his own cost one Work Order Book to Site-in-charge of WBMSCL, who is authorised to receive and keep in custody the Work Order Book on behalf of the Engineer-in-Charge. The Work Order Book should have machine numbered pages in triplicate. Directions or instructions from the officers of the Corporation to be issued to the Contractor will be entered (*in triplicate*) in the Work Order Book (*except when such directions or instructions are given by separate letters*). The Contractor or his authorised representatives should regularly note the entries made in the Work Order Book and also record thereon the actions taken or being taken by him for complying the said directions or instructions on any relevant points relating to the work. The Contractor or his/ its authorised representative may take away the triplicate pages of the Work Order Book for his own record and guidance.

Cases of supplementary items or of claims may not be entertained unless supported by entries in the Work Order Book or any written order from the Corporation.

The first page of the Work Order Book shall contain the following particulars:

C. 14.1. Name of the Work;

C. 14.2. Reference to contract number;

C. 14.3. Contractual rate in percentage;

C. 14.4. Date of opening of the Work Order Book;

C. 14.5. Name and address of the Contractor;

C. 14.6. Signature of the Contractor;

C. 14.7. Name & address of the Authorized representative (*if any*);

C. 14.8. Specific purpose for which the contractor's representatives is authorized to act on behalf of the Contractor;

C. 14.9. Signature of the authorized representative duly attested by the Contractor;

C. 14.10. Signature of the Site-in-charge of WBMSCL;

C. 14.11. Date of actual completion of work;

C. 14.12. Date of recording final measurement;

Entries in C. 14.11. & C. 14.12. above shall be filled in on completion of the work and before the Work Order Book is recorded in the office of the Site-in-charge of WBMSCL.

C. 15. **Clearing of Materials:**

Before starting any work, work site, wherever necessary, must be properly dressed after cutting clearing of all varieties of jungles, shrubs, bamboo clusters or any undesirable vegetation from the alignment or site of Works. On completion of Works, all temporary structures or obstructions including extra pipes in underground works, *if any*, must also be removed. All scars of construction should be obliterated and the whole site should be left in a clear and neat manner to the satisfaction of the Engineer-in-Charge. Total length (*in case of road project*) should be demarcated by proper chainaging with fixing 200 m post as per direction of the Engineer-in-Charge on both sides of the alignment and Bench Marking at desired locations as per direction of the Engineer-in-Charge. No separate payment will be made for all these works, the cost thereof being deemed to have been included in the rates of various items of works quoted by the Contractor in the Price Schedule.

C. 16. **Sundry Materials:**

The Contractor must erect temporary pillars, master pillars etc. as may be required in suitable places as directed by the Engineer-in-Charge at his/ its own cost before starting and during the work by which the departmental staff will check levels layout of different works and fix up alignment and the Contractor will have to maintain and protect the same till completion of the work. All machineries and equipments like Level Machine, Staff, Theodolite etc. and other sundry material like pegs, strings, nails, flakes instruments etc. and also skilled labour required for setting out the levels, for laying out difference

structures and alignment will also have to be supplied by the Contractor at his/ its own cost as per direction of the Engineer-in-Charge without any extra claim.

C. 17. **Supplementary / Additional items of Works:**

C. 17.1. Rates of Supplementary Item(s) will be analysed in the 1st instant as far as possible from the rates of the allied items of works appearing in the tender schedule.

C. 17.2. Rates of Supplementary Item(s) will be analysed to the maximum extent possible from the rates of allied items of works appearing in the Public Works Department Schedule of Rates (for Building / Sanitary & Plumbing Works) of probable items of work forming part of the Tender Document. SOR for the working area at the time of floating of NIeT will be applicable.

C. 17.3. In Case, additional items do not appear in the above Public Works Department Schedule of Rates, such items for the works will be paid at the rates entered in the Public Works (Roads) Department Schedule of Rates for the working area at the time of issue of NIeT.

C. 17.4. It the Supplementary Item(s) cannot be computed even after application of clauses stated above, rates of supplementary item(s) will be analysed to the maximum extent possible from the rates of allied items of works appearing in the current PWD Schedule of Rates (for Building / Sanitary & Plumbing / Road Works) of probable items of work for the work area at the time of execution of work.

C. 17.5. If the rates of the Supplementary Item(s) cannot be computed even after application of clauses stated above, the same will be determined by analysis from market rates of material, labour and carriage cost prevailing at the time of execution of such items of work. Profit and overhead charges (*both together*) at10% (*ten percent*) will be allowed only. In that case the contractual percentage will not be applicable.

Contractual percentage shall only be applicable with regard to the portions of the analysis based on PWD Schedule of Rates as mentioned in Clauses C. 17.1., C. 17.2., C. 17.3 & C. 17.4. stated above only.

It may be noted that the cases of supplementary items of claim will not be entertained unless supported by entries in the Work Order Book or any written order from the

Corporation.

C. 18. **Covered up works:**

When one item of work is to be covered up by another item of work the later item should not be done before the former item has been measured up and has been inspected by the Site-in-charge, as the authorized representative of the Engineer-in-Charge and order given by him for proceeding with the later item of work.

C. 19. **Approval of Sample:**

Samples of all materials to be supplied by the contractor and to be used in the work will have to be approved by the Engineer-in-Charge and checking the quality of such materials will have to be done if deems necessary by the Engineer-in-Charge prior to utilization in the work.

C. 20. **Water and Energy:**

The Contractor will have to arrange at his own cost, required energy for operation of equipments and machineries, for operating pump set, illuminating work site, office, etc. that may be necessary in difference stages of execution of work. No facility of any sort will be provided for utilization of the departmental sources of energy existing at the site of work. Arrangement for obtaining water for the work should also be made by the Contractor at his own cost. All cost for getting energy and / or for any purpose whatsoever will have to be borne by the contractor for which no claim will be entertained.

All materials, tools and plants and all labour (*skilled and unskilled*) including their housing, water supply, sanitation, light, procurement of food for contractors staff & crews, medical aids etc. are to be arranged for by the Contractor at his own cost. The cost for transportation of labour, materials and all other incidental items as required for work shall also have to be borne by the Contractor without any extra claim.

C. 21. **Road open to traffic:**

It should be clearly understood that the Contractor will be responsible to keep the road open to all kinds of traffic during execution of the work. The work should be so arranged and the programme of work must be so adjusted as not to disturb the smooth flow of road traffic in any way. If necessary, diversion road should be provided and maintained by the Contractor at his/ its own cost for the entire period of work. The Contractor should take all necessary precautions including guarding, lighting and barricading as necessary, to guard against the chances of injury or accident to the road user and traffic and ferry users during

execution of the work for which nothing extra will be paid except otherwise mentioned in the specific Price Schedule. The Contractor will also have to indemnify WBMSCL against consequences of any such injury or accident, if so happens and which, as per opinion of the Engineer-in-Charge is attributable to the Contractor.

Suitable road signs, as and where necessary, should be provided by the Contractor at his/ its own cost as per direction of the Engineer-in-Charge and will also be maintained till the completion of the work. Road barriers, with red light at night, are to be placed where the existing surface is disturbed with proper road signs. All these should be done at the cost of the Contractor without any extra claim.

C. 22. **Drawings:**

All works should be carried out in conformity with the approved Drawings .The Contractor will have to carry out all the works according to the General Arrangement Drawing and Detail Working Drawings if any supplied and approved from time-to-time.

C. 23. **Serviceable Materials:**

The responsibility for stacking the serviceable materials (*as per decision of the Engineer-in-Charge*) obtained during dismantling of existing structures/roads and handing over the same to the Site-in-Charge of work of Corporation lies with the Contractor and nothing will be paid on this account. In case of any loss or damage of serviceable materials prior to handing over the same, full value will be recovered from the Contractor's bill at rates as will be assessed by the Engineer-in-Charge.

C. 24. **Unserviceable Materials:**

The Contractor will have to remove all unserviceable materials, obtained during execution at a place as will be directed. The Contractor should dress and clear the work site after completion of work as per direction of the Engineer-in-Charge. No extra payment will be made on this account.

C. 25. **Contractor's risk for loss or damage:**

All risk on account of railway or road carriage or carriage by boat including loss or damage of vehicles, boats, barges, materials or labour, *if any*, will have to be borne by the Contractor without any extra claim from the DoHFW.

C. 26. **Idle labour & additional cost:**

Whatever may be the reason, no claim on idle labour, enhancement of labour rate

additional establishment cost, cost of toll and hire and labour charges of tools and plants, railway freight etc. will be entertained under any circumstances.

C. 27. **Charges and fees payable by Contractor:**

C. 27.1. The Contractor will have to pay all fees required to be given or paid by any statute or any regulation or bye-law of any local or other statutory authority which may be applicable to the Works.

C. 27.2. The Contractor will, if asked for, save and indemnify WBMSCL from and against all claims, demands, suit and proceedings for or on account of infringement of any patent, rights, design, trade mark of name of other protected right in respect of any constructional plant, machine, work, materials, thing or process used for or in connection with works or temporary works or any of them.

C. 28. **Issue of Departmental Tools and Plants:**

All Tools and Plants required for the work will have to be supplied by the Contractor at his own cost. All cost of fuel and stores for proper running of the Tools and Plants shall also be borne by the Contractor.

C. 29. **Compliance of different Acts:**

The Contractor shall comply with the provisions of the Apprentices Act, 1961, Minimum Wages Act, 1848. Contact Labour (Regulation and Abolition) Act 1970 and the rules and orders issued hereunder from time to time. If he fails to do so, Engineer-in-Charge may at his discretions, take necessary measure over the contract.

The Contractor shall also make himself responsible for any pecuniary liabilities arising out on account of any violation of the provision of the said Act(s). The Contractor must obtain necessary certificate and license from the concerned Registering Office under the Contract Labour (Regulation & Abolition) Act, 1970.

The Contractor will be required to obtain valid Registration Certificate & Labour License from respective Regional Labour Offices where construction work by them are proposed to be carried out under Section 7 of Building & Other Construction Workers' (Regulation of Employment & Conditions of Service) Act, 1996 and Section 12 of Contract Labour (Regulation & Abolition) Act, 1970. The Contractor will be required to observe the following conditions strictly:

(i) Employees' Provident Fund and Miscellaneous Provisions Act, 1952 and Employees State Insurance Act, 1948 should be strictly adhered to wherever such Acts become applicable.

(ii) Minimum wages to the workers shall be paid according to the rates notified and/ or revised by the Government of West Bengal from time-to-time under the Minimum Wages Act, 1948 in respect of scheduled employments, within the specified time as per law.

(iii) Payment of bonus, wherever applicable, has to be made.

(iv) Adequate safety and welfare measures must be provided as per the provisions of the Building and Other Construction Workers (Regulation of Employment & Conditions of Service) Act, 1996 read with West Bengal Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Rules, 2004.

(v) All liabilities arising out of engagement of workers are to be duly met before submission of bills for payment.

If there is any failure in compliance of the applicable labour laws during execution of the Works, it will render the Selected Bidder(s) ineligible for carrying out the Works and the contract may be terminated in accordance with the provisions of the STC.

The Contractor shall be bound to furnish the Engineer-in-Charge all the returns, particulars or date as are called for from time-to-time in connection with implementation of the provisions of the above Acts and Rules and timely submission of the same, failing which the contractor will be liable for breach of contract and the Engineer-in-Charge may at his discretion take necessary measures over the Contract.

C. 30. **Safety, Security and Protection of the Environment:**

The Contractor shall, throughout the execution and completion of the Works and the remedying of any defects therein:

C. 30.1. have full regard for the safety of all persons and the Works.

C. 30.2. provide and maintain at his own cost all lights, guards, fencing, warning signs and watching, when and where necessary or required by the Engineer-in-Charge for the protection of the Works or for the safety and convenience of the public or others;

C. 30.3. take all reasonable steps to protect the environment on and off the site(s) and

to avoid damage or nuisance to persons or to property of the public or others resulting from pollution, noise or other causes arising as a consequence of his/ its methods of operation;

C. 30.4. ensure that all lights provided by the Contractor shall be screened so as not to interfere with any signal light of the railways or with any traffic or signal lights of any local or other authority.

C. 31. **Commencement of work:**

The work must be taken up within the date as stipulated in the Work Order and completed in all respects within the period specified in Notice Inviting e-Tender.

C. 32. **Programme of work:**

Before actual commencement of work, the Contractor shall submit a programme of construction of work with methodology clearly showing the required materials, men and equipment. The Contractor will submit a programme of construction in the pattern of Bar Chart or Critical Path Method and a time table divided into four equal periods of progress of work to complete the work within the specific period for approval of the Engineer-in-Charge who reserves the right to make addition, alterations and substitutions to such programme in consultation with the Contractor and such approved programme shall be adhered to by the Contractor unless the same is subsequently found impracticable in part or full in the opinion of the Engineer-in-Charge and is modified by him/her. The Contractor must pray in writing, showing sufficient reasons therein for modification of programme.

C. 33. **Setting out of the work:**

The Contractor shall be responsible for the true and perfect setting out of the work and for the correctness of the position, levels, dimensions and alignments of all parts of work, if any rectification or adjustment becomes necessary, the Contractor shall have to do the same at hi/ itss own cost according to the direction of the Engineer-in-Charge. During progress of Works, if any, defect appears or arises in respect of position, level, dimensions or alignment of any part of the Works, the Contractor shall at his/ its own cost rectify such defects to the satisfaction of the Engineer-in-Charge. Any setting out that may be done or checked by either of them shall not in any way relieve the Contractor from their responsibility for correctness and rectification thereof.

C. 34. **Precautions during Works:**

The Contractor shall carefully execute the work without disturbing or damaging underground or overhead service utilities viz. electricity, telephones, gas pipelines, water pipes, sewers etc. In case disturbances of service utilities is found unavoidable the matter should immediately be brought to the notice of the Engineer-in-Charge and necessary precautionary measures as would be directed by the Engineer-in-Charge shall be carried out at the cost and expenses of the Contractor. If the service utilities are damaged or disturbed in any way by the Contractor during execution of the Works, the cost of rectification or restoration of damages as would be fixed by the Engineer-in-Charge concerned will be recovered from the Contractor.

C. 35. **Testing of qualities of materials & workmanship:**

All materials and workmanship shall be in accordance with the specifications laid down in the relevant Schedule of Rates for Building Works (Volume - I) and Sanitary & Plumbing Works (Volume - II) and relevant IS / IRC codes and the Engineer-in-Charge reserves the right to test, examine and measure the materials / workmanship direct at the place of manufacture, fabrication or at the site of works or any suitable place. The Contractor shall provide such assistance, instrument, machine, labour and materials as the Engineer-in-Charge may require for examining, measuring and testing the works and quality, weight or quantity of materials used and shall supply samples for testing as may be selected and required by the Engineer-in-Charge without any extra cost. Besides this, he will carry out tests from outside Government Laboratory as per instruction of Engineer-in-Charge. The cost of all such tests will have to be borne by the Contractor at actuals.

C. 36. **Site Condition:**

The Contractor shall continue and complete the Works within the time as stipulated in this tender without dislocation of normal traffic during day as well as to night. The execution of the Works should be planned and phased so that there are no undue hazards to the movement of normal traffic over the road. No additional payment will be entertained on this account.

Difficulties and inconveniences in transporting materials over the bad roads, kutcha roads, incomplete roads and over the weak and damaged culverts should be taken into consideration by the Contractor. The materials for the work may be required to carry over kutcha roads. These approach roads should be maintained by the Contractor at his/ its

own cost.

Difficulties in collection of different materials in lot, over the road flank due to insufficient space if there be any, shall be noted by the Contractor. No extra rate or extra time will be allowed on these accounts. Regarding security of the materials, no claim of the Contractor will be entertained under any circumstances.

C. 37. **Preliminaries:**

During execution of the Works, Contractor will remain responsible for providing reasonable facilities to traffic on the road and also lighting and guarding of the road during night for its safety while the work is in progress and no extra rate will be paid on this account before taking up the work.

Approximately half of the road width including one flank should be kept clear to the traffic from all obstructions and the surface should be properly cleaned and leveled as far as possible.

Sign Boards / Direction Boards are to be erected at required points of specified size indicating in red letters on a white background as per direction of the Engineer-in-Charge, cost of which will have to be borne by the Contractor.

Road barriers should be placed wherever the existing road surface is disturbed with proper road signs. During night, these should be provided with light, Night Guard / "Chowkidar" for watching the barrier etc. should also be maintained by the Contractor to give due warning to road users, specially at night.

C. 38. **Specification for Building, Sanitary & Plumbing Works & Ancillary Works and Quality Control Tests:**

All works and all quality control tests should conform to specifications mentioned in the BOQ/Price Schedule and in the NIeT and in the relevant "Schedule of Rates, Building, Sanitary & Plumbing Works of PWD, Government of West Bengal read with relevant Corrigenda and Addenda". Where the above BOQ, NIeT & SOR is silent about specification or quality control tests of any particular item of work, the same should conform to the specifications and quality control test laid down in the relevant, "Schedule of Rates of Road & Bridge Works PWD, Government of West Bengal read with relevant Corrigenda & Addenda / relevant IS / IRC Codes of practice."

C. 39. **Timely completion of Works:**

All supply and works must have to be completed in all respects within the time specified in Notice Inviting e-Tender from the date of commencement as mentioned in Work Order. Time for completion as specified in the tender shall be deemed to be the essence of the Contract.

C. 40. **Procurement of materials:**

All materials required to complete execution of the work will have to be supplied by the contractor after procurement from authorised and approved source.

C. 41. **Rejection of materials:**

All materials brought to the site must be approved by the Site-in-Charge. Rejected materials must be removed by the Contractor from the site within 24 hours from the issue of order to that effect. In case of non-compliance of such order, the Engineer-in-Charge will have the authority to cause such removal at the cost and expense of the Contractor and the Contractor will not be entitled to claim for any loss or damage on that account.

C. 42. **Implied elements of work in items:**

Except of such items as are included in the Price Schedule of probable items and approximate quantities no separate charges will be paid for traffic control measures, shoring, shuttering, de-watering, curing etc. and the rates of respective items or works are deemed to be inclusive of the same.

C. 43. **Damaged cement:**

Any cement lying at the Contractor's custody, which is found at the time of use to have been damaged, will be rejected and must immediately be removed from the site by the Contractor or disposed of as directed by the Engineer-in-Charge at the costs and expenses of the Contractor.

C. 44. **Issue of Departmental Materials:**

Departmental materials will not be issued under any

circumstances.

C. 45. **Forced Closure:**

In case of forced closure or abandonment of the works by the Corporation, the Contractor will be eligible to be paid for the finished works and reimbursement of expenses actually incurred but not for any losses.

C. 46. **Tender Rate:**

The Contractor should note that the tender is strictly based on the rates quoted by the Contractor on the estimated amount put to tender of probable item of work. The quantities for various other items of works as shown in the priced schedule of probable items of works are based on the drawings and designs prepared by the Corporation. If variations become necessary due to design consideration and as per actual site conditions, those will have to be done by the Contractor at the time of execution at the rate prescribed in the tender. No conditional rate will be allowed in any case.

C. 47. **Delay due to modification of drawing and design:**

The Contractor will not be entitled for any compensation for any loss due to delay arising out of modification of the drawings, addition & alterations of specifications, delay in issuance of drawings, etc.

C. 48. **Additional Conditions:**

A few additional conditions under special terms and conditions:

C. 48.1. Display board (*Informatory*) of size 150 cm X 90 cm is to be provided at starting and end chain age of the work-site with aluminum plate hoisted on steel tubular pipe/ angle post to a height of 1.5 Meter at the cost of the contractor including fitting, fixing, painting, lettering etc. complete as per direction of the Engineer-in- Charge.

C.48.2 All materials required for the Works including bitumen (*all grade*), bitumen emulsion, cement & steel will have to be of specified grade and approved brand in conformity with relevant codes of practice (*latest revisions included*) and manufactured accordingly and will have to be procured and supplied by the Contractor(s) at his/its own cost inclusive of all rates and taxes. Authenticated evidence for purchase of bitumen, bitumen emulsion, cement and steel are to be submitted along with challan and Test Certificate. In the event further testing is directed by the Engineer-in-Charge, such testing from any Government approved/ Government Testing Laboratory will have to be conducted by the Contractor at his/ its own cost. VG 30 grade paving bitumen of I.O.C.L/ B.P.C.L/ H.P.C.L will be permitted as Straight run Bitumen. All steel materials to be used for the work should be SAIL/ TATA/ RINL unless

otherwise mentioned specifically in the Schedule of Works and cement to be used for the work should be of Ultratech / Ambuja / ACC. The Works shall conform to strength, quality and workmanship to the accepted standards of the relevant industry and specifically to PWD SOR as applicable to the state of West Bengal. Modifications of or additions to basic standard products of less size or capability to meet these requirements will not be acceptable.

C. 48.3. The Contractor is to display caution board maintaining I.S. / I.R.C. norms at his own cost as per direction of the Engineer-in-Charge.

C. 48.4. Deep excavation of trenches left out for days should be avoided.

C. 48.5. Labour Welfare CESS will be deducted @ 1% (*one percent*) of gross bill value as per rule, *if applicable*.

C. 48.6. The Works will have to be executed as per approved drawings available in this connection at the Contract Price

C. 48.7. Income Tax will be deducted from each bill of the Contractor as per applicable rate and rules in force.

C. 49. **Royalty:**

The Contractor will have to comply the relevant rules and regulations and laws of the land in this regard.

C. 50. **Night Work:**

The Contractor shall not ordinarily be allowed to execute the work at night. The Contractor may however, have to execute the work at night, if instructed by the Engineer-in-Charge, for true, technical or emergent reasons. In that case, the Contractor shall have to arrange for separate set of labour with sufficient and satisfactory lighting arrangement for the night work. No extra payment whatsoever in this respect will be made to the Contractor.

C. 51. **Working condition:**

During execution of work, contractor will remain responsible for providing unhindered passage to traffic on road adjacent to site, providing lighting and guarding arrangement during night for safety and no extra cost will be paid on this account.

It is to be noted that there will not be any electrical facility at work site. The Contractor

shall make its own arrangement for water, necessary power of lighting, welding, running of pumps etc. and no extra payment will be made on these accounts.

C.52. **Consequences of defacement or destruction:**

If the Contractor or his/ its workmen or servants or representatives break, deface, injure or destroy any part of the building, in which they may be working or any building, road, road kerbs, fence, enclosure, water pipes, cables, drains, electric or telephone posts or wires, trees, grass or grassland or cultivated ground contiguous to the site or which the Works or any part of it is being executed or if the Works get damaged from any cause whatsoever or any imperfections becoming apparent in it at any time whether during its execution or within the Defect Liability Period, the Contractor shall rectify at his/ its own expenses, or in default, the Engineer–in-Charge may cause the same to be rectified by other agencies and deduct the expenses (of which the certificate of the Engineer–in-Charge shall be final) from any sums whether under the Contract or otherwise, that may be then, or at any time thereafter become due to the Contractor by the Corporation, or from the Performance Security or the proceeds of the sale thereof, or of a sufficient portion thereof and if the cost, in the opinion of the Engineer–in-Charge (which opinion shall be final and conclusive against the Contractor), of making such damage or imperfection rectified shall exceed the amount of such Performance Security and or such sum, and the Corporation shall be entitled to recover the excess cost from the Contractor in accordance with the procedure prescribed by any law for the time being in force.

C.53 **Defect Liability Period:**

There will be a "Defect Liability Period" of 03 (*three*) years from the date of successful completion of the Works to the satisfaction of Engineer-in-Charge. The Contractor will have to execute the Works in such manner so that appropriate service level for the stipulated stretch(es)/ length of the approach road/ surface drain/ sewer line/ covered pathway under improvement is maintained during stipulated contractual period till expiry of the Defect Liability Period. If any defect/ damage is found during the period as mentioned above, the Contractor will rectify the same at his/ its own expense, or on default, the Engineer-in-Charge may cause the same to be rectified by any other agency and deduct the expenses (*of which the certificate of the Engineer-in-Charge shall be final*) from any sums that may be then, or at any time thereafter becomes due under the Contract or from the Performance Security, or of sufficient portion thereof.

C.54 **Terms and Mode of Payment:**

C.54.1 Payment shall be made subject to recoveries, if any, by way of liquidated damages or any other charges as per terms and conditions of contract in the following manner.

C.54.2 The Contractor shall not be entitled to any interest on payments under the Contract.

C.54.3 Where there is a statutory requirement for tax deduction at source, such deduction towards income tax and other taxes as applicable will be made from the bills payable to the Contractor at rates as notified from time to time.

C.54.4 The payment of bills of the Contractor shall be made by the Corporation in INR (Indian National Rupee) and the frequency of RA-Bill is to be counted once at least one-quarter of estimated amount of the respective package is executed at site.

C.54.5 While claiming payment, the Contractor is also to certify in the bill that the payment being claimed is strictly in terms of the Contract and all the obligations on the part of the Contractor for claiming that payment has been fulfilled as required under the Contract.

C.54.6 Provided that the Works shall not be deemed to have been completed unless the "final bill" in respect thereof shall have been passed and certificate for payment by the Engineer–in-Charge has been issued.

C.54.7 Provided further that the Engineer–in-Charge shall pass the "final bill" and certify thereon, within a period of 45 (forty five) days with effect from the date of submission thereof by the Contractor, the amount payable to the Contractor under this Contract and shall also issue a separate certificate of completion of work to the Contractor within the said period of 45 (forty five) days. The certificate of Engineer–in-Charge whether in respect of the amount payable to the Contractor against the "final bill" or in respect of completion of work shall be final and conclusive against the Contractor. However, the Performance Security of the Contractor held by the Corporation shall be refunded to the Contractor once the Defect Liability Period is over.

C.55 **Delay in the Contractor's performance:**

C.55.1 The Contractor shall perform the Works under the Contract within the time of completion as provided in the NIeT.

C.55.2 Subject to the provisions of 'Force Majeure', any unexcused delay by the Contractor in maintaining its contractual obligations towards execution of Works shall render the Contractor liable to any or all of the following sanctions:

(i) Imposition of Liquidated Damages,

(ii) Forfeiture of its Performance Security and

(iii) Termination of the Contract for default.

C.55.3 When the time of completion is extended due to unexcused delay by the Contractor, the amendment letter extending the time of completion shall, *inter alia*, contain the following conditions:

(a) The Corporation shall recover from the Contractor, Liquidated Damages on the unfinished Works, which the Contractor has failed to complete within the time of completion stipulated in the NIeT.

(b) That no increase in Contract Price on account of any ground, whatsoever, including any stipulation in the Contract for increase in price on any other ground and also including any enhancement of taxes or duties which may be levied in respect of the Works specified in the Contract, shall be admissible.

C.56. **Liquidated Damages:**

C.56.1If the Contractor fails to complete the Works within the time of completion, the Corporation shall, without prejudice to other rights and remedies available to the Corporation under the Contract, deduct from the Contract Price, as Liquidated Damages, a sum equivalent to 0.5% per week of delay or part thereof until the date of successful completion of the Works to the satisfaction of Engineer-in-Charge, subject to a maximum of 10% of the total Contract Price. Once the maximum delay has been committed by the Contractor, the Corporation may proceed for termination of the Contract, in accordance with the STC without prejudice to the Corporation's right to terminate the Contract even prior thereto for breach by the Contractor.

C.56.2 No Liquidated Damages shall be imposed on the Contractor by the Corporation, without giving a reasonable opportunity to the Contractor to explain the reason behind its delay.

C.57. **Termination for default:**

C.57.1 The Corporation, without prejudice to any other contractual rights and remedies available to it (the Corporation), may, by written notice of default sent to the Contractor, terminate the Contract in whole or in part, if the Contractor fails to complete the construction of the Works within the time of completion or fails to perform any other contractual obligation(s) within the time of completion specified in the Contract; or within any extension thereof granted by the Corporation, or there has been a material breach in any declaration by the Contractor, in terms of the Contract.

C.57.2 In the event, the Corporation terminates the Contract of the Contractor in whole or in part, the Corporation may undertake completion of the unfinished Works, in such terms and conditions and in such manner as it deems fit at the Contractor's risk and cost and the

Contractor shall be liable to the Corporation for the extra expenditure, if any, incurred by the Corporation for undertaking such construction.

C.57.3 Unless otherwise instructed by the Corporation, the Contractor shall continue to perform the Contract to the extent not terminated.

C.58 **Termination for insolvency:**

C.58.1 If the Contractor becomes bankrupt or otherwise insolvent, the Corporation reserves the right to terminate the Contract at any time, by serving written notice to the Contractor without any compensation, whatsoever, to the Contractor, subject to further condition that such termination will not prejudice or affect the rights and remedies which have accrued and / or will accrue thereafter to the Corporation.

C.59 **Force Majeure:**

C.59.1Notwithstanding the provisions contained in C.55, C.56 and C.57 above, the Contractor shall not be liable for imposition of any such sanction so long the delay and/or failure of the Contractor in fulfilling its obligations under the Contract is the result of an event of Force Majeure. For purposes of this clause, Force Majeure means an event beyond the control of the Contractor and not involving the Contractor's fault or negligence and which is not foreseeable and not brought about at the instance of, the party claiming to be affected by such event and which has caused the non -performance or delay in performance. Such events may include, but are not restricted to, acts of the Corporation either in its sovereign or contractual capacity, wars or revolutions, hostility, acts of public enemy, civil commotion, sabotage, fires, floods, explosions, epidemics, pestilence, quarantine restrictions, strikes excluding by its employees and lockouts excluding by its management.

C.59.2 If a Force Majeure situation arises, the Contractor shall promptly notify the Corporation in writing of such conditions and the cause thereof within 21 (twenty one) days of occurrence of such event. Unless otherwise directed by the Corporation in writing, the Contractor shall continue to perform its obligations under the Contract as far as reasonably practical, and shall seek all reasonable alternative means for performance not prevented by the Force Majeure event.

C.59.3 If the performance in whole or in part or any obligation under this contract is prevented or delayed by any reason of Force Majeure for a period exceeding 60 (sixty) days, either party may at its option terminate the Contract without any financial repercussion on either side.

C.59.4 In case due to a Force Majeure event, the Corporation is unable to fulfill its contractual commitment and responsibility, the Corporation will notify the Contractor accordingly and subsequent actions taken on similar lines described in above sub-clauses.

C.60. Indemnification:

The Contractor shall indemnify, defend and hold the Corporation, the Hospital and the Government harmless against any or all proceedings, actions and third party claims arising out of a breach by the Contractor of any of its obligations under this Contract. This indemnity shall be limited in respect of making harmless to the Corporation, the Hospital and the Government. The Contractor shall indemnify the Corporation, Hospital and/ or the Government against all actions, suits, claims and demands brought or made against it, in respect of anything done or committed to be done by the Contractor in execution of or in connection with the work of this Contract and against any loss or damage to the Corporation, Hospital and/ or the Government in consequence to any action or suit, or a legal proceeding, being brought against the Contractor for anything done or committed to be done in the execution of this Contract. The Contractor will abide by the job safety measures prevalent in India and will free the Corporation, Hospital and/ or the Government from all demands or responsibilities arising from accidents or loss of life, on account of the Contractor's negligence and responsibility. The Contractor will pay all indemnities arising from such incidents without any extra cost to the Corporation, Hospital and/ or the Government and will not hold the Corporation, Hospital and/ or the Government responsible or obligated. The Corporation, Hospital and/ or the Government may at their discretion and entirely at the cost of the Contractor defend such suit, either jointly with the Contractor or severally in case the latter chooses not to defend the case and /or proceeding.

C.61 Confidentiality:

C.61.1 The Corporation and the Contractor, its agents, employees and servants shall keep confidential and shall not, without the written consent of the other party hereto, divulge to any third party any documents, data, or other information furnished directly or indirectly by the other party hereto, in connection with the Contract, whether such information has been furnished prior to, during or following competition or termination of the Contract.

C.61.2 The Contractor shall not use such documents, data and other information received from the Corporation for any purpose unrelated to the Contract. Similarly, the

Contractor shall not use such documents, data and other information received from Contractor for any purpose other than the performance of the Contract.

C.61.3 The obligation of a party under the two foregoing paragraphs shall not apply to information that:

(a) Now or hereafter enters the public domains through no fault of that party;

(b) Can be proven to have been possessed by that party at time of disclosure and which was not previously obtained, directly, from the other party, or

(c) Otherwise lawfully becomes available to that party from a third party that has no obligation of confidentiality.

C.62 Dispute Resolution Mechanism :

Unless settled amicably, all disputes and differences shall be settled by the parties by arbitration. Unless otherwise agreed by both parties:

(a) the dispute shall be settled under the rules of arbitration of the Arbitration & Conciliation Act, 1996 (including any amendment(s) or re-enactments thereof),

(b) the dispute shall be settled by a sole Arbitrator to be appointed by the Principal Secretary, Department of Health & Family Welfare of the Government of West Bengal, India,

(c) the arbitration shall be conducted in accordance with the rules of the Arbitration & Conciliation Act, 1996 (including any amendment(s) or re-enactments thereof),

(d) the arbitration shall be held at Kolkata,

(e) Courts at Kolkata shall alone have jurisdiction (to the exclusion of all other Courts) to entertain all disputes arising out of this contract, and

(f) the arbitration shall be conducted in English.

C.63 Miscellaneous

C.63.1 Governing law and jurisdiction

This Contract shall be construed and interpreted in accordance with and governed by the laws of India, and the Courts at Kolkata shall have jurisdiction over matters arising out of or relating to this Contract.

C.63.2 Waiver of immunity

Each party unconditionally and irrevocably:

(i) agrees that the execution, delivery and performance by it of this Contract constitute commercial acts done and performed for commercial purpose;

(ii) agrees that, should any proceedings be brought against it or its assets, property or revenues in any jurisdiction in relation to this contract or any

transaction contemplated by this Contract, no immunity (whether by reason of sovereignty or otherwise) from such proceedings shall be claimed by or on behalf of the party with respect to its assets;

(iii) waives any right of immunity which it or its assets, property or revenues now has, may acquire in the future or which may be attributed to it in any jurisdiction; and

(iv) consents generally in respect of the enforcement of any judgment or award against it in any such proceedings to the giving of any relief or the issue of any process in any jurisdiction in connection with such proceedings (including the making, enforcement or execution against it or in respect of any assets, property or revenues whatsoever irrespective of their use or intended use of any order or judgment that may be made or given in connection therewith).

C.63.3 **Waiver**

Waiver, including partial or conditional waiver, by either party of any default by the other party in the observance and performance of any provision of or obligations under this Contract:-

(a) shall not operate or be construed as a waiver of any other or subsequent default hereof or of other provisions of or obligations under this Contract;

(b) shall not be effective unless it is in writing and executed by a duly authorised representative of the party; and

(c) shall not affect the validity or enforceability of this Contract in any manner.

Neither the failure by either party to insist on any occasion upon the performance of the terms, conditions and provisions of this Contract or any obligation there under nor time or other indulgence granted by a party to the other party shall be treated or deemed as waiver of such breach or acceptance of any variation or the relinquishment of any such right hereunder.

C.63.4 **Exclusion of implied warranties, etc.**

This Contract expressly excludes any warranty, condition or other undertaking implied at law or by custom or otherwise arising out of any other agreement between the parties or any representation by either party not contained in a binding legal agreement executed by both parties.

C.63.5 **Severability**

If for any reason whatever, any provision of this Contract is or becomes invalid, illegal or unenforceable or is declared by any court of competent jurisdiction or any other instrumentality to be invalid, illegal or unenforceable, the validity, legality or enforceability of the remaining provisions shall not be affected in any manner and the parties will negotiate in good faith with a view to agreeing to one or more provisions which may be substituted for such invalid, unenforceable or illegal provisions, as nearly as is practicable to such invalid, illegal or unenforceable provision. Failure to agree upon any such provisions shall not be subject to Dispute Resolution Mechanism set forth under this Contract or otherwise.

C.63.6 **Third Parties**

This Contract is intended solely for the benefit of the parties and their respective successors and permitted assigns, and nothing in this Contract shall be construed to create any duty to, standard of care with reference to, or any liability to, any person not a party to this Contract.

C.63.7 **Successors and Assigns**

This Contract shall be binding upon, and inure to the benefit of the parties and their respective successors and permitted assigns.

C.63.8 **Language**

All notices required to be given by one party to the other party and all other communications, documentation and proceedings which are in any way relevant to this Contract shall be in writing and in English language.

SECTION - D
SPECIAL CONDITIONS OF CONTRACT

1. In the event of tender being submitted by other than an individual proprietorship firm it must be signed by the member of the firm having Power of Attorney to do so. Any tender signed by a member, not holding a power of attorney shall be treated informal or non-responsive.
2. Before submission of tenders, the contractors shall inspect the sites of work, get themselves thoroughly acquainted with local conditions and difficulties under which the work will have to be carried out. They should consider among others, the nature of soil, climate conditions of locality, depth of water in the area of work, condition of existing Kutcha & Pucca road, transport etc.
3. Before submission of the tender, the bidder must see that the Memorandum of the printed tender form is properly filled in and all particulars given. The bidder must sign in the space allowed of the printed tender form and the declaration by the bidder (at the special terms and conditions and specifications). The signature must be properly witnessed in the space allotted for the purpose. The bidder, must also sign at the bottom of each page, of the printed tender form and other tender documents. Overwriting shall not be allowed. All corrections, additions, alternations etc. must be duly signed. Bid will be submitted only in English.
4. The bidder shall furnish a certificate to the effect that all the stipulations of the tender documents have been fully and clearly explained to him and understood by him.
5. All rates to be quoted by the contractors shall be inclusive of all incidental fees and charges e.g. Royalties, Octroi Tax of materials, Electricity, Water and other charges of Municipalities or statutory bodies, Sales Tax, Income Tax, Carriage costs, Import duties if any, etc. Nothing extra will be paid on any such account. No claim for labour, material or of any other kind other than that stipulated in the Bid Document would be entertained under any circumstances.
6. If any bidder withdraws his tender before its acceptance or refusal within a reasonable time viz. three weeks from date of opening of tender without giving any satisfactory explanation for such withdrawal he shall be disqualified for submitting any tender to this WBMSC for a minimum period of one year.

7. The successful bidder shall have to start the work at site within the stipulated date as mentioned in the work order. The contractor shall within seven days of the receipts of order to take up work and will supply at his own cost work order book to the authority concerned. The work order book shall be kept at the site of work under the custody of the WBMSC or his authorized representative. The work order book shall have machine numbered page in triplicate. Directions from WBMSC Officer to be issued to the contractor will be entered (in triplicate) in the work order book (except when such direction or instructions are given by separate letters). The contractor or his authorized representative shall regularly note the entries in the work order book and also record thereof the action taken or being taken by him complying with the site direction, instructions any relevant point relating to the work. The contractor or his representative may take away the duplicate page of the work order book for his own record. In case of supplementary items, claims may not be entertained unless supported by entries in the work order book or any written order.

The first page of the work order book shall contain the following particulars

a) Name of the work.

b) Reference to contract No.

c) Contractual rate.

d) Date of opening the order book.

e) Name & Address of the contractor.

f) Signature of the contractor.

g) Name and address of the authorized representative (if any) or the contractor authorized by him.

h) Specific purpose for which the contractor's representative is authorized to act on behalf of the contractor.

i) Signature of the authorized representative duly attested by the contractor.

j) Signature of the WBMSC authority concerned.

k) Date of actual completion of work.

l) Date of recording final measurements.

The contractor shall pay all charges and fees legally payable for acts arising out of work and hold the employer fee from all such costs.

8. The water to be used for construction purpose should be clean, free from loam, silt and organic materials. No hard water shall be used. The rates quoted by the contractors must be inclusive of all such charges and cost. The quality of water to be used for actual work must satisfy by the relevant ISI Codal provision.
9. The contractor shall make their arrangement for storage space and go down for their tools & plant, materials etc. and shall create at their own cost necessary sheds and go downs for proper storage of materials such as cement, steel materials etc., which may be issued to them as necessary from time to time or procured by the contractor.
10. Before starting any work, work site where necessary, must be properly dressed after cutting and cleaning all varieties of jungles and shrubs including bamboo cluster or any undesirable vegetation from within the boundary or alignment of site of works, for which nothing will be paid extra unless specifically provided in the priced schedule.
11. The contractor shall appoint an authorized representative of the contractor, for the project The selection of the authorized representative is subject to the prior approval of the WBMSC authority concerned & the contractor shall seek in writing for such approval of the WBMSC giving there in the name of work, the name and address of representative he wants to appoint and the specific purpose for which the representative will be authorized for even after first approval, the WBMSC may issue at any subsequent date, revise direction about such authorized representative of the contractor and the contractor shall be bound to abide by such directions. The WBMSC shall not be bound to assign any of its directions with regard to the appointment of authorized representative
12. **The authorized representatives of the contractors as per provision of the contract for supervision of works on their behalf shall be 01 (one) Degree /Diploma holder in Civil Engineering and 01 (one) Degree /Diploma holder in Electrical Engineering , whose details have been submitted at the time of bidding. Any Notice, correspondence etc. issued to the authorized representative or left at his address will be deemed to the contractor himself.**
13. The contractor must erect temporary pillars as many as required, in suitable places as directed by the WBMSC authority at his own cost before starting the work, from which the WBMSC staff will layout all important levels and fix alignments. All threads, pegs, nails, flags, labours etc. required for setting out / laying out different structures, alignments shall also be supplied by the contractors at their own costs.
14. The responsibility for stacking the serviceable materials obtained during execution of the work.
15. All works are to be carried out in accordance with the General Conditions & Specifications as mentioned in B.O.Q. (Specification Schedule). The specifications of work not covered by the specifications laid down in the relevant PWD Schedule shall be governed by ISI Code of Practice & as per direction of the Engineer-in-charge.

16. The contractors should give complete specification showing the method of execution and the quantity of materials they intend to use per unit.

The contractor will have to leave ducts in walls and floors to run conduit or cables, pipelines where necessary, and he will not be entitled to any extra payment on this account.

17. The rates of Supplementary items of work will be determined in order of precedence as given below notwithstanding what has been stated in clause 12 of the contract agreement form.

i) The rates will be derived where possible, from the relevant PWD Schedule of rates plus/minus contractual percentage.

ii) The rates will be derived where possible, from the rates of allied items of work appearing in the specific priced Schedule plus/minus the contractual percentage.

iii) The rates of items or part thereof which cannot be derived by any of the above processes, shall be determined from the prevailing market rates of materials and labour plus profit and overhead charges which (taken together) Shall constitute 10 (ten) per cent on the cost of materials and labour (excluding cost of materials supplied) but no contractual percentage will be applicable on those materials.

18. If the contractor shall desire any extension of the time for completion of the work under Clause 22 of the contract, no application for such extension will be entertained if it is not received within the specified time stated in the clause and if sufficient time ahead is not allowed for WBMSC to consider it. In such event the contractor will be responsible for the consequences arising out of his negligence in this respect.

19. It must be clearly understood by the contractor that no claim on account of enhanced rates on those already accepted due to rate fluctuations will be entertained during the currency of this contract for the work as per schedule attached to the agreement and the additional work.

No compensation for any damage done by rain or traffic during the execution of the work will be made.

20. The contractor must obtain the license under the Contract labor (Regulation & Abolition) Act. 1970 and the certificates for the same should be submitted to the Engineer-in-charge.

ADDITIONAL CONDITIONS OF CONTRACT FOR MATERIALS SUPPLIED BY WBMSC

[Note: No material will be issued by WBMSC in present bid.]

(a) When the contract provides for use of certain specified materials to be supplied by the WBMSC the contractor shall not obtain such materials from other sources unless so authorized in writing by WBMSC.

(b) Materials supplied for a particular work or a part there of shall not be used else where except with the written permission of WBMSC.

(c) Material shall be supplied to the contractor in such installments as may be decided by the said Engineer-in-Charge.

(d) The value of materials supplied by the WBMSC for use on the work shown in schedule A of the contract form in respect of items of works for which the contractor's rates are inclusive of the cost of such materials will be debited to him in his account as specified in schedule.

(e) The contractor shall be held responsible for any misuse, loss or damage of the materials issued or handed over to him by the Engineer-in-charge. In default the cost of such materials shall be recovered from the contractor according to the terms of the provisions made in sub- clauses (f) and (g) thereof.

(f) In the following cases the materials issued or handed over to the contractor shall be deemed to have been misused by him.

a. Materials lost or damaged due to negligence on the part of the contractor and/or defective storage by him.
b. Materials used in excess of the requirements as shown in consumption statement attached herewith.
c. Materials used without permission of WBMSC in temporary works or in the construction of contractor's godown, site office, labour hutments etc.

(**g**) Regarding materials in respect of items of work which the contractors rates are not inclusive of the cost of such materials the contractor shall only act as an custodian on behalf of the WBMSC and the value of such materials will not be charged to him except in case of misuse, loss or damage to materials

(**h**) The value of materials misused as above (in which case the decision of the Engineer-in-charge shall be final) shall be recovered at 50 per cent in excess of the highest of the following three rates.

(i) Issue rates as specified in the contract.
(ii) WBMSC stock rate at the time of recovery of value and
(iii) Market rate at the time of recovery of value.

(**i**) In cases of loss or damage of materials issued or handed over to the contractor other than under the circumstances mentioned in Sub-Clause

(**g**) the materials so lost or damaged shall be replaced by the Engineer-in-charge as to the cost of replacement shall be final and binding on the contractor.

(**j**) Whenever asked for by the Engineer-In-charge during the progress of the work and also with the final bill the contractor shall submit to WBMSC a statement showing.

a. The total quantity of materials received by the contractor from WBMSC;
b. Consumption thereof item by item in the work; and c. The balance in hand.

(k) Whenever by completing the consumption of materials of any description in any item or group or items of work requiring use of such materials

(a) It is found that the contractor has used less materials than are required by the specifications and/or are shown in consumption statement attached herewith, the value of the quantity of materials less used shall be recovered from the contractor at 5 (five) percent in excess of the issue rate of such materials. In such an event the contractor shall not be entitled to claim or to receive the materials the cost of which has been thus recovered.

(b) It is found that the contractor had used any materials in excess as indicated in paragraph (a) and (b) of Sub clauses shall be subject to the decision of the Engineer-in-charge who may allow variation according to Para I of consumption statement follow.

(l) Consumption of different materials of construction of corresponding contract item of work shall be computed on the basis of quantities shown in this table subject to a variation of plus/minus five per cent except incase of steel materials in respect of which the variation may be + 10 per cent. Where however, the circumstances of work so require the Engineer-in-charge shall be competent to allow (for recorded a reasons) for a greater variation.

(**m**) Any item taken from WBMSC store if found surplus after the completion of a work should be returned to the WBMSC store. The value of the item returned to the WBMSC will be credited to the contractor. If any contractor is found to have used the surplus item for his own purpose or otherwise disposed of without the written consent of the WBMSC, he may be held guilty of theft. In this connection the provision of Clause 10 may be referred to, where it is clearly stated that all materials issued to the contractors shall remain the property of the WBMSC.

(**n**) Contractors in the course of their work should understand that all materials (e.g., Store and other materials) obtained in the work of dismantling; excavation, etc will be considered WBMSC property and will be disposed of to the best advantage of WBMSC

(o) It will not be mandatory on the part of WBMSC to supply any or all the materials required for the work. Material for work will be issued only in special cases and as per schedule given in "Schedule of recovery of rates of materials if issued by WBMSC".

SECTION - E

TECHNICAL SPECIFICATION FOR BUILDING WORKS

CIVIL WORKS

(A) MATERIALS

GENERAL :

All materials is to be used in works shall conform to Indian Standards specification as published by I.S.I from time to time (and in the absence thereof as approved by the Engineer - in- Charge).

A-1 **BRICKS :**

All bricks shall be approved quality of standard specifications, made of good brick earth, uniform deep red, cherry colour , thoroughly burnt in kiln (machine made) without being vitrified , regular in shape and size , sound , hard ,homogeneous in texture , true to shape and of standard dimensions and shall be free from cracks, chips, flaws, stones or humps of any kind and shall not show appreciable signs of efflorescence either dry or subsequent to soaking in water. The size of bricks shall be 9.3/4" x 4.3/4" x 2.3/4" (conventional) , 190 x 90 x 90 mm. (modular). The bricks shall emit a clear ringing sound on being struck and have a minimum crushing strength of 110kg/sqm. All the bricks which absorb water more than 20% of their own dry weight after 24 hours immersion in cold water shall be rejected.

A-2 **COARSE AGGREGATES FOR CEMENT CONCRETE WORKS** :

Stone chips or stone ballast for cement concrete(plain or reinforced) shall be hard, of uniform and fine texture, free from faults or planes of weakness and free from weathered faces and coatings. The ballast or chips must be free from loam, clay or any surface coating , free from organic matter or other impurities and screened , free of dust. Trap stone of black and hard variety as is generally available from quarries in Pakur or Chandil areas will be normally used. Stone aggregates from other sources may also be used provided the same is a trap stone with high density, linear cleavage, low absorption of water and finally found suitable in the opinion of Engineer - in -charge. The opinion of Engineer-in charge must be recorded in writing. The ballast or chips shall be obtained by breaking from large blocks and must be more or less cubical in shape. Stone aggregate with flakiness index more than 25% is not allowed.

SIZE OF COARSE AGGREGATES :

For any of the following nominal sizes of graded coarse aggregates , grading shall be in conformity with the requirements laid down in the Indian Standard Specification . IS; 383-1963 as shown in Table I.

TABLE - I

I.S. Sieve Designation	Percentage passing for graded aggregate of nominal size			
	40 mm	20 mm	16 mm	12.5 mm
1	2	3	4	5
80 mm	100	-		
63 mm	-	-		
40 mm	95 -100	100		
20 mm	30 -70	95 -100	100	100
16 mm	-	-	90 -100	-
12.5 mm	-	-	-	90 -100
10 mm	10 -35	25 -55	30 -70	40 -85
4.75 mm	0 -5	0 -10	0 -10	0-10
2.36 mm	-	-	-	-

When coarse aggregate brought to the site is ungraded , single size coarse aggregate of different nominal sizes conforming to the requirements vide Table II given below , shall be mixed at site with the other ingredients of concrete either directly in the mixture or on the platform to the proportion indicated in Table III below :-

TABLE II

I.S. Sieve Designation	Percentage passing for single sized aggregate of nominal size					
	63 mm	40 mm	2 0 mm	16 mm	12.5mm	10 mm
1	2	3	4	5	6	7

80 mm	100					
63 mm	85-100	100				
40 mm	0-30	85-100	100			
20 mm	0-5	0-20	85-100	100		
16 mm	-	-	-	85-100	100	
12.5 mm	-	-	-	-	85-100	100
10 mm	0.5	0-5	0-20	0-30	0-45	85-100
4.75 mm	-	-	0-5	0-5	0-10	0-20
2.36 mm	-	-	-	-	-	0-5

TABLE III

Sl. No.	**Cement Conc. mix.**	**Nominal size of aggregate**	**Parts of aggregate of size 63 mm.**	**Parts of aggregate of size 40 mm.**	**Parts of aggregate of size 20 mm.**	**Parts of aggregate of size 12.5 mm**	**Parts of aggregate of size 10 mm.**
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
1	1:6: 12	63 mm	9	-	3		
2	1: 6: 12	40 mm	-	9	3		
3.	1: 5: 10	63 mm	7.1/2	-	2.1/2		
4.	1: 5 :10	40 mm	-	7.1/2	2.1/2		
5.	1: 4: 8	63 mm	6	-	2		
6.	1: 4: 8	40 mm	-	6	2		
7.	1:3: 6	63 mm	4.1/2	-	1.1/2		
8.	1: 3 : 6	40 mm	-	4.1/2	1.1/2		
9.	1: 3 : 6	20 mm	-	-	4.1/2	-	1.1/2
10.	1: 2 : 4	40 mm	-	2.1/2	1	-	1/2
11.	1 :2 : 4	20 mm	-	-	3	-	1
12.	1:2 :4	12.5 mm	-	-	-	3	1
13.	1: 1.5 :3	20 mm	-	-	2	-	1

Notes :- The proportions indicated in Table III above are by volume. These proportions may be varied somewhat by Engineer- in - charge after making sieve analysis of the aggregates brought to the site, when considered necessary for obtaining better density and strength of concrete.

A 2.1) **ALL - IN - AGGREGATES** : If combined aggregates are available ,they need not be seperated into fine and coarse, but necessary adjustment may be made in the grading by the

addition of single size aggregates. The grading of the all- in- aggregate when analysed as described in IS : 2386 (Part I) shall be in accordance with Table IV.

TABLE IV

I.S. Sieve Designation	Percentage passing for all- in- aggregate of	
	40 mm. Nominal Size	20 mm. Nominal Size
80 mm	100	
40 mm.	95 -100	100
20 mm	45 -75	95 - 100
4.75 mm	25 - 45	30 -50
600 micron	8 -30	15 -35
150 micron	0 - 6	0 -6

A 2.2) **GRAVEL** ,for use as coarse aggregates in cement concrete work , must be hard absolutely free from surface coating and on being broken , the fractured surface must indicate a uniform and fine texture free from laminations ,planes of weakness. It shall be thoroughly washed and free from any foreign elements. Dead stones are not allowed.

A 2.2) **JHAMA** chips, not to be used in structural concrete whether plain or R.C., for cement concrete work shall be obtained by breaking good quality over bricks or jhama bats, must not be spongy or with any coating of foreign materials and should be homogeneous in texture. The chips shall be more or less cubical in shape and to be screened to make removal of dust. No under-burnt brick aggregates should remain present. All coarse aggregates for concrete works must be well-graded .These shall be screened for removal of dust and if so necessary in the opinion of the Engineer -in- Charge shall be washed at the cost and expense of the contractor.

A -**3** **COARSE AGGREGATE FOR LIME CONCRETE WORKS :**

i) Brick aggregates for lime concrete in foundation or flooring shall consist of approved , clean, hard and over-burnt jhama khoa. The khoa must be well- graded and unless otherwise specified , shall pass through 32 mm sieve.

ii) Brick aggregates for lime terracing work on roof shall consist of khoa broken from 1st class bricks bats and unless otherwise specified, shall pass through 25 mm sieve and be suitably graded . No over -brunt or under burnt bricks or bats are to be broken for preparing such aggregates. No jhama khoa should be used in lime terracing work.

A -4 **SAND:-**

All sand shall be clean sharp and free from clay, loam , organic or any other foreign matter, shall be obtained from approved source. The Contractor shall get the sample of sand to be used in different kinds of work approved by the Engineer- in -Charge before using the same in work. Sand which in the opinion of the Engineer -in -Charge or his representative is dirty must be washed to his satisfaction at the cost and expenses of the Contractor.

i) Sand for all cement concrete work must be coarse. The sand shall pass through a mesh 4.75 mm square measured in the clear. Sand shall not be used for concrete works if contains more than 10 % of fine grains passing through a 76 mesh sieve as used for cement test nor should fineness modules be less than 2.00.

ii) Medium sand may be used for cement mortar , for masonry ,plaster etc. Fineness modulus shall be between 2 to 1.8.

iii) Sand filling in plinth or foundation where specified may be done with fine sand or silver sand but should be free from clay or loam.

A -5 **SURKI :-**

Surki shall be made from well burnt 1st class bricks bats , so as to pass through a mesh 2 mm. each way , and shall be perfectly clean and free from foreign matter. No under- burnt brick aggregate should be pulverised for making surki.

A- 6 **LIME :-**

All lime shall be freshly burnt and slaked and screened before use. The slaking should be done at site of work. Lime for works including roof terracing shall be Bisra, Satna or other approved stone lime

The specification covers lime as used in construction of buildings and other structures as described below:-

a) **Quick - lime** shall mean a calcined material the major part of which is calcium oxide in natural association a relatively small amount of magnesium oxide and capable of slaking with water.

b) **Fat- lime** shall mean the lime which has high calcium oxide content (between 95 and 100 per cent) and is dependent for setting and hardening on the absorption of carbon dioxide from the atmosphere. This is defined as class "C" in I.S. : 712-1973 which is used for finishing coat in plastering , white washing etc. and with addition of pozzolonic material (surki) for masonry mortar.

c) **Hydraulic lime** shall mean the lime which contains small quantities of silica and alumina and /or iron oxide which are in chemical combination with some of the calcium oxide content giving a putty or mortar that has the property of setting and hardening under water.

d) **Hydrated lime** shall mean a dry powder resulting from treatment of quick-lime with water enough to satisfy its chemical affinity for water under the conditions of hydration.

CLASSIFICATION OF LIME :

Class A : Eminently hydraulic lime used for foundations and other hydraulic structures shall be supplied as hydrated lime only and should be used particularly in any masonry work below G.L. It should be noted here that no masonry work below G.L should be taken up with the use of any other lime other than specified hydraulic lime. In case of doubt, if any, in respect of hydraulic lime being used in work below G.L. it is preferable not to use lime mortar at all below G.L.

Class C : Fat lime used mainly for lime punning , white washing and with suitable admixture , such as surki or any other pozzolonic material to produce artificial hydraulic mortar.

A- 7 **CEMENT :**

a) Unless otherwise specified , cement shall be ordinary Portland cement/Slag cement of grade 33 or 43 conforming to IS : 269 / IS: 455 of approved make and brand and to be tested at an approved laboratory.

b) It shall be stored in a dry place in regular piles not exceeding 10 bags high and in such a manner that it is adequately protected from moisture and contamination.

c) Different consignments shall be stacked seperately so that they can be used in the order in which they are received.

A- 8 **STEEL REINFORCEMENT :**

i) **MATERIALS :**

a) Mild steel reinforcement shall be hot rolled mild steelbars conforming to IS : 432 - Grade- I or IS: 226 - 1962 - " Standard Quality". Other qualities of Steel shall not be acceptable .

b) Strength of hot rolled mild steel deformed bars shall conform to IS: 1139 and cold twisted deformed bars should conforming to IS : 1786.

c) Each consignment shall be of approved make and if necessary certificates of test performed by a recognised testing laboratory or the manufacturer shall be produced. These test certificates shall give the ultimate stress, yield stress, elongation and results of cold bend test. If further required steel shall be tested at an approved laboratory.

d) Reinforcing steel of different varieties and sizes and types shall be stacked seperately.

e) Reinforcement bars shall be stored at the site in such a manner as to prevent rusting and contamination of the surface by deleterious materials like dirt ,oil, grease, paint, etc.

f) When placed in the work, reinforcement shall be free of loose mill scale, rust, dirt, oil, grease, paint etc.

g) Steel reinforcement shall always be protected from damages due to impact and rough handling.

ii) **FABRICATION , BENDING & SPLICING :**

a) Bars shall be cut to size and bent to shape in accordance with the appropriate dimensions shown in the drawings. When an overall or an internal dimension of bent bar is specified , the tolerance unless otherwise specified , shall be as in Table XI of IS : 2502.

b) Bars shall be bent cold gradually by machine or any other means approved by the Engineer- in- Charge except in case of mild steel bars larger than 28 mm. If approved by the Engineer-in- Charge , mild steel bars greater, than 28 mm. dia and conforming to IS : 433 only may be bent hot at cherry red heat (not exceeding 850 C). Bars bent hot shall be allowed to cool gradually in air and shall not be cooled by quenching . High yield strength deformed steelbars shall not be hot bent.

c) Bars having cracks or splits shall be rejected.

d) All bars shall be properly tagged for easy identification.

e) All reinforcement shall be furnished in full length indicated in the drawing. Splicing of bars, except those shown on the drawings, will not be permitted without the written authority of the Engineer- in charge.

f) At a tension splice, the minimum clear distance between bars shall be maintained. Splices in adjacent tension bars shall be staggered. At a compression splice , each side of lapped bar may be contacted but the minimum clear spacing between the splice and an adjacent splice shall be that specified for adjacent unspliced bars.

g) In no case shall the clear distance between two adjacent bars be less than the diameter of the bar (larger of the diameters to be considered if the adjacent bars of different diameters) or 6 mm more than the maximum size of coarse aggregate used in the concrete Guidance as per I.S.I. code 456.

h) Unless otherwise stated in the working drawing provisions of clause No. 25.4 of IS : 456 regarding cover to the reinforcement shall be followed.

iii) **PLACING AND FASTENING :**

a) All steel reinforcement shall be accurately placed in position shown on the drawing and firmly held during the placing and setting of concrete. Bars shall be tied together with mild steel wire (annealed) not less than 0.9 mm dia. (conforming to IS : 280) or secured with clips at all intersections. Where the spacing of intersection is less than 30 cms. in each direction alternative intersections shall be tied . Binders shall tightly embrace and shall be securely held . Placing of bars on layers of fresh concrete as the work progress shall not be permitted. Adjusting bar spacing in concrete already poured shall not be permitted.

b) Distance of the bars from the form work shall be maintained by approved concrete spacer blocks, ties, hangers and other approved supports. Metal chairs which are in contact with the exterior surfaces of concrete where specially allowed shall be galvanised or painted with epoxy. Layers of bars shall be supported at correct spacing by precast mortar blocks or other equally suitable devices approved by the Engineer- in - Charge. The mortar for the precast blocks shall have the same composition as the concrete in which it is embedded and shall have been cured for at least 28 days before being placed in position. The use of pebbles, pieces of broken stone of bricks , metal pipe or wooden blocks will not be permitted for use as spacers.

c) No reinforcement shall be bent when in position in the work without the approval of the Engineer- in -Charge whether or not it is partially embedded in concrete . Workmen will not be permitted to climb on bar extensions until the concrete has sufficient strength so as not to be damaged and no movement of the bar is possible.

A- 9 **TIMBER :**

All timber shall be of specified type best quality well - seasoned and / or well - treated for preservation and protection against decay etc . It shall be uniform in substance, straight in fibre free from large or dead knots, sap , flaws, sun- cracks , shakes or blemishes of any kind . Any insect damage or splits across the grain shall not be permissible. The colour of the timber shall be uniform throughout, firm and shining with a silky lustre when planed and shall not emit dull sound when struck.

A- 10 **GLASS**

All glasses shall be of the specified type ,colour ,clear visibility and sound and shall be free from cracks ,flaws spick bubbles and blemishes and shall not weigh less than 7.4 Kg./Sq.m. unless otherwise specified.

A- 11 **TIMBER DOORS, WINDOWS ETC. AND THEIR FITTINGS :**

i) Doors and windows works shall be carried out as per detailed drawings or as directed by the Engineer-in -Charge. Specified timber shall be used , and it shall be sawn in the direction of the grains and be straight and square.

ii) Fittings shall be of anodised iron, brass, aluminium or as specified. These shall be well made, reasonably smooth and free from sharp edges , flaws and other defects. Screw holes shall be counter sunk to suit the head of specified wood screws. Iron fittings shall be finished bright or black enameled or copper oxidised. Brass fittings shall be finished bright, brass oxidised or chromium -plated (Electroplated) .All fittings shall be finished bright or anodised , or as specified . Fittings shall be got approved by the Engineer- in -Charge before fixing . In case of renewal works, the new fitting shall, as far as possible ,match with the existing ones. Screws shall be driven with screw driver and not hammered in.

A- 12 **PAINT ETC.**

All paints shall be Hi- gloss Synthetic Enamel and shall be delivered in strong containers and marked with the colour of the paint, brand, volume of paint content in litres and of the best quality of approved make and brand as approved by the Engineer- in - Charge. Under no circumstance shall the paint be diluted with linseed oil or otherwise. Any paint although or approved brand , which so hardens in the container that it cannot be readily broken up with a stirrer to a smooth uniform painting consistency , shall be rejected . Any paint too thick for proper brush application shall be rejected. No paint should be used after one year of the date of manufacture.

(B) EXECUTION

GENERAL :

All works shall be carried out in proper workmanlike manner. Items of works not covered by the following , shall carried out as per best practice according to the directions of the Engineer - in - Charge and to his satisfaction. Unless otherwise specified in this section or in the description of item , the cost of all stages of works mentioned hereunder shall be deemed to have been included in the rates of items provided in the Tender.

B- 1 (A) **EXCAVATIONS OF FOUNDATION AND FILLING UP TRENCHES :**

i) Foundation when excavated to the level shown in the drawing will be shown to the Engineer -in Charge and if on account of bad ground or for any reason whatsoever he decides to go deeper with the foundation , the Contractor shall excavate further to the depths required by the Engineer- in - Charge . In no case shall the foundation soling or concrete be laid prior to receiving orders to that effect from the Engineer- in -Charge or his authorised representative.

ii) Excavating shall include throwing the excavated earth at least one metre or half the depth of excavation , whichever is more , clear of the edge.

iii) The excavated areas around the foundation of structures are to be filled up properly to the required levels with earth obtained from excavation or other materials as directed , well rammed with water and consolidated in layers not exceeding 150 mm. at a time. The quantity for this item of work will be measured on the basis of quantity of excavation paid for less the volume occupied by the structure in foundation.

(B) **SHORING**

i) Shoring for loose earth and when the depth of excavation exceeds 3 metres poling boards (Vertical members) of 50 to 75 mm. in thickness and 175 to 225 mm in width preferably of sal- wood to be placed close together and to be driven about 300 mm. in ground below the bottom of the trench with intermediate sal-bullah pilling of dia not less than 100 mm. at the rate of 900 to 1000 mm. centre to be placed in between the vertical surface of trench and the poling

boards and double struts of sal- bullah of not less than 100 mm. in dia. between two wallings (horizontal member) of 250 mm in width and 75 mm thickness held horizontally between them.

ii) For medium clay and when the depth of excavation exceeds 2 metres but does not exceed 3 metres single struts will be provided and sal- bullah piling may not be placed. Other requirements are to be satisfied as (i) above.

B- **2** **CEMENT CONCRETE WORKS (PLAIN OR REINFORCED) :**

i) **SHUTTERING AND STAGING** :

Wherever necessary , shuttering and staging must be provided. Unless otherwise stated no payment will be made for such shuttering or staging and the cost thereof will be deemed to have been covered by the rate of relevant finished item of work. Where payment for shuttering has been specified , the rate shall be deemed to cover the cost of the necessary staging as well. Payment if any, for shuttering will be on the basis of surface area of shuttering in actual contact with concrete.

Shuttering may be of approved dressed timber true to line , not less than 25 mm. thick. Surface to be in contact with concrete are to be planed smooth except where otherwise stated. As an alternative, sufficiently rigid steel shuttering may be used . In every case , joints of the shuttering are to be such as to prevent the loss of liquid from concrete. In timber shuttering the joints must be perfectly covered with polythene sheets of approved quality. In case of steel shuttering also the joints are to be similarly lined.

All shuttering and framing must adequately be stayed and braced to the satisfaction of the Engineer- in- charge for properly supporting the concrete during the period of hardening. It shall be so constructed that it may be removed without shock or vibration to the concrete. The stays should be preferably with sal-bullahs of girth not less than 20 cm. and straight in length. If Bamboos are used as stays, girth less than 20cm. will not be allowed. These should invariably be straight in length. The bottoms of stays should be flat and should rest on a wider platform so as to minimise chance of settlement when concrete is vibrated.

Before the concrete is placed those faces of the formwork come in contact with the concrete shall be treated to prevent concrete adhesion to them and to reduce the risk of damage to the concrete when the formwork is struck.

Interior of all moulds and boxes must be thoroughly washed out with a hose pipe or otherwise so as to be perfectly clean and free from all extraneous matter prior to the deposition of concrete.

All form works shall be removed without shock or vibration. Before the form work is stripped, the concrete surface shall be exposed where necessary in order to ascertain that the concrete has hardened sufficiently .

In normal weather and with ordinary cement , vertical or side shuttering may be removed after three days and the bottom shuttering of horizontal member after fourteen days in case of slab and twenty one days in case of beams and twenty eight days for cantilevers etc. from the date of placing the last concrete in the structure . The above figures are minimum and may be extended if found necessary. Before stripping the shuttering of structural member the contractor shall take prior permission of the Engineer-in-Charge or his representative.

No plugs , bolts , ties , hold fasts or any other appliances whatsoever for the purpose of supporting the shuttering are to be fixed in the structure of placed in such a way that damage might result to the work in removing the same when the shuttering is struck.

ii) STRIPPING TIME :

Forms shall not be struck until the concrete has reached a strength at least twice the stress to which the concrete may be subjected at the time of removal of formwork. The strength referred to shall be that of concrete using the same cement and aggregates , with the same proportions and cured under conditions of temperature and moisture similar to those existing on the work. Where possible , the formwork shall be left longer as it would assist the curing.

In normal circumstances and where ordinary Portland cement is used , forms may generally be removed after the expiry of the following periods :

a) Walls, columns and vertical faces of all structural members	24 to 48 hours as may be decided by the Engineer- in - Charge
b) Slabs (props left under)	3 days
c) Beam soffits (props left under)	7 days
d) Removal of props under slabs :	
(1) Spanning up to 4.5 m	7 days
(2) Spanning over 4.5 m	14 days
e) Removal of props under beams and arches:	
(1) Spanning up to 6 m	14 days
(2) Spanning over 6 m	21 days

The above period are minimum and may be extended for other type of cement used if necessary . Before Stripping the shuttering of structural members the contractor shall take previous permission of Engineer - in - Charge or his representative.

iii) SCAFFOLDING :

The scaffolding must be strong and rigid stiffened with necessary cross bracers and always decked and boarded on the sills with close boarded ceiling and swings to prevent any injury to persons. The contractor shall have to allow other traders to make reasonable use of his scaffolding as and when directed by the Engineer- in - Charge.

If for the interest of the work the contractors have to erect scaffolding in other‟s properties including local bodies or Corporation, the arrangement for the same including the cost of licensing fees etc. shall have to be borne by the contractor and the department should be kept free from any liability on this account.

iv) MIXING, PLACING AND COMPACTING :

The proportion specified is by volume in dry condition of the different constituent. Boxes of suitable size shall be used for measuring sand and aggregate. Boxes of suitable size shall be used for measuring cement weighting 50 kg. and this shall be taken as 0.035 cubic metre. While measuring the aggregate , shaking ,ramming or hammering shall not be done. The proportioning of sand shall be on the basis of its dry volume and in case of damp sand, allowance for bulkage be made. Cement is also to be measured in boxes unless otherwise directed in writing by Engineer- in - Charge.

All structural concrete shall be mixed in mixer machine of appropriate capacity & shall have to be vibrated with suitable vibrator (needle or form vibrator). Mixing shall be continued until there is a uniform colour and consistency , but in no case shall the mixing be done for less than two minutes. Concrete mix obtained from mixer machine should be laid within 20 minutes from the time water is added to the dry mix. Beyond 20 minutes the mix should not be used in structural concrete. No hand mixing is permissible under any circumstances.

As the bulking of sand may vary from day to day and at different parts of the day on account of varying moisture content , frequent tests for bulking shall be carried out with the sand to be used and the amount of bulking allowed for in the field mix so as to keep the actual proportion constant throughout.

Only such quantities are as required for immediate use are to be mixed at any one time. Sufficient water is to be added to obtain proper workability so that the mixture may flow readily round the reinforcement and into every part of the moulds. The workability shall be measured by the amount of slump.

The quantity of water to be used for each mix of 50 kg. cement to give the required consistency shall not be more than 34 litres for 1 : 3 : 6 mix. 32 litres for 1 : 2 : 4 mix. 30 litres for 1: 1.5 :3 mix. and 27 litres for 1 : 1 : 2 mix. In the case of vibrated concrete , the limit specified may be suitable reduced to avoid segregation. Water cement ratio shall conform to IS : 456.

The total water content in each batch of concrete shall always be kept constant as the amount previously determined by trial mixes. The quantity of water to be actually added may , therefore , vary depending on the moisture content in the aggregates. In actual job if the quantities

of the ingredients remain constant the amount of slump may be taken as a good guide indicating the total water content in the mixture. The consistency and consequently the water content of the concrete shall, therefore , be kept constant and checked from time to time as work proceeds , by means of standard slump tests. The slump tests shall be carried out with concrete immediately after it has been mixed and before any initial set has commenced , the sample being taken perfectly at the point where the concrete is being delivered for placing in the moulds.

The Slump Cone shall be filled about one-fourth of its height with concrete which shall then be tamped , using 25 strokes of a 16 mm diameter rod , 60 cm long and bullet -pointed at the lower end. The filling shall be completed in successive layers similar to the first and top struck off so that the Slump Cone is exactly filled.

The Slump Cone then be removed by raising vertically immediately after filling. The mould concrete shall then be allowed to subside and the height of the specimen measured after coming to rest.

The consistency shall be recorded in terms of millimeters of the subsidence of the specimen during the test , which is known as Slump.

The following slumps shall be adopted for different works :-

SL. NO.	**TYPE OF WORK**	**SLUMPS**	
		When vibrators are used	**When vibrators are not used**
1.	Mass concrete in foundation footings and retaining walls and pavements	10 to 25 mm	50 to 75 mm
2.	Mass concrete in R.C.C foundation, footings and retaining walls.	10 to 25 mm	80 mm
3.	Beams ,slabs and columns simply reinforced	25 to 40 mm	100 to 125 mm
4.	The R.C.C section or section with congested steel	40 to 50 mm	125 to 150 mm

IS : 456 - 1978 allows use of nominal mix of concrete upto grade M 20 and may be allowed in works at the discretion of Engineer -in - Charge and will be guided by the provision of IS : 456-1978. For grade of concrete above M20 design mix has to be adopted. For determination of mix proportion for design mix concrete , the target strength should be higher than the specified characteristic strength to ensure that characteristic strength is attained at 28 days. Accordingly to the Explanatory Hand Book on IS : 456-1978 (S.P. 24 -1983) .

Target strength = characteristic strength + 1.65 x Standard deviation .

If controlled concrete is to be adopted , design mix is required. Otherwise proportion with cubic strength of concrete at 28 days shall be the guidance.

Standard deviation for different grades of concrete in absence of any test may be taken as per IS : 456- 1978 as follows :-

GRADE OF CONCRETE	**ASSUMED STANDARD DEVIATION (N/MM^2)**
M 10	2.3
M 15	3.5
M 20	4.6
M 25	5.3
M 30	6.0

Once the target strength of cube moulds with specific mix design is obtained in the laboratory , it may be inferred that corresponding characteristic strength of concrete , prepared with the materials used in the test mould (s) cured under identical condition as that of the test specimen , shall be obtained at site at 28 days.

Frequency Of Sampling :

Sampling Procedure - A random sampling procedure shall be adopted to ensure that each concrete batch shall have a reasonable chance of being tested ; that is, the sampling should be spread over the entire period of concreting and cover all mixing units.

Frequency - The minimum frequency of sampling concrete of each grade shall be in accordance with the following :-

QUANTITY OF CONCRETE IN THE WORK (M^3)	**NO. OF SAMPLES**
1 -5	1
6 - 15	2
16 - 30	3
31 - 50	4
51 and above	4 (Plus one additional sample for each additional 50 M^3 or part thereof.)

Test Specimen - Three test specimens shall be made from each sample for testing at 28 days. Additional cubes may be required for various purposes such as to determine the strength of concrete at 7 days or at the time of striking the form work , or to determine the duration of curing , or to check the testing error. Additional cubes may also be required for testing cubes cured by

accelerated methods as described in IS : 9013 - 1978. The specimen shall be tested as described in IS : 516-1959.

Test Strength Of Sample - The test strength of the sample shall be the average of the strength of three specimens. The individual variation should not be more than ± 15 percent of the average.

Transporting ,Placing , Compacting - Concrete shall be handled from the place of mixing to the place of final deposit as rapidly as practicable by methods which will prevent the segregation or loss of the ingredients. It shall be deposited as nearly as practicable in the final position to avoid rehandling or flowing. Unless specially permitted by the Engineer - in- Charge , concrete shall not be dropped freely from a height of more than 1.5 metres.

Before placing the concrete , the moulds shall be cleaned of shavings, pieces of wood or other rubbish. The concrete shall be carefully placed against the moulds so that the faces of concrete shall be left perfectly smooth and free from honey- combing upon withdrawal of the moulds. Any defect in this respect must be dealt with by the contractor as directed by the Engineer-in -Charge without any extra charges therefore.

During placing and also immediately after deposition ,the concrete shall be thoroughly compacted by ramming ,spearing etc. until it has been made to penetrate and fill all the spaces between and around the steel rods, around embedded fixtures ,and into the corners of form work in such a manner as to ensure a solid mass entirely free from voids. If so directed by the Engineer - in - Charge , in addition to usual ramming ,spearing etc., sufficient number and suitable type of vibrators may have to be used on important jobs to enable working with a comparatively low water -cement ratio and ensure the maximum possible degree of compaction and homogeneity. Use of form vibrators for slabs, nozzled vibrators for beam and columns are permitted. It is imperative that the work should be done quickly as well as efficiently and adequate number of hands must therefore be employed to ensure this. Concrete shall be placed and compacted in its final position before setting is commenced and shall not subsequently be disturbed.

Concreting shall be carried out continuously up to construction joints, the position and arrangement of which shall be predetermined by the Engineer- in -Charge or his representative. Any rest, pauses , such as for meal, shall also be subject to his approval.. All concreting work should be so programmed as not to necessitate work at night. If for any reasons this becomes imperative ,the contractor shall obtain previous permission of the Engineer- in - Charge or his representative and make proper lighting arrangements to his satisfaction.

v) PROTECTION AND CURING :

The Contractor shall adequately protect freshly laid concrete , for about 1 to 2 hours after its laying from too rapid drying due to sunshine , drying winds etc. and also from rains or surface water and shocks. About 24 hours after laying of concrete , the surface shall be cured by flooding with water of minimum 25 mm depth or by covering with wet absorbent materials. The curing shall be done for a minimum period of 10 days. Over the foundation concrete the masonry work

may be started after 48 hours of its laying , but the curing of cement concrete shall be continued along with the masonry work for a minimum period of 10 days.

In case of cement concrete used as sub- grade for flooring , the flooring may be commenced within 48 hours of the laying of sub-grade . In case it is not possible to do so due to exigencies of work, the sub-grade shall be roughened with a steel wire brush without disturbing the concrete , wetted and neat cement slurry at the rate of 1.75 kg of cement per square /metre applied to the base before laying floor . Full rate of IPS / mosaic flooring will be paid with the specific orders of the Engineer - in - Charge. The curing to be continued along with the top layer of flooring for a minimum period of 10 days.

vi) CONSTRUCTION JOINTS :

All joints in slabs and other horizontal members are to be formed by inserting vertical boards against which the concrete deposited can be properly rammed. The positions where such joints to be made will be indicated by the Engineer- in -charge or his representative.

In the case of horizontal joints any excess mortar or laitance shall be removed from the surface after the concrete is deposited and before it has set.

When the work has to be commenced on a surface which has hardened , such surface shall be well roughened and all laitance removed ; the surface shall then be swept clean., thoroughly wetted and covered with a thin layer of mortar composed of equal volumes of cement and sand. Such works shall be deemed to be covered by the rates for concrete.

vii) **MAJOR R.C.C WORKS :**

Where concrete is specified by strength the mix should not be leaner than 1 : 2 : 4 so as to give ultimate crushing strength not less than 20 N/mm^2 at 28 days cured under field condition. The mix. for the concrete is to be so adopted and the slump is to be so allowed as to give specified strength and proper workability at the existing site conditions. Contractor shall remain fully responsible for producing concrete of specified strength in the actual job and therefore cast at his own cost test specimens of 15 cm. cube as already specified during work and cure the same in similar way as for laid concrete for being tested for strength. Each set of test specimen shall be taken to cover the quality of concrete laid on the job during the period from the time of taking the previous set of specimens and the quantity will be estimated by the Engineer - in- Charge from records maintained by him.

a) When the job concrete is compacted by ordinary methods, the test specimen shall be moulded by placing the fresh concrete in the mould in three layers, each approximately one-third of the volume of the mould. In placing each scoopful of concrete , the scoop shall be moved around the top edge of the mould as the concrete slides from it in order to ensure a uniform distribution of concrete within the mould. Each layer shall be rodded , 25 times with a 16 mm. rod, 60 cm. in strength , bullet pointed at the lower end. The strokes shall be distributed in a uniform manner over the cross- section of the mould and shall penetrate into the underlying layer. The bottom layer shall be rodded, throughout its depth. After the top layer has been rodded , the

surface of the concrete shall be struck off with a trowel and covered with a glass plate at least 6.5 mm thick or machined metal plate. The whole process of moulding shall be carried out in such a manner as to preclude the alteration of the water-cement ratio of the concrete , by loss of water either by leakage from the bottom or overflow from the top of the mould.

b) When the job concrete is placed by vibration and consistency of the concrete is such that the test specimens cannot be properly moulded by hand rodding as described under (a) above , the specimens shall be vibrated to give a compaction corresponding to that of the job concrete. The fresh concrete shall be placed in the mould in two layer each approximately half the volume of the mould. In placing each scoopful of concrete , the scoop shall be moved around the top edge of the mould as the concrete slides from it , in order to ensure a symmetrical distribution of concrete within the mould. Either internal or external vibrator may be used. The vibration of each layer shall not be continued longer than is necessary to secure the required density. Internal vibrators shall be of appropriate size and shall penetrate only the layer to be compacted. In compacting the first layer , the vibrators shall not be allowed to rest on the bottom of the mould. In placing the concrete for the top layer , the mould shall be filled to the extent that there will be no mortar loss during vibration.

After vibrating the second layer, enough concrete shall be added to bring the level above the top of the mould. The surface of the concrete shall then be struck off with a trowel and covered with a glass or steel plate as specified under (a) above. The whole process of moulding shall be carried out in such a manner as to preclude the alteration of water-cement ratio of the concrete by loss of water either by leakage from the bottom or overflow from the top of the mould.

After curing , the specimen properly wrapped shall be made over to the Engineer- in -Charge or his representative who will arrange to have them tested at 28 days from the date of casting from either National Test House or other Authorised Test House. If there be any delay for any reason whatsoever the result of the test shall nevertheless be valid and will be applicable as per rules in each case for all test specimens whatsoever.

The Contractor shall be responsible for proper packing of the specimens at his own cost, for safe and convenient transport of the same from the site to the testing laboratory. The cost of testing the test moulds from the work site to the particular laboratory (both ways) and other incidental charges in this connection will have to be borne by the contractor.

In case of concrete showing , on the result or the cube tests, strength less than that specified in (a) and (b) of the Acceptance Criteria ,but has a strength greater than (c) & (d) of the said Acceptance Criteria concrete may , at the discretion of the Engineer- in -Charge be accepted as being structurally adequate without further testing.

If the concrete is deemed not to comply pursuant to (c) & (d) of the Acceptance Criteria , the structural adequacy of the parts affected may be investigated as per provision of clause 16.3 and /or clause 16.5 of IS : 456- 1978 i.e. , core test /or load test , as the case may be before rejection on the application of the Contractor with the undertaking to bear the cost of such tests.

If the strength of the concrete is such that it satisfies provisions made in sub- clause 16.5.3 of IS : 456- 1978 , concrete in that member represented by such tests shall be considered acceptable but the Engineer - in -Charge shall have the full power to fix the rate of deduction.

In case the test results do not satisfy the relevant requirement of the proceeding paragraph , the volume of concrete so deficient shall be deemed to be un-acceptable and shall be removed from the structure and replaced by fresh concrete of specified strength .The Contractor shall, in that case , have to carry out the instruction of the Engineer -in- Charge irrespective of the amount of loss, inconvenience and difficulties involved.

The Contractor shall remain liable to act /to carry out instructions under the provision of this clause , notwithstanding issuing by the Engineer- in - Charge of any certificates or the passing of any bills or accounts.

B-3 **1ST- CLASS BRICK WORKS :**

Cement mortar shall be prepared by mixing sand and cement in specified proportion. Sand shall be measured on the basis of its dry volume. In case of damp sand, its quantity shall be increased suitably to allow for bulkage

Brick work shall be laid in English bond. The brick shall be laid by Larrying method. A layer of mortar shall be spread on full width for suitable length of the lower courses. Each brick shall first be laid so as to project over the one below , both at the end and at the side , then pressed into the mortar and shoved into final position so as to embed the brick and to fill its inside face fully with mortar. cut bricks shall not be used except where necessary.

The walls shall be taken up truly plumb with plumb bob. The thickness of brick courses shall be kept uniform and for this purpose , wooden straight edge with graduations giving thickness of each brick course including joint shall be used. All courses shall be laid truly horizontal and all vertical joints shall be truly vertical. Vertical joints in alternate course shall come directly one over the other. A set of tools comprising wooden straight edge , masons sprit level, square , half metre rule , line and pins , string and plumb shall be kept for every 3 masons for frequent checking during progress of work. Faces of walls found not in plumb shall be dismantled.

Both the faces of walls of thickness greater than 25 cm (10”) shall be kept in proper plane. All the connected brickwork shall be carried up nearly at one level and no portion of the work shall left more than 1 m. below the rest of the work. Where this is not possible , the work shall be racked according to bond (and not left toothed) at an angle not steeper than 45^0

Brick shall be so laid that all joints are quite full of mortar. The thickness of joints shall not exceed 10 mm. Bricks shall be laid with frogs upward except in the top course where from shall be placed downward. The face joints shall be racked to a minimum depth of 15 mm by racking tools daily during the progress of work when the mortar is still green , so as to provide proper key for plaster or pointing to be done. Where plastering or pointing is not required to be done, the joints shall be struck flush and finished at the time of laying

The face of brick work shall be cleaned the very day that brick work is laid and all mortar droppings removed

Green work shall be kept wet for a period of at least 7 days. The top of masonry work shall be left flooded at the close of the day Scaffolding shall be sound and strong and holes left in masonry work for supporting the scaffolding shall be filled and made good before plastering.

B-4 **DAMP PROOF COURSE :**

This shall be laid to specified thickness over walls for the full thickness of the super - structure walls. The surface shall be levelled and prepared before laying the cement concrete. Edge of damp proof course shall be straight , even and vertical. Side shuttering shall consist of wooden form and shall be strong and properly fixed so that it does not get disturbed during compaction and the mortar does not leak through. The concrete mix shall be of workable consistency and shall be tamped thoroughly to make a dense mass. When the sides are removed , the surface should come out smooth without any honey- combing. The damp proof course shall be laid continuous and the surface shall be double chequered. Damp proof course shall be cured for at least seven days , after which it shall be allowed to dry . Water proofing materials of approved quality shall be added to the concrete mixture in accordance with the manufacturer‟s specification. No extra payment will be made for such admixture of water proofing compound.

B- 5 **CEMENT PLASTER :**

The proportion of mortar of exterior or interior plaster shall be as specified in the items of work.

The plaster shall be of thickness as specified and the surface shall be similarly cured as for cement concrete. The moulding shall be carried out as shown in the drawing and shall be separately measured in overall length unless otherwise specified in the items. Interior corners and edges of openings if so directed by the Engineer - in- Charge shall be rounded of or chamfered with the same mortar for which no extra payment will be allowed. All cement concrete surface should be chipped off properly before taking up the plastering work.

(i) **Barium Plaster** shall be done by mixture of one part of cement , two parts of fine barium sulfate and two parts of coarse barium sulphate thoroughly mixed with requisite amount of water. Cement used shall be fresh Portland cement of approved brand and sand shall be medium clean and free from organic matter and clay or any other deleterious materials. Water to be used shall be clean potable water. The mixture shall be well stirred during the use to maintain an even consistency.

The mixture as mentioned above shall be applied over a layer of cement sand (1:4) backing of thickness of 20 mm. admixtured with approved water proofing compound as per manufacturers specification. The application of the mixture shall be done uniformly to maintain a thickness of about 1.5 mm. and to be rubbed thoroughly with wooden trowel. Finishing shall be done with steel

trowel to give a smooth surface. The surface should be kept wet by sprinkling water for at least one week.

B - 6 **WHITE WASHING , COLOUR WASHING :**

Preparation of surface : All surface for white washing , colour washing , painting , shall thoroughly cleaned free from mortar droppings and foreign matter and prepared to the satisfaction of Engineer - in - Charge , before application of the treatment.

Before white washing , all the nails etc. have to be removed from the walls and all nails or other holes ,small depressions or damages in plaster or wall surface shall be filled or repaired to original condition with lime consisting 2 parts of shell lime and 1 part of stone lime.

Treatment of oily surface to be done with soda & sajimati cleaned with fresh water.

Preparation of White wash : The white washing is to be done with 5 parts of stone lime and one part of shell lime with necessary gum (2 kg. per cu. m. of lime) using indigo as necessary and to be mixed as per standard practice.

Preparation of Colour wash : Colour washing shall have primer of white wash and shall be of shade as approved by the Engineer- in - Charge. Sufficient quantity of colour wash enough for complete job shall prepared in one operation to avoid any difference in shade. Procedure and preparation of surface shall be same as in white washing.

Application of white wash and colour wash : The operation for each coat shall consist of four consecutive strokes of the brush , one horizontally from right to left and next from left to right and the third stroke bottom upward and the fourth from top downward before the previous stroke dries. Each coat shall be allowed to dry before the next coat applied. No portion of the surface shall be left out initially to be patched up later on. The brush shall be dipped in white wash or colour wash , pressed lightly against the wall of the container and then applied by lightly pressing against the surface with the full swing of hand.

The white wash on ceiling should be done prior to that on walls.

Protective Measures : Surface of doors ,windows , floors, articles of furniture , beams etc. and such other parts of the building not to be white or colour washed shall be protected from being splashed upon. Such surface shall be cleaned of white or colour wash splashed, if any. Dados are to be cleared as also the windowsills.

Plaster of Paris : The material (gypsum) shall be in the form of a fine white powder of smooth texture , free from foreign matter and lumps conforming to IS : 2547

The Plastered surface over which plaster of Paris to be applied shall be thoroughly cleaned and kept wet with water for at least 24 hrs. before application. The powder should be stirred with requisite quantity of water to form a paste and the paste shall be applied uniformly to maintain a

thickness of about 1.5 mm. and the surface shall be rubbed thoroughly with wooden trowel. Finishing should be done with steel trowel to give a shining appearence.

B -7 **DRY DISTEMPERING:**

Dry distemper of approved brand and manufacture shall be used. The shade shall be got approved from the Engineer - in - Charge before application of the distemper. The dry distemper shall be stirred slowly in clean water using 6 decilitres (0 - 6 litre) of water per kg. of distemper or as specified by the manufacture. Warm water shall preferably be used. It shall be allowed to stand for at least 3 minutes (or if practicable over night) before use. The mixture shall be well stirred before and during use to maintain an even consistency. Distemper shall not be mixed in larger quantity than is actually required for one day"s work.

Before new work is distempered , the surface shall be thoroughly cleared free from mortar dropping and other foreign matter and sand papered smooth. New plaster surface shall be allowed to dry for at least two months before applying distemper. In case of old work, all loose pieces and scales shall be removed by sand papering. The surface shall be cleaned of all grease ,dirt etc. Pitting in plaster shall be made good with plaster of Paris mixed with dry distemper of the colour to be used. The surface shall then be rubbed down again with a fine grade sand paper and made smooth. A coat of the distemper shall be applied over the patch. The surface shall be allowed to dry thoroughly before the regular coat of distemper is applied. The priming coat of whiting shall be applied and no white washing coat shall be used as a priming coat for distemper.

Whiting (ground white chalk) shall be dissolved in sufficient quantity of warm water and thoroughly stirred to form a thin slurry which shall be screened through a clean cloth. Areldite or equivalent adhesive to be added as per manufacturers specification and the mix then be diluted with water to the consistency of milk so as to make a wash ready for use.

The treated surface shall be allowed to dry before distemper coat is given. In the case of new work, the treatment shall consist of a priming coat of whiting followed by the application of two or more coats of distemper till the surface shows an even colour. For old work the surface is to be prepared as described above and one or more coats of distemper shall be applied till the surface attains an even colour. The application of each coat shall be as follows :-

The entire surface shall be coated with the mixture uniformly , with proper distemper brushes (ordinary white-wash brushes shall not be allowed) in horizontal strokes followed immediately by vertical ones which together shall constitute one coat. The subsequent coats shall be applied only after the previous coat has dried. The finished surface shall be even and uniform and shall show no brush marks. Enough distemper shall be mixed to finish one room at a time. The application of a coat in each room shall be finished in one operation and no work shall be started in any room , which cannot be completed the same day. After each day"s work , the brushes shall be washed in hot water and hung down to dry. Old brushes which are dirty or hardened with distemper shall not be used.

B - 8 **PAINTING :**

All surface for painting shall be properly sand papered and cleaned and where necessary good quality ready- mixed putty shall be used to hide all holes, cracks, open joints etc. The rate for painting includes such work. Paint shall be applied with approved brushes and surfaces shall be sand papered after drying of every coat. All work when completed shall present a smooth , clean solid and uniform surface , to the satisfaction of the Engineer- in -Charge.

a**)** **Primer :** All surface for painting , if they are new , should have a coat of priming before application of the paint. Old surface where existing paints have been completely worn out and raw wooden surface is exposed owing to long use should also receive a coat of priming before application of fresh painting. The primer should be of approved quality of ready mix primer.

i) **Wood Primer :** Wood primer of approved brand and manufacture is to be applied on the wooden surface which would be free from moisture and loose particles.

ii) **Steel Primer :** For steel surface red oxide primer , zinc chromate primer of approved brand and manufacture and as per direction of the Engineer - in -Charge is to be applied on the surface. The surface should be made free of grease , rust , moisture and loose particles. All blistered surface should be made free by hammering , filling or otherwise so as to have smooth surface before priming.

iii) **Cement Primer Coat (Alkali Resisting Primer) :** Cement primer coat is to be used as base coat on wall finish of cement, lime or lime cement plaster or on asbestos cement surface before application of any wall coating e.g. oil bound distemper ,oil based paints, synthetic enamel, plastic emulsion etc. on them. The cement primer is composed of a medium and pigment which are resistant to the alkalis present in the cement , lime or lime cement in wall finish and provides a barrier for the protection of subsequent coats of oil bound distemper or paints. Priming coat shall be preferably applied by brushing and not by spraying. Hurried priming shall be avoided particularly on absorbent surface. New plaster patches in old work before applying oil bound distemper paints etc. should also be treated with cement primer. The surface shall be thoroughly cleaned of dust ,all white or colour wash by washing and scrubbing. The surface shall then be allowed to dry for at least 48 hours. It shall then be sand papered to give a smooth and even surface. Any unevenness shall be made good by applying putty ,made of plaster of Paris with water on the entire surface including filling up the undulation and then sand papering the same after it is dry. The cement primer shall be applied with a brush on the clean dry and smooth surface. Horizontal stroke shall be given first. Vertical strokes are to be applied after horizontal stroke is absorbed on wall/ ceiling surface immediately afterwards. This entire operation will constitute one coat. The surface shall be finished as uniformly as possible leaving no brush mark. It shall be allowed to dry for at least 48 hours before oil bound distemper or paint is applied.

b) **Aluminium Paint :** Aluminium paint of approved brand and manufacture shall be used. The paint comes in compact dual containers with the paste and the medium separately. The two shall be mixed together to proper consistency before use. Each coat shall be allowed to dry for 24 hours and lightly rubbed down with fine grade sand paper and dusted before the next coat is

applied. The finished surface shall present an even and uniform appearance. As aluminium paint is likely to settle in the container , care shall be taken to frequently stir the paint during use.

c) **Plastic (Acrylic) Emulsion Paint :** Plastic (acrylic) emulsion paints are not suitable for application on external surface and surface which are liable to have condensation and are to be used generally on internal surface. For plastered surface a cement priming coat is required before application of plastic emulsion Plastic emulsion paint of approved brand and manufacture and of the required shade shall be used. The paint will be applied in the usual manner with brush or roller. The paint dries by evaporation of the water content and as soon as the water has evaporated the film gets hardened the next coat can be applied. The time for drying varies from one hour on absorbent surface to 2 to 3 hours on non- absorbent surfaces. Thinning will be particularly required for the undercoat which is applied on the absorbent surface. The quantity of thinner to be added shall be as per manufacturer‟s instructions. The surface on finishing shall present a flat ,velvety , smooth finish.

If necessary more coats will be applied till the surface present a uniform appearance.

Precaution :

i) Brushes should be quickly washed in water , immediately after use and kept immersed in water during break periods to prevent the paint from hardening on the brush.

ii) In the preparation of walls for plastic emulsion painting , an oil base putty shall be used in filling cracks , holes etc.

iii) Splashes in floors etc. shall be cleaned out without delay as they will be difficult to remove after hardening.

iv) Washing of surface treated with emulsion paints shall not be done within 3 to4 weeks of application or the time specified by manufacturer.

OIL EMULSION (OIL BOUND DISTEMPERING)

Materials :

Oil emulsion (Oil Bound) distemper (IS- 428-1969) of approved brand and manufacture shall be used. The primer where used as on new work shall be cement primer or distemper primer as described in the item. These shall be of the same manufacturer as distemper. The distemper shall be diluted with water or any other prescribed thinner in a manner recommended by the manufacturer. Only sufficient quantity of distemper required for days work shall be prepared.

The distemper and primer shall be brought by the contractor in sealed tins in sufficient quantities at a time to suffice for a fortnight‟s work ,and the same shall be kept in the joint custody of the Contractor and the Engineer. The empty tins shall not be removed from the site of work , till this item of work has been completed and passed by the Engineer.

Preparation of the Surface :

For new work the surface shall be thoroughly cleaned of dust, old white or colour wash by washing and scrubbing. The surface shall then be allowed to dry for at least 48 hours. It shall then be sand papered to give a smooth and even surface. Any unevenness shall be made good by applying putty , made of plaster of Paris mixed with water on the entire surface including filling up the undulation and then sand papering the same after it is dry.

In the case of old work ,all loose pieces and scales shall be removed by sand papering. The surface shall be cleaned of all grease , dirt etc. pitting in plaster shall be made good with plaster of Paris mixed with the colour to be used . The surface shall then be rubbed down again with a fine grade sand paper and made smooth. A coat of the distemper shall be applied over the patches. The patched surface shall be allowed to dry thoroughly before the regular coat of distemper is applied.

Application :

Priming Coat - The priming coat shall be with distemper primer or cement primer , as required in the description of the item.

If the wall surface plaster has not dried completely cement primer shall be applied before distempering the walls. But if the distempering is done after the wall surface is dried completely, distemper primer shall be applied

Oil bound distemper is not recommended to be applied , within six months of the completion of wall plaster.

Distemper Coat -

For new work ,after the primer coat has dried for at least 48 hours , the surface shall be lightly sand papered to make it smooth for receiving the distemper , taking care not to rub out the priming coat. All loose particles shall be dusted off after rubbing. One coat of distemper properly diluted with thinner (water or other liquid as stipulated by the manufacturer) shall be applied with brushes in horizontal strokes followed immediately by vertical ones which together constitute one coat.

The subsequent coats shall be applied in the same way. Two or more coats of distemper as are found necessary shall be applied over the primer coat to obtain an even shade.

A time interval of at least 24 hours shall be allowed between consecutive coats to permit the proper drying of the preceding coat. For old work the distemper shall be applied over the prepared surface in the same manner as in new work. One or more coats of distemper as are found necessary shall be applied to obtain an even and uniform shade.

15 cm. double bristled distemper brushes shall be used . After each day"s work brushes shall be thoroughly washed in hot water with soap solution and hung down to dry. Old brushes which are dirty and caked with distemper shall not be used on the work.

Touch Wood Finish -

Touch wood polyurethane clear wood finish to be applied whenever specified in the Bill of quantities as per the following direction of use :-

Touch Wood Clear Matt : is to be applied on filled wood surface , (Apcolite wood filler) which have been smooth sanded along the grains with emery paper No. 320. Staining with Apcolite wood stainer is also to be done. It is to be ensured that surface coated is free from all loose dust. TOUCHWOOD Clear Mat is a single pack system . The contents should be well stirred and strained through a clean muslin cloth prior to use. Two coat of touch wood to be applied by brush with thinner 101. The first coat of TOUCHWOOD Clear Mat should be allowed to dry for 6 - 8 hour prior to sanding and recoating. Container s should be well capped after use.

Flat Wall Painting : The painting coat shall consist of "Distempering Primer or Cement Primer" . The flat wall paint shall be of approved brand and manufacture and of required shade. The surface shall be prepared as described in sub-head " Cement Primer Coat" . Flat wall paint shall normally be applied on walls 12 months after their completion (in case of new work) , in which case Distemper Primer will be sufficient . If the walls are to be painted earlier the primer coat shall consist of cement Primer.

When the surface is dry , painting with the wall in uniform and even layers will be done to the required number of coats. Each coat shall be allowed to dry overnight and lightly rubbed with very fine grade of sand paper and loose particles brushed off before the next coat is applied. If after the final coat of wall paints the surface obtained is not upto the mark, further one or more coat as required shall be given to obtain a smooth and even finish at the cost of Contractor . If primer or wall paint gets thickened it shall be thinned suitably with the thinner as recommended by manufacturer.

B - 9 **TERRAZZO FLOORING (CAST IN SITU) I.S. 2114 -1962**

(a) i) The aggregates used in terrazzo topping shall be marble aggregates of required colour. Marble powder used in terrazzo topping shall pass through I.S. Sieve 30.

ii) Aggregates for terrazzo under layer as well as the base concrete shall conform to the requirements of ordinary cement concrete.

b) Cement used for floor finish work shall ordinary cement or white cement of approved quality as specified in the bill of quantity.

c) Pigments incorporated in terrazzo shall be of approved make and brand and of permanent colour.

d) The dividing strips may be of aluminium or glass or similar materials as specified in the bill of Quantities. The thickness of strip shall not be less than 1.5 mm and width not less than 20 mm.

(e) i) The base concrete shall be lean cement concrete of mix 1 : 3 : 6 or lime concrete of mix 18 : 36 : 100 and thickness shall be not less than 100 mm.

ii) The cushioning layer shall preferably be lime concrete of mix 18 : 36 : 100 and thickness shall be not less than 75 mm..

iii) The under layer shall be of cement concrete of 1 : 2 : 4 size of coarse aggregates not exceeding 10 mm. The thickness of terrazzo topping shall be not less than the following , depending upon the grades and size of chips used.

Grade No.	Size of Chips	Minimum thickness of topping
00	1 to 2 mm	6 mm
0	2 to 4 mm	
1	4 to 7 mm	9 mm
2	7 to 10 mm	12 mm

f) The mix for terrazzo shall consist of cement with or without pigments, marble powder , marble aggregates and water. The proportions of cement and marble powder shall be 3 parts of cement and one part of powder by WEIGHT. For every part of cement marble of powder mix, the proportion of aggregates by VOLUME shall be as follows depending upon the size and grade of marble aggregates :-

For grades 00.0 and 1	Proportion of aggregates to under mix
For grades 00.0 and 1	1. 1/4 Parts
2	1.1/3 Parts

g) The proportions of cement shall be inclusive of any pigments added to cement. The proportions in which pigments are mixed with ordinary cement or white cement to obtain different colour to the binder, shall be as specified in the following Table :

Colour	Pigment to be used	Proportion of pigment Portland Cement	Proportion ordinary cement	Proportion of white cement
Red	Red Oxide of iron	1	15 to 20	Nil
Black	Carbons black	1	25 to 40	Nil
Pink	Red Oxide	1	Nil	100 to 400
Cream	Yellow Oxide of iron	1	Nil	100 to 400
Yellow	lead chromed	1	Nil	25 to 75
Light Green	Green Chromium oxide	1	Nil	50 to 150
French Grey	----------	Nil	1 to 2	1

(h) i) Terrazzo topping shall be laid while the under after layer is still soft but is hardened sufficiently , normally between 18 and 24 hours. After the laying of the under layer , terrazzo topping may be laid. A cement slurry , preferably of the same colour as the topping shall be brushed on the surface immediately before laying is commenced.

The terrazzo topping shall be compacted thoroughly by tamping or rolling and trowelled smooth. Excessive trowelling or rolling in early stages shall be avoided. The compaction shall ensure that air is cleared from the mix.

ii) The surface shall be left dry for a duration of 12 to 18 hours and then be cured by allowing water to stand in pools over it for a period of not less than 7 days.

iii) Grinding and polishing may be done either by hand or by machine. The first and second grinding shall be done with carborundum stone of grit size 60 and 80 respectively. After each grinding , the surface shall be washed clean and grouted with neat cement grout of the same colour (without marble powder) of cream like consistency and then shall be allowed to dry for 24 hours and wet cured for 4 days. The third grinding shall be done with carborundum stone of grit 120 to 150 and the surface shall then be washed clean and allowed to dry for 24 hours and wet cured for 4 days. The fourth grinding shall be done with carborundum stone of grit size 320 to 400 and the surface shall then be washed clean and rubbed hard with felt and slightly moistened oxalic acid powder (5 grams of Oxalic acid powder per sq.m of floor area shall be adequate) and finally the surface shall be washed clean with dilute oxalic acid solution and dried.

B - 10 **ARTIFICIAL STONE FLOORINGS :**

All cement concrete surface should be chipped off properly before taking up flooring work. The artificial stone flooring shall be laid in panels of shape and size as directed. The casting of the panels will be so programmed as to prevent bonding on the freshly laid panel with adjacent panels.

Unless otherwise specified , the underlay shall be with graded stone chips 12 mm down the thickness of topping shall be of 10 mm. thick and colouring pigment as may be required shall only be added with the topping. The topping and the underlay shall not be laid in one operation . After laying the „ Underlay" the surface shall be left out to dry. The topping shall be laid only after the Underlay has sufficiently dried and after thoroughly brushing with hand wire brush and sweeping clean and after application of slurry. The topping shall be finished with an English trowel and a piece of clean dry linen. During all the stages, the required level shall be carefully observed and maintained. Suitable grading , where required shall be provided in the flooring for water drainage as directed by the Engineer- in - Charge.

The corner between floor and wall shall be round off if directed by the Engineer- in - Charge for which no separate payment shall be made.

(2) **Ironite flooring :**

Ironite flooring shall be done with the mixture of 6 mm. nominal stone chips, cement and Ironite powder (or equivalent metallic floor hardening compound). Four parts of cement to be mixed with one part of Ironite powder with requisite amount of water to form a paste . One part of the paste shall be mixed with two parts of 6 mm. nominal size stone chips with requisite amount of water to get workability and the mixture to be laid over a backing of 40 mm. thick cement concrete (4 : 2 : 1) (4 parts of graded stone aggregate 20 mm. nominal size : 2 parts of coarse sand : 1 part of cement) . The mixture shall be laid uniformly to maintain a thickness of 12 mm. and the surface should be finished smooth with steel trowel. Immediately after the flooring surface is finished it shall be protected from rapid drying by erecting barriers against wind, or strong sunlight.

As soon as the surface is hardened curing shall be started and continued for at least ten days by means of wet gunny bags or stagnating or by standing water with mud bunds.

TERRAZZO (MOSAIC) TILES :

Materials :

a) Marble mosaic tiles (Terrazzo tiles) shall be of the colour and pattern approved by the Engineer and the size shall be 25 cms. x 25 cms. They shall conform to IS : 1237 in respect of constituent materials , manufacture , shape , dimensions , tolerances , wearing layers, colour and appearance , general quality, strength resistance to wear , water absorption etc. Prior to use , the samples of tiles shall be approved by the Engineer who shall keep them in his office for reference. Tiles shall be properly cured by immersion in water before incorporation.

Tiles shall conform to the detailed specification , and shall be of colour and pattern as approved by the Engineer , who shall keep samples in his office for reference.

Mortar for bedding the tiles shall be in the proportion of one part of cement to four parts of sand. The mortar shall be thoroughly mixed either manually or mechanically. The water added shall be the minimum required to give sufficient plasticity in laying and compacting. Care shall be taken in the preparation of the mortar to ensure that there are no hard lumps that would interfere with the even bedding of the tiles.

CONSTRUCTION DETAILS :

a) A bed of cement mortar consisting of one part of cement to four parts sand shall be laid and properly levelled to an average thickness of 20 mm. , the surface being kept slightly rough to provide a key for the tiles.

b) Neat cement paste of honey like consistency shall be spread over the mortar bed over such an area as would be covered by about twenty tiles.

c) Tiles should be soaked in water for 15 minutes and allowed to dry for an equal amount of time before being laid.

d) The tiles shall then be coated with a thin coat of cement paste on the back and fixed in place and gently tapped with a wooden mallet till it is properly bedded and level with the adjoining tiles. The joints between tiles shall be fine and nearly imperceptible (1.1/2 mm maximum.).

e) After tiles have been laid in a room or a days work completed , surplus cement paste that has come out of the joints should be wiped clean. A thick slurry of coloured cement , matching the colour of the tiles is then spread over the laid tiles and rubbed so as to seal even the thinnest joint between the tiles.

f) The floor shall be cured for 14 days.

g) The floor shall be polished and finished in accordance with IS : 1433.

Skirting :

Skirting shall be 25 cms. high unless otherwise specified and shall perfectly match with the adjacent flooring. Mortar used shall be 1 :4 cement mortar and polishing shall be done by hand to a smooth and plane surface . Skirting tiles shall be as per 1 A, 2 A, and 3 A 1B , 2 b, and 3 B shown in IS : 1237.

POLISHED STONE TILE WORKS :

This item relates to the requirements of furnishing materials and installation of Polished Stone Tile work. The types of work that are mainly intended under this head are Marble , Kota, stone Dholpur stone , Agra red stone , Tandur, Shahabad or Cuddappah stone slabs in flooring and wall facing.

Reference to Standard specifications :

IS : 1805 - Glossary of terms relating to stone , quarrying and dressing.

IS : 1129 - Dressing of Natural Building Stones.

IS : 1143 - Laying and finishing of natural Building stones.

IS : 1128 - Line stone (Slabs and tiles)

IS : 1130 - Marble (Blocks , slabs and tiles)

IS : 3622 - Sand stone (Slabs and tiles)

Materials :

Stone shall be of the best quality available in the locality and of specified colour. The stones shall stand weathering and when immersed in water for 24 hours shall not absorb more than

5% of its dry weight, when tested according to IS : 1124. All stones shall generally be freshly quarried and shall not have any streaks or flaws and shall be free from discolourations , oil or any unwanted matter that may prevent adhesion of mortar or be otherwise harmful to the work. Particular attention shall be paid to uniformity of colour and matching patterns and grains. The thickness shall be as specified in the detailed specifications.

Laying and Polishing :

The tiles shall be machine cut to specified sizes and shall be of approved colour and quality. They shall be of specified thickness and laid to patterns as directed. The floor surface to be tiled shall be thoroughly brushed and scrubbed and profusely watered and cleaned. Mortar for bedding shall be as specified and shall be no less than 3/4" (20 mm) thick.

Immediately each stones is laid it shall be tapped with a wooden mallet and set joints shall be not more than 1 mm thick. The floor shall be perfectly even with no depressions or mounds as per levels indicated and joints shall be in line. Joints shall be grouted with cement mortar of matching colour with the tiles. The tiled surface shall be kept wet and allowed to set for 14 days No movement of personnel be allowed over newly set tiles for at least 3 days.

After the work has set , the surface shall be machine polished to be satisfaction of the Engineer-in-Charge. The final polish shall be with Oxalic Acid.

GLAZED TILES :

General :

This item relates to the furnishing of materials and installations of glazed tiles in flooring ,dado, and also in counters , shelves, sinks etc. Tiles shall conform to IS : 777 and workmanship shall be per IS : 1443.

Materials :

The tiles shall be of first quality of „ SPARTEX"/ „ REGENCY „ or other approved manufacturers. The size of tiles shall be as specified as directed in the drawing and shall be at least 6 mm thick. No chipped ,cracked, crazed or warped tiles shall be used. Glazed rounded corners and cups (convex or concave) shall be provided at corner of walls , edge, junctions of floor and dado etc., if so specified. The mortar shall be in the proportion 1 : 3. Preparation of mortar shall be as specified for Terrazzo tiles.

Laying :

The fixing shall generally conform to IS : 1443.

Workmanship :

The surface to be covered shall be plastered rough to a thickness of 20 mm. Fix 12 mm size stone chips (5 no. one in each corner and one in the middle of each tile with Adhesive viz., Areldite of equivalent for keying action) and the tiles shall be soaked in water for at least 2 (two) hours prior to fixing at site. A thin layer of cement paste shall be buttered on the back of the tile and on the side after which the tile shall be pressed and tapped home taking care that the corner tiles are perfectly matching. After the backing coat has set the tile joints shall be grouted with neat, white cement slurry with necessary pigment. All surplus slurry that remains on the surface shall be carefully wiped off before it sets. Care shall be taken to ensure that the finished surface is absolutely plumb and to proper levels without any profusions , waviness or zig- zag. Joints between tiles shall be uniform in straight level lines. After completion of the entire work or part of it , the surface shall be cleared of all stains , cement etc., by washing with oxalic acid (1:10) or any other approved compound.

(1) CARPENTARY WORK :

Door , Window, Frames and Shutters :- All doors , window frames must have plaster rabbit 12mm x 12mm. Rabbit for receiving shutter 12 mm deep. Wood work shall not be painted , oiled or otherwise treated before it has been approved by the Engineer - in - Charge. All portion of timber abutting against or embedded in masonry or concrete shall be painted with boiling coal tar or creosote, before being placed in position. In case of door frames without sills, the vertical members shall be buried in floor 40 mm deep . When sills are provided these sills shall be sunk in

the floor to 40 mm depth and shall rest on damp- proof course. Sills shall be provided , where so directed . The door frames without sills while being placed in position , shall be provided with temporary wooden bracing or dry bricks well wedged between the styles at the sill level . These shall be retained to keep the frames from warping during construction. The frame shall also be protected from damage during construction.

EXTERNAL DOORS :

All external doors should be Factory -made Panel doors made of kiln seasoned and chemically treated commercial hardwood (hollock timber of Assam or approved variety timber) to all styles and rails accurately plained , and rounding shaped to the size rebates , and rounding as per dimensions shown in drawings , jointing or plugging to knots of any kind shall not be permitted. All panels are of 12 mm thick waterproof pressure treated plywood (conforming to I.S. 4990-1969) of full width of panel . Panels other than one parts are not permissible.

Door , Window Clamps or Holdfasts :

a) unless otherwise specified the clamps shall be fixed to outer side of the frame with screws. For the purpose of receiving clamps a recess of at least 12 mm deep of suitable size shall be cut into the frame. After fixing the frame true to plumb with the clamps, the exposed face of the clamps shall be covered by a thin wooden covering fixed with screws.

b) the side of the door ,window frames which remains in contact with masonry shall invariably be painted with coal tar or creosote oil.

Schedule of Fittings :

i) Fittings shall be of iron , aluminium or as specified .

These shall be well made , reasonably smooth and free from edges , corners, flaws and other defects. Screw holes shall be counter sunk to suit the head of specified wood screws. All hinge pins shall be of steel and their riveted heads shall be well formed.

Iron fittings shall be finished bright or black enamelled or copper oxidised. Brass fittings shall be finished Bright ,Brass-oxidised or Chromium - plated (electroplated) and all aluminium fitting shall be of extruded section and surface screwed should be used. Fittings shall be got approved by the Engineer- in - Charge before fixing .

ii) Screws used for fittings shall be of the same metal and finish as the fittings. However , anodised brass screws or chromium brass screws shall be used for fixing aluminium fittings.

iii) Fittings shall be fixed in proper position as shown in the drawings or as directed by the Engineer- in - Charge. These shall be truly vertical or horizontal as the case may be. Screws shall be driven home with screw driver and not hammered in. Recesses shall be cut to the exact size and depth for the counter -sinking of hinge.

(2) **FALSE CEILING :**

These specifications refer to the supply and installation of False ceiling.

Materials :

a) **Suspension System :**

The main load bearing member shall be a rectangular pressed metal formed section of size 2" x 1.5 " fabricated from 22 gauge G.I. sheet. The cross runners or furring channel shall be in the form of a trough 2" x 3/8 " fabricated from 24 gauge G.I sheet. Wall angles shall be 1" x 1". The main runners or load bearing members shall be suspended from the R.C. Roof by means of a metallic expansion fastener. The hanger rods with threaded ends and 2 heavy M.S. Checknuts shall hold the main runners with level adjusting holding clamp of size 3" x 1". The main runners shall be fixed at 3 feet centre to centre and the cross runner shall be fixed to the underside of the main runners at a distance not greater than 1"-6 " and at right angles to the main by means of Galvanised Clips diagonally , made of 10/12 SWG G.I. Wire.

b) **Ceiling Tiles :**

The ceiling tiles shall be 12 mm teakwood particle board plain tiles bonded with phenol formaldehyde synthetic resin or as specified. They shall be of approved quality and manufacture .

Workmanship :

After the runners are fixed at the required height they shall be checked for straightness. They shall be made perfectly level by means of the threaded hangers. Before fixing the tiles, the upper surface and edges of the tiles shall be treated with double coat of double boiled linseed oil or water- resistant varnish. They shall then be screwed on to the underside of the cross runners. Care must be taken that the tiles present an absolutely flat and level surface and that all joints are perfectly straight. All joints shall be sealed with filler of approved quality.

(3) **A.C.SHEETING :**

This item of specification relates to the furnishing of materials and installation of asbestos cement sheets for roof, cladding and ceilings including specials and accessories.

Reference to Standard specifications.

The provisions of the following Indian standard specifications shall form a part of this specification in so far as applicable or referred to specifically , hereinafter.

IS : 459 - Specifications for un-reinforced corrugated asbestos cement sheets.

IS : 730 - Specification for fixing accessories for corrugated sheet roofing.

IS : 1120 - Specifications for steel square or hexagonal head coach screw with gimlet points.

IS : 2098 - Specification for asbestos cement building boards.

IS : 3007 - Code of practice for laying of asbestos cement sheets Part -I corrugated sheets.

IS : 3007 - -do- Part II semi- corrugated sheets.

Materials :

a) **Corrugated or Semi - Corrugated Asbestos Sheets :**

The asbestos cement sheets (corrugated or semi - corrugated) shall conform to the requirements of IS : 459. The sheets shall be free from cracks , deformities and other defects and damage when laid in place. All defective and damage sheets shall be removed and replaced.

b) **Plain Asbestos Sheets :**

Plain asbestos sheets shall conform to the requirements of IS : 2098 and other requirements regarding defects and damages in (a) above.

c) **Fixing Accessories :**

Fixing accessories such as J- Bolts , roof washers etc., shall conform to the requirements of IS : 730. They shall be at least 8 mm in diameter.

Storage , Handling and Safety Precaution :

Provisions of clause No. 6 & 7 IS : (Part -I) or IS : 3007 (Part -II) shall apply with regard to storage , handling and safety precautions. All damages caused due to inadequate care in transport , handling , storage etc., shall be borne by the Contractor.

Laying and Fixing of sheets :

In laying and fixing of sheets , all applicable requirements of IS : 3007 (Part - I) for corrugated sheets and IS : 3007 (Part -II) for semi- corrugated sheets shall be followed.

Specials and Accessories :

Various specials like north - light curves valley gutters, corner pieces, aprons etc., shall be furnished and installed .

Finished Surface :

Finished Surface shall be smooth and leakproof. Slope or fall shall be 1 to 50 unless otherwise specified and shall be sloped from ridges to outlets. The junction of roof and parapet wall shall be neatly rounded off. Average thickness shall be as specified.

(4) **BITUMEN MASTIC FOR WATER PROOFING OF ROOF :**

It should be carried out as per IS : 4365

(5) **RAIN WATER PIPES**:

Materials :

P.V.C Pipes :

P.V.C pipes shall conform to the relevant specifications of IS : 4985. (Pipes shall be Wavin make or equivalent) . They shall be made of unplasticised polyvinyl chloride and shall be with good surface finish , mechanical strength and opacity. During manufacture , only those additives may be added which are required to produce the above characteristic. No additives shall be added separately or together in quantities sufficient to constitute toxic hazard, or impair the fabrication or welding properties of the pipe , or impair its chemical or physical properties. Addition of the manufacturers own re-work material is permissible only upto10 %. Pipes shall be spigot and socket type. Pipes shall have pressure rating (Class 3). Tolerance shall be as per IS : 4985.

ii) **Jointing P.V.C. Pipes :**

The pipe shall be cut to the length required with a hacksaw. Pipe shall be cut square. The socket and spigot shall be clean and dry and burrs removed , both inside and outside , with a file. The surface of the lengths to be in contact shall be roughened with emery paper, and dry fit checked. A thick coat of solvent cement shall be applied to the outer surface to the spigot and on the inside surface of the socket by means of a brush.

Solvent cement shall be of approved make and manufacture. The pipe shall then be inserted into the socket and turned for 90^0 to ensure even distribution of cement. Excess solvent cement shall be wiped off.

(6) **STEEL WORK :**

Mild Steel Grills :

These should be made of the best quality material and shall be of the shape , size and pattern ordered. They shall be free from dust , burrs, blisters and cracks . Welding shall be neatly done and all slag chipped off, before primer coat is applied . Spot welding only will not be accepted.

Grills shall be true to shape and accurate in dimensions so that they fit exactly into the door/window frame. They shall be fitted into the frame by means of 10 mm square steel lugs welded to the grill. If screws are used , the screw heads shall be welded to the grill and welding is ground off neatly.

Rate shall include cost of materials, cutting , fabricating , transport to site, fixing etc. , complete with one coat of shop paint. Rate shall be in sq.m. or kg. as specified.

STEEL WINDOW / VENTILATORS:

General :

a) All steel casement windows and ventilators shall be of approved make and quality and shall conform to IS:7452. Putty for glazing shall be as specified in IS:420. Hinges shall be of projecting type. Handles and peg- stays shall be of steel or as specified. Suitable legs to be provided for fixing.

b) Glazing clips shall be provided at a spacing not exceeding 30 cms. The holes for the same will have to be drilled during fabrications by the manufacturer and not while fixing glazing.

c) The sections for the fixed and hinged frame shall be mitred and electrically flash butt welded to form a solid and true right angle.

d) All windows shall be thoroughly cleaned of rust , mild scale dirt, oil etc., either by mechanical or by chemical means and be given 2 coats of primer.

e) All steel casement windows and ventilators etc., shall be stacked vertically at site and proper care taken that they are not warped or twisted.

Construction Operation :

a) Casement shall be fitted to their frames by the Contractors as to provide continuous contact for weathering on the inside and outside and shall be secured in closed position by the fittings which shall have been properly checked and adjusted.

b) All windows ,ventilators shall be got checked by the Engineer-in-Charge before erecting in position.

c) All the steel windows are to be fixed in brick masonry or concrete on the sides and concrete lintel on top and sill at bottom.

d) The sizes of the prepared openings should be checked first and these should be cleared of all the obstructions. All the units shall be fixed into the opening. They shall not be forced into the openings which are not square or too small. The sizes shown on drawings are those of the opening before plastering. The size of the window , ventilators shall be 15 mm less all round to allow for plastering . The frames of each unit shall be grouted with cement mortar (1 : 2) tamped into the channel of the frame.

e) The windows , ventilators shall be erected and set straight to plumb level and shall operate satisfactorily after fixing.

f) Directly after fixing , and before glazing , the units shall be thoroughly cleaned , set and bedded and then painted with one coat of paint. After glazing , the final coats of paint shall be applied. In no circumstances, shall the finishing coats contain lithophone or carbon black.

g) There shall be no direct contact between glass and metallic part of the frame without a layer of putty in between.

GLAZING :

Glass for glazing shall be as specified in the drawing and/ or specifications. All glass shall be sheet free from spots, stains , air bubbles, waviness or other defects.

All glazing shall be bedded on putty and secured by glazing clips and putty of approved quality. Where the unsupported area of glazing is less than 1.50 sq.m. 4mm glass shall be used. Where unsupported glazing area is 1.50 sq.m. or more , thickness of glass shall be 5.5 mm . All glazing shall be cleared of all cement , paint and other stains , putty etc. before handing over.

ROLLING SHUTTERS AND GRILS :

Rolling Shutters :

The rolling shutters shall be of approved make and the design and shall be suitable for fixing in the position shown in the drawing i.e. , inside, outside, or below lintel or below joists. The shutter shall be of the manually push and pull type upto 9 sq.m. If the area of the shutter is between 9 sq.m. and 12 sq.m. There ball bearing shall be provided for easy operation . When the area is more than 12 sq.m. mechanical gear arrangements shall be provided. The rolling shutters shall generally conform to IS : 6248. The shutter shall be complete with door suspension , shafts, locking arrangements, pulling handles and other accessories. The slats shall not be less than 1 mm. in thickness.

Mode of Measurement :

a) Measurements shall be in Sq.m

b) Payment shall be made for the clear size of the opening only and the Contractor shall include in his rate for the side guide rails , pipe shaft , springs, hood/ cover and brackets.

c) Rate shall include for all materials, fabrication , transport , erection , maintaining in place till completion of the job. One coat of shop paint , all tools ,tackle , plant , equipment , scaffolding etc., required for the completion of the job as per the specifications.

COLLAPSIBLE GATE/ DOOR

The Collapsible gate / door shall be of approved make and design . It shall be of single or double leaf as indicated in the drawing made out of 20 mm gate channel with jointing of 20 mm x 5 mm throughout the length and height of the gate , fitted with ball bearings, handles and a coat of red- oxide paint . The spacing of lattice shall be 150 mm both ways.

The rollers shall be of 40 mm dia. and fixed to alternate lattices at the bottom . The rollers shall roll over a Tee rail fixed inside a channel box. The top guide shall also be a continuous channel section. The fixed end of the shutter shall be fixed to the joints by welding the shutter to top plate insert already left in wall complete with locking arrangements and all accessories.

(7) ALUMINIUM DOORS & WINDOWS AND PARTITIONS .

Materials :

a) All sections shall be obtained from approved , reputed , manufacturers such as Jindal or Indal and shall be extruded from aluminium alloy conforming generally to IS : 733 - 1983 and IS : 1285 - 1975.

b) Sections shall be as per detailed drawings and generally , conform to IS : 1948.

c) All sections shall be anodised in natural matt finish or such colour as specified . The thickness of anodising shall be a minimum of 20 microns and the contractor shall furnish necessary evidence in proof of this to the satisfaction of the Engineer-in-Charge.

d) The engineer at his discretion may send samples to an independent laboratory for testing at the cost of the contractor and if the test report from the laboratory indicates any deficiency the materials shall be rejected.

Workmanship :

a) All frames for windows , ventilators , doors partitions etc., shall be flat , with all corners at right angles and shall not be warped.

b) Frames shall be fabricated from sections machine cut to length , mitred and rivetted with clips at corners. Sub- dividing bars shall be tenoned and rivetted into the frame.

c) Side hung windows shall generally have projecting -type hinges made of aluminium alloy and rivetted/ welded to the frames , and shall have stainless steel pins . Peg stays , handles and locking arrangement shall be of approved quality and design.

d) Sliding windows shall be 2 track or 3 track as specified . Shutters shall have approved quality rollers and neoprene gasket to ensure easy and noiseless operation and fully weather seal.

e) Hinged door shall be provided with approved quality floor springs , and aluminium push plates. Push plates shall extend the full width of the shutter , and shall be provided with tower bolts and approved quality lock.

f) Partitions profile are to be made from anodised aluminium rectangular tube section of „INDAL" made measuring 63.50 mm x 38.10 mm x 2.5 mm (thick) complete with all

accessories. Partition panels are to be either 6 mm thick MODI GUARD FLOAT GLASS or with cement bonded particle board (BISON BOARD or EQUIVALENT) of 10 mm thick or as specified in the drawing.

All the members of all shutters have built -in grooves to take on snap on aluminium beading. Neoprene gaskets shall be provided to prevent direct contact between glass and aluminium and make the shutter completely weather seal. Lead lining is to be provided for doors, windows and partitions of X- Ray Room as per manufacturers specification .

g) The contractor shall measure each opening before fabrication. The employer shall not be responsible for any variation in the widths and heights of openings .

h) Frames shall be fabricated so that during fixing 6 mm clearance is obtained all round .

i) The contractor before fabrication shall submit shop drawings to the Engineer-in-Charge for prior approval.

j) Before erecting , frames coming in contact with masonry , plaster , concrete or dissimilar metals shall be coated with a coat of zinc chromate conforming to IS : 104 . The contractor shall cover the frames with a transparent lacquer or other protective materials to protect the member from contact with cement during installation.

k) Plain or tinted glass glazing , as specified shall be fixed.

i) Cement Bonded Particle Board partition panels should conform to IS : 14276 - 1995. The Boards used for partition should be resistant to weather , fire, termite and fungus . It should act as sound insulation and should be chemically stable and have smooth surface and good workability with normal wood working tools. The size and thickness of panels should be as specified in the Bill of Quantity. The board panels for partition wall should be constructed with steel stud or Aluminium Stud or Timber Stud as specified and fixing of Board to the Stud should be done as per manufacturers specification.

m) On completion , the contractor , shall wash the aluminium work with non- alkali soap and water.

Mode of Measurement and Payment :

a) Measurement shall be in Sq.m.

b) The rate for Doors , window and Glass partitions shall include for all materials including glazing , fabrication , transport to site, erection , cost of scaffolding , maintaining in position till completion of job and including all tools, tackle , plant and equipment and all other necessary works incidental to the completion of the work as per these specifications. For partitions with Bison panel in Aluminium frame the rate should also be inclusive all materials labour and tools and plants.

c) Doors shall be measured as follows :

Height , from sill to outer edge of top member of frame . Windows shall be measured from outside edge to outside edge of the frame .

(8) PRE-CONSTRUCTION ANTI-TERMITE TREATMENT

a) Treatment to the bottom surface (in case of Masonry Foundation) and the sides (upto a height of 300 mm) of the excavation with chemical emulsion by admixing 1.0% by weight of concentrated Chloropyrifos or equivalent emulsified with water as specified in Code IS-8944-1978 at the rate 5 litres per square metre area. The work shall be carried our as per Code IS-6313 (Part-2) –1981.

b) Treatment to the backfill of the Masonry foundation with chemical emulsion as described above at the rate of 7.5% litre per sqm. Of the vertical surfaces of the substructure for each side of the foundation. The work shall be carried out as per Code IS-6313 (Part-2)-1981.

c) Treatment to the top surface of the consolidated earth within plinth walls shall be treated with chemical emulsion as described above at the rate of 5 litres per sqm. of the surface before sand bed or sub grade is laid. If the filled earth has been well rammed and the surface does not allow the emulsion to seep through holes upto 50 to 75 mm deep at 150 mm centre to centre both ways may be made with 12 mm diameter mild steel rod on the surface to facilitate saturation of the soil with the chemical emulsion. The work shall be carried out as per Code IS – 6313 (Part-2) –1981.

d) Treatment at the junction of the wall and floor upto the level of filled earth surface by making a small channel 30 mm x 30 mm at all the junction of wall and floor (before laying the sub-grade) and rod holes made in the channel upto the ground level 150 mm apart and iron rod moved backward & forward to break up the earth and chemical emulsion , as described above , poured along with channel at the rate of 7.5 litres per sqm. Of vertical wall to soak the soil right to the bottom . The soil shall be tamped after operation. The work shall be carried out as per Code IS-6313 (Part-2) –1981.

e) Treatment to the external Perimeter of building with chemical emulsion by admixing 1.0% by weight of concentrated Chloropyrifos/ equivalent emulsified with water as specified in Code IS-8944-1978 including digging holes in the soil along and parallel to the wall upto a depth of such extent that chemical emulsion will be dispersed to a depth of 300 mm from Ground level by rodding with 12 mm dia M.S.rod at 150 mm internal 2.25 litres quantity of chemical emulsion per metre length shall be used. The work is to be carried out as per Code IS-6313 (Part-2) –1981.

POST CONSTRUCTION ANTI-TERMITE TREATMENT

a) Anti-termite treatment to the outside of foundation with chemical emulsion by admixing 1.0% by weight of concentrated Choloropyrifos or equivalent emulsified with water as specified in Code IS.: 8944 –1978 including cutting shallow channel by excavating soil along and close to the wall face upto a depth such extent that Chemical emulsion will be dispersed to a depth of 300 mm from ground level by rodding with 12 mm dia M.S. rod at 150 mm interval 2.25 litres quantity of chemical emulsion per metre length shall be used. The work is to be carried out as per Code IS: -6313 (Part-3)-1981.

b) Anti-termite treatment of the soil under floor with chemical emulsion or equivalent by admixing 1.0% by weight of concentrated Choloropyrifos or equivalent emulsified with water as specified in Code IS: 8944-1978 including drilling vertically 12 mm holes at the junction of floor and walls at 300 mm intervals to reach the soil below, using hand operated pressure pump to squirt chemical emulsion into the holes at the rate of one litre per hole. The holes shall be sealed after operation to match with existing floor. The work is to be carried out as per Code IS: - 6313 (Part –3) –1981.

c) Anti-termite treatment to the junction of woodworks and masonry walls with chemical emulsion by admixing 1.0% by weight of concentrated choloropyrifos or equivalent emulsified with water as specified in Code IS:-8944 –1978 including spraying at the points of contracts with the adjoining masonry by drilling 6 mm holes as a downward angle of about 45 deg. At the junction of woodwork and masonry and squirting chemical emulsion into these holes at the rate of half litre per hole. The holes shall be sealed after operation . The work is to be carried out as per Code IS-6313 (Part-3)-1981. The shutters are to be sprayed with emulsion on both sides. All wooden fixtures like almirahs, racks , etc. Also to be thoroughly sprayed with chemical emulsion.

TECHNICAL SPECIFICATIONS FOR PILING WORK

A. Particular specification for Bored Cast-in-situ piles

Unless otherwise mentioned in the following paragraphs, stipulations of relevant section ofl.S.2911 shall be followed:-

1. The layout and number of piles shown in the Tender Drawing are based on allowable carrying capacity on the piles section as given in the drawing.

2. Boring equipment and accessories shall generally conform to I.S. 2911. Boring may be done by either rotary or percussion equipment or direct mud circulation method. In case of unstable soils the boring tools used should be such that suction efforts are minimized. Stabilization of the sides of the bore-hole shall be done by the use of bentonite slurry or casing. The size of cutting tool shall not be less than diameter of the pile by more than 75 mm.

3. The drilling mud shall be used at least from the level of sub soil water or from the level of bottom of M.S. liner depending upon site conditions and the hole shall than be always kept full with the fluid which should preferably be kept in motion. The density and composition of the fluid shall be such as to suit the requirements of the ground conditions and to maintain the fine materials from the borings in suspension. A 5% bentonite suspension would be generally suitable and its quality shall conform to specification given in Appendix 'A' of I.S. 2911 (Part l/Sec-2).

4. The bottom of the hole shall be cleaned very carefully before concreting work is taken up. The cleaning of the hole shall be ensured by careful operation by air lifting process, unless otherwise allowed by the Architect/Engineer.To lift the soil at founding level before concreting, bore hole shall be agitated by jetting with fresh drilling much with relatively higher pressure than that used during boring of air through tremie pipe. While boring by use of drilling mud, the specific gravity of the mud suspension in the vicinity of the bottom of bore hole shall be determined by suitable slurry sampler in the first few piles and at suitable interval of piles and recorded. Consistency of the drilling mud suspension shall be controlled throughout the boring as well as concreting operation in order to keep the hole stabilized as well as to avoid concrete mixed up with thicker suspension of the mud.

5. In case of boring with casing, the casing should be used from the ground level. The casing shall be kept ahead of boring in cases where there is danger of caving-in due to subsoil water entering into the bore hole or where the soil is loose.

While boring below sub soil water level, precaution shall be taken so that no boiling of the bottom of the hole occurs due to difference in hydrostatic head.

6. Concreting of bore holes shall start *as* soon as possible after its completion. Should a bore hole, be left un-concreted for more than two hours, it shall be cleaned thoroughly as directed by the Architect/Engineer.before placing concrete. Concreting under water shall be done in one operation. Concrete shall be placed by means of a tremie pipe. It shall, however be ensured that concrete entering the tremie pipe does not get mixed in with the slurry and % kg. of granulated vermiculite shall be poured in the tremie pipe before pouring concrete as directed by the Architect/Engineer.

7. The tremie pipes and funnel shall be filled and lifted just 15 cm above bottom before releasing the concrete column to facilitate flushing out the bottom. The concrete levels in the tremie shall be checked every few feet in order to note the difference, if any, between the theoretical quantity that should have been placed and actual quantity that has gone in.This is to locate the position of over cut during boring.

In addition to the normal precautions to be taken in tremie concreting as per relevant section of IS: 2911 the following specifications shall be particularly applicable for the use of tremie concrete pipes:

a) The concrete shall be coherent, rich in cement (not less than 400 kg/cum) and of slump not less than 100 mm.

b) The hopper and tremie shall be a closed system embedded in the placed concrete, through which water cannot pass.

c) The tremie shall be large enough with due regard to the size of the aggregate. For 20-mm aggregate the tremie pipe shall be of diameter not less than 200 mm, aggregates more than 20 mm shall not be used.

d) The first charges of concrete shall be placed with a sliding plug pushed down the tube ahead of it or with a steel plate of adequate site of prevent mixing of concrete and water. However, the plug shall not be left in the concrete as a lump.

e) The tremie pipe shall always penetrate well into the concrete with an adequate margin of safety against withdrawal of the pipe is surged to discharge the concrete.

f) The pile shall be concreted wholly by tremie and the method of deposition shall not be changed part way up the pile, to prevent the laittance from being entrapped within the pile.

g) All tremie tubes shall be scrupulously cleaned after use.

Normally concreting of the piles shall be uninterrupted. In the exceptional case of interruption of concreting but which can be resumed within 1 to 2 hours, the tremie shall not be taken out of the concrete. Instead it shall be raised and lowered slowly from time to time to prevent the concrete around the tremie from setting. Concreting should be resumed by introducing a Irttle richer concrete with a higher slump for easy displacement of the partly set concrete.

If the concreting cannot be resumed before final set of concrete already placed the pile so cast may be rejected or accepted with modifications at the sole discretion of the Architect/Engineer.

In case of withdrawal of tremie out of the concrete, either accidentally or to remove a choke in the tremie, the tremie may be reintroduced in the following manner to prevent impregnation of laittance of scum lying on the top of (he concrete already deposited in the bore.

The tremie shall be gently lowered on to the old concrete with very little penetration initially. Avarmiculrte plug shall be introduced in the tremie. Fresh concrete of slump between 150 mm and 175 mm shall be filed in the tremie, which will push forward and will merge out of the tremie displacing laittance/scum. The tremie will be pushed further in steps making fresh concrete sweep away laittance/scum in its way. When tremie is buried by about 60 to 100 cm concreting may be resumed.

8. The top of conrete in a pile shall be brought 1 metre above the cut off level to permit removal of all laittance and weak conrete before capping and to ensure good concrete at the cut off level for proper embedment into the pile cap. Remaining length of bore is to be filled by silver sand.

When concrete is placed by tremie method, concrete shall be cast to the piling platform level to permit overflow of concrete for visual inspection or to a minimum of one metre above cut-off level. In the circumstances, where cut-off level is below ground level the need to maintain a pressure on the onset concrete equal to or greater than water pressure shall be observed and accordingly length of extra concrete above cut-off level shall be determined and allowed in works.

During installation of piles the sequence of construction shall be as directed by the Architect/Engineer.

9. In case defective piles are formed, they shall be removed or left in places whichever is convenient without affecting performance of the adjacent piles or the cap as a whole. Additional piles shall be provided at Contractor's cost to replace them as

directed by the Engineer and in this regard Engineer's decision shall be binding on the Contractor.

Any deviation from the designed location alignment or load capacity of any pile shall be noted and adequate measures taken well before the concreting of the pile and plinth beam if the deviations are beyond the permissible limit. All such alterations shall be done at Contractor's cost.

10. Pile shall be installed accurately as possible as per the designs and drawings. Pile shall not deviate more than 75 mm or one-tenth of diameter whichever is more. In case of piles having diameter more than 600 mm it will not deviate more than 100 mm from their designed position. In case of single pile in a column, positional tolerance shall not be more than 50 mm.

In case of piles deviating beyond these limits and to such an extent that the resulting eccentricity cannot be taken care of by a redesign to the pile cap or pile tiles, the piles shall be replaced or supplemented by one more additional piles by the Contractor at his own cost along with any additional cost for pile cap being over size. The decision taken in this regard by the Architect/Engineer, shall be final and binding on the Contractor.

11. Manual chipping shall be permitted after three days of pile casting. Pneumatic chipping of permitted by the Architect/Engineer.shall not be started before 7 days. In case, Portland Pozzalana Cement is used, shipping shall only be started as directed by the Architect/Engineer.

12. When working near existing structure, care shall be taken to avoid any damage to such structure. In the case of cased bored pile care shall be taken to avoid effect due to loss of ground.

In case of deep excavations adjacent to piles, proper shoring or other suitable arrangement shall be done to guard against the lateral movement of soil stratum or releasing the confining soil stress.

13. Main longitudinal reinforcement in the length of the piles as well as links or spirals shall be provided as shown in the drawing. Longitudinal bars shall preferably be in one length. Reinforcing cage shall be handled and installed carefully without damaging its shape.

All other requirements or reinforcement bars i.e. quality, workmanship, etc. shall be specified for reinforced concrete work in the relevant I.S. Codes.

14. During installation of pile the following date shall be recorded along with any other date as directed by the Architect/Engineer.. These dates shall be submitted to the Architect/Engineerin triplicate on completion of installation of each pile. Recording of date of

a) Sequence of installation of piles in a group.
b) Dimensions of the pile, including reinforcement details and mark of pile.
c) Details of mild steel lines were provided along with stiffener.
d) Depth bored and founding level along with a bore level indicating nature of stratum.
e) Time taken for penetration of every 15 cm during last 2 m depth before founding level.
f) Method of cleaning bottom of hole at founding level before concreting.
g) Time taken for concreting.
h) Cut-off level/working level/RL of top of concrete
i) Cement bag consumption, slump of concrete
j) Any other relevant important observation.

B. Pile Test

The Contractor shall quote separately for carrying out pile test for bored piles.

The test shall commence as per provision laid down in I.S. 2911 Part-(V 1979, latest revision. Before any load test being performed, the proposed set-up and the kentledge (load frame) shall have to be approved by the Architect/Engineer.

The Architect/Engineer .shall have the right to get test certificate regarding calibration of pressure gauge from the Government Laboratory, at the cost of Contractor.

For each pile failing to conform of the specified requirements, the Contractor shall at his expense, test further pile or piles as directed by the Architect/Engineer.. The cost of all additional piles, and all other work necessitated to failure or inadequacy of any test of pile to meet specified requirements shall be the responsibility of the Contractor.

The results of pile test shall be graphically represented to show the following relations:

i) Load vs. time
ii) Total settlement vs. time
iii) Load vs. total settlement (for loading and unloading)
iv) Load vs. net settlement

C. Procedure for Routine Load Test on Working Pile

i) Load to be applied by means of hydraulic jack with a pressure gauge with a remote control pump, reacting against suitable load frame;

ii) The reaction to be made available for the test should be 25% more than final test load proposed to be applied;

iii) The test load shall be applied in increment of about 20% of assumed safe load carrying capacity.

iv) Settlement should be recorded with minimum three dial gauges of 0.02 mm sensitivity for single pile and 4 gauges for pile groups. Each positioned at equal distance around the piles, and normally held by datum bars resting on immovable supports at least *5D* away from the periphery of test pile where 'D' is the diameter of pile;

v) Each stage of loading shall be maintained till the rate of movement of pile top is not more than 0.10. mm per hour in case of clayey soil or a maximum period of 2 hours whichever is greater. For this purpose, the type of soil met at the pile top shall be considered. The estimated safe load carrying capacity may be maintained for 24 hours and settlement should be observed every hour during this period;

vi) For each increment, application of load shall be as smooth as possible. Settlement observation shall be made at about 15 minutes interval;

vii) The loading shall be continued upto twice the safe load carrying capacity or the load which total displacement of pile top/cap equals the appropriate value specified below, whichever is earlier:

a. Safe load carrying capacity on single pile 2/3rd of the final load at which gross settlement is 12 mm.

b. 50% of the final load at which gross settlement comes to 10% of diameter of pile.

Safe load carrying capacity on group of piles :

a) 2/3rd of the final load at which gross settlement comes to 40 mm.

b) Final load at which gross settlement comes 25 mm.

viii) The load on the pile may be removed in one stage by releasing jack steadily after completion of the test and rebound observations should be made for atieast 2 hours.

D. <u>Records :</u>

The Contractor shall prepare in triplicate, a comprehensive record during the driving of piles, giving the following and other necessary data in a tabular form :

i) Serial No. of pile driven

ii) Data and time at which pile is driven

iii) Total depth of pile

iv) Strata chart in case of bored piles only

v) Any other data ordered by the PMC

vi) For cyclic test, loading record should be as per I.S. Code 2911 (Part IV), 1979 (latest revision).

Each of the three copies of such data prepared daily shall be signed by the Contractor or his authorised representative as well as the Architect/Engineer.. One copy shall be retained by the Contractor and the other submitted to the Architect/Engineer, for final record.

E. Standard of Acceptance

The piles shall be accepted satisfactory only when the work has been executed in accordance with this specification and the standards stated hereinafter to the satisfaction of the Architect/Engineer.

a) The pile shall not be out of plumb by more than 1.5%.

b) The toe of pile shall be at the approved bearing level in each case.

c) The total volume of concrete consumed for pile shall not be less than 10% and note more than 40% greater than the calculated volume. The calculated volume for this purpose shall be cross sectional area inside the casing multiplied by the length of pile.

The concrete shall show the specified strength as indicated by the cube test results.

d) The results of the load test carried out in accordance with the contract and with the specification for load testing shall be satisfactory.

F. Basic of Measurement of Piles :

The top eighty millimeters of each pile shall penetrate into the pile cap the bottom of which shall be regarded as cut off level and reinforcement shall further project into the pile cap as specified.

The piles shall be measured in linear meter from the cut-off level to the bottom most point of the pile. The rate shall include the cost of driving the casing tube (if any), boring and placing in situ concrete including that in the portion inside pile cap. The rate shall also include for all labour and materials, if required, bailing out water from underground surface, withdrawing of the tube, breaking of boulders, old foundation, etc. met with before reaching the desired stratum, and everything necessary to have the pile in plumb and secure in position.

No payment will be made for piles driven out of plumb beyond the specific tolerance limits, or for imperfect or defective piles regarding which the judgments of the Engineer-in-Charge shall be final and binding on the Contractor.

G. Defective Piles

Any pile, which is shown to be defective under load test, shall not be accepted and the Architect/Engineer, will relate such failure to the acceptance of other piles in the area.

If an individual pile should fail to meet the requirements specifie4d in clause 'F' as stated above, such pile shall be deemed to be defective and the Architect/Engineer .may order such investigation to be made which he considers appropriate.

When any pile is found defective, the Contractor shall replace the pile at his own cost. » No. extra time shall be allowed for such relocation of piles due to obstruction/failure during boring operation.

The Contractor may carry out the piling work before excavation. In such an event, the portion of empty boring shall be filled with sand as per direction of Architect/Engineer. The cost of such empty boring and sane filling shall be included in the Contractor's rate.

H. Setting Out:

The positions of the piles are to be set out by the Contractor from cardinal points, which will be provided by the Architect/Engineer. The Contractor shall be responsible for all errors in setting out and shall rectify the same at his expense, to the satisfaction of the Arch itect/Engineer.

I. Safety of Existing Structure :

The Contractor shall take every precaution to avoid damage or subsidence or collapse of the existing structure and services in the vicinity as a result of pile driving. All claims arising on account of the damage caused to the existing structures and services in the vicinity as a result of pile driving and during the process of boring shall be duly covered by the Contractor by Insurance or borne by the Contractor.

The design prepared by the Architect/Engineer, is on the following basis : Cast-in-situ bored reinforced concrete piles.

The accompanying drawings and bill of quantities have been accordingly prepared.

J. Design and Concrete Quality :

The grade of concrete of all pile shall be minimum M-20 unless otherwise mentioned. The cement content of piling work shall be minimum 400 kg/cm with ordinary Portland Cement. Water cement ratio and slump shall be as per I.S. Specification for relevant piling work. Maximum size of coarse aggregate shall be 20 mm.

Grading and other requirement of coarse and fine aggregate, water and concrete shall be as specified for reinforced cement concrete work in the relevant I.S. Codes.

The average basic length of the piles shown in schedule of quantities is tentative and is to be assumed for cut-off level to the top of the pile.

K. Rates to include

1. Mobilization :
   Mobilization of piling rig/rigs with other necessary tools, planks & machinery at site, erecting the same for work, dismantling the same after completion of the work and transportation back from site including satisfactory clearance of the site.
2. Setting out the pile location as per drawing.
3. Providing the complete pile including the following :
   a) Driving the pile up to the design/accepted founding level including necessary chiseling through hard obstruction encountered, if any, provision of bentonite slurry, etc. casing pipes, etc.
   b) Disposal of spoils, slurry, soil - bentonite slurry, etc. satisfactorily.
   c) Pumping out water and slurry including drainage and disposal of same and necessary cleaning of the bore hole before concreting.
4. Removing/trimming the concrete from the projected pile head exposing, straightening and cleaning the reinforcement.
5. Shifting the rig and other equipment from place to place.
6. Provision of slurry tanks, etc.
7. Provision of all additional work for rectification measures of defective pile as per specification and as directed by the Architect/Engineer
8. Cleaning the site thoroughly and leveling the area after completion of the work or as directed wherever required.
9. Provision of all types of checking.
10. Provision of empty boring and filling with sand inside the bore hole.
11. Testing :
    Provision of approved temporary arrangements for load testing as necessary, loading, unloading, recording of results, supplying results in triplicate, cleaning the site after testing and all the necessary bye-work complete

TECHNICAL SPECIFICATION FOR WATER SUPPLY & SANITARY.

I. GENERAL:

1. The Contractor shall arrange with local Municipal Authorities for getting the water and sewerage connections. the actual connection charges to be paid to the local bodies will be reimbursed by the Employer.

2. No payment will be made to the Contractor for submission of plans to the Municipal Corporation and obtaining sanction of the same. The rates quoted by the contractor shall be considered to be considered o be inclusive of this item.

3. The rates are of complete items as fixed in position and over all costs- e.g. cutting of holes ,chases, etc., and also for provision of fixing arrangement viz., clamps ,brackets, wooden blocks etc. the rates shall also include restoration to original condition of all damages to walls, floors etc., during the process of fixing sanitary installations , water supply and drainage . all debris of plumbers excavation , etc., shall be removed without any extra charge. the plumbing work/or the building work effected by the plumber work shall be left thoroughly cleaned to the satisfaction of the Engineer-in-charge.

4. Unless specified to the contrary, all material should conform to ISI specification and be of best quality and make as approved by the Engineer- in-charge. Testing shall be undertaken for various pipe lines and as may be directed by the Engineer- in - charge.

5. All G.I pipes (except concealed pipes and underground pipes) and brackets and fixtures and manhole covers shall be painted with 2 coats of synthetic enamel paints.

6. All concealed and underground G.I pipes and specials shall be painted with 2 coats of Bituminous paint.

7. All painting work shall be carried out to the satisfaction of the Engineer-in-charge and cost thereof shall be covered in the rates of all the respective items.

8. The Plumbers shall obtain the drainage completion certificate and the certificate of adequate water supply from the Municipality and shall abide by the rules and regulations prescribed by them or other authorities concerned , wherever necessary.

9. In case of concealed G.I pipe work , the chases in floors and walls shall be made as approved by the Engineer-in-charge. the pipes shall be secured tightly to the walls with clamps. The chases shall be filled with cement concrete 1:2:4 (1 cement: 2 coarse 4 hard jhama aggregate 20mm nominal size). Payment shall be made for cutting chase3s filling in the cement concrete and making them good as per relative item in the Bill of quantity.

10. The cast iron pipes shall be laid exposed on all with M.S. holder bat clamps made from 32mm thick. M.S. flats of approved design and required size. A clear minimum gap of

25mm between the wall and the pipe shall be left. All the clamps shall be embedded in cement concrete blocks sized 20cm x 20 x 10 cms. in 1:2: 4 mix (1 cement :2 coarse sand : 4 hard jhama aggregate - 20mm. nominal size) . the holes in walls and RCC work shall be made at point approved by the Engineer -in-charge and shall be made by the contractors. Payment shall be made as per relative item in the Bill of Quantity.

11. All plumbing and sanitary fixtures, pipes and pipe fittings, traps etc., which are to be embedded into the concrete or masonry work or other building work shall be placed in position and embedded for concealed at the time of casting of concrete and during the work shall be placed in position and embedded for concealed at the time of casting of concrete and during the work of construction. In case where chasing or cutting of concrete , masonry , or other structural or constructional work is unavoidable ,the location of such fittings, pipe lines and traps etc., shall be chalked out at the various places and the cutting, chasing or disturbing of the construction work shall be proceeded only after the due approval of the supervising authority in charge.

12. All cuttings, chasing and fixing work shall be completed before commencement of any plastering , tiling or finishing work.

13. Galvanised iron pipes and pipe fittings shall be of medium quality.

14. **SAMPLES:**

Sample of the materials proposed to be used shall be submitted for approval of the Engineer-in-charge before taking up the work in hand.

15. **MATERIALS, WORKMANSHIP & SAMPLES** :

All the materials and workmanship are to be of the best possible description and to the entire satisfaction of the engineer -in-charge and the contractors shall immediately remove from the site any materials and /or workmanship which, in the opinion of the Engineer-in-charge , is defective or unsuitable and shall substitute proper materials and /or workmanship forthwith.

16. The contractors shall ,if required by the Engineer-in-charge, arrange to test material and/or portions of the works at his own cost in order to prove their soundness and efficiency. If after any such test, the work or portion of works is found in the opinion of the Engineer-in-charge to be defective or unsound , the contractor shall pull down and re-execute the same at his own cost. DEFECTIVE materials shall be removed from the site within 7 days from receipt of such order.

17. Wherever reference has been made to Indian Standard or any other specifications, the same shall mean to refer to the latest specifications irrespective of any particular edition of such specifications being mentioned in the specifications or schedule of quantities.

18. The rates quoted shall be for all heights and depths.

19. Bidders should note that the quantities in the Bill of quantities are approximate and are subject to variation.

II. MATERIALS :

General : a) All materials shall be of best of their kind and shall conform to the latest Indian Standard specification .

b) A set of specification samples of all approved materials shall be kept in the office of the Engineer-in-charge ,cost of which is to be borne by the contractor.

1. SANITARY WARES :

All sanitary wares and fittings shall be of first class quality white vitreous China as manufactured by Parryware, Hindustan Sanitary Wares, Neycer , CERA or equivalent.

Stainless steel sinks and draining board shall be of best quality stainless steel of “Neelkant” or equivalent.

2. CAST IRON SOIL PIPE :

All cast iron soil pipes shall be of standard make. The thickness and specification shall conform to Indian Standard specifications IS : 3389/1970 and IS : 1029/1964. All piles shall be coated with Dr. Angus Smith‟s solution.

Pipes and fittings shall be true to shape smooth cylindrical, their inner and outer surfaces being as nearly as practicable concentric.

Pipe when tested for soundness by striking with a light hand- hammer shall emit a clear ringing sound. The pipes shall be free from cracks, laps, pinholes or other imperfection and shall be neatly dressed and carefully felted.

The fittings shall be of easy clean type. The access door fittings shall be designed so as to avoid dead spaces in which filth may accumulate. Door shall be provided with(3mm) rubber insertion packing and when closed and bolted ,these shall be water tight.

Pipes and fittings shall be supplied without ears. Each pipe fittings shall have the trade mark of the Manufacturer and nominal size suitably marked on it.

M.S. stays and clamps shall be made from 1/16” (!.6mm) thick M.S. flat of 1.1/4” (30mm) width bent to the required shape and size to fit tightly on the socket, when tightened with screw bolts. Lead to be used for the jointing of the pipes shall be refined lead of best quality.

Floor traps shall be of approved make, „P‟ or „S‟ type with minimum of 2” (50mm)water seal. These shall be provided with 5” dia.(125mm) CP brass grating of approved make.

3. **G.I PIPES AND FITTINGS** :

All pipes shall be of galvanised iron heavy quality of TATA make unless otherwise specified. All fittings shall be of „R‟ brand or other equivalent make bearing ISI certification mark. The pipes shall be seamless screwed of socketed conforming to the requirement of IS : 1239-1985. These shall be of the diameter (nominal bore) specified. The pipes and sockets shall be cleanly finished, well galvanised in and other defects. All screw threads shall be clean and well cut. the ends shall be cut cleanly and square with the axis of the tube.

Full Way Valves :

these shall be of gun metal heavy quality or „Leader‟ or equivalent conforming to IS : 778-1971 specification and tested to 21 kg. per sq. cm. for 2 minutes.

Brass Bib Cocks :

These shall be of gun metal heavy quality of „Leader‟ or „Annapurna‟ or equivalent approved quality conforming to IS specification.

Ball Valve :

The ball valves shall be of high pressure or of Pressure as specified. The ball valve shall be of brass and the float of copper sheet. The minimum gauge of copper sheet used for making the float sheet shall be of 26 SWS (0.580mm) for float of upto 4.1/ 2” dia.(114mm) size. the body of the ball valve shall be capable of withstanding a pressure of 200 lbs. per sqm.(14 kg. per sqm.) . the ball valve shall conform to IS specification No. 1708-1962.

4. **DRAINAGE- STONE WARE PIPES :**

All pipes shall be of best salt glazed variety conforming to IS specification. The pipes shall be free from visible defects such as fire cracks or hair cracks. the glaze of the pipe shall be free from blisters. The pipes shall conform to IS : 651-1965.

C.I Pipes :

These shall be spun iron pipes (class 7A) conforming to Indian Standard specification IS : 1536/1976.

TESTING OF MATERIALS AND WORKS :

As and when required by the Engineer-in-charge , the Contractor shall arrange to test materials and /or portions of works at his own cost to prove their soundness and efficiency.

if after tests, any materials ,work or any portions of work are considered defective or unsound by the Engineer-in-charge , the contractor shall remove the same from the site.

(A) **SANITARY INSTALLATION :**

1. The W.C. Pans shall be of white Viterous China (58mm) Orissa Pattern fitted with „P" or „S" trap of viterous China with effective 2" seal and 2" vent as per IS : 771-1963 & IS:2556 (Part II & VII) , 1967.

Fixing :

The W.C. Pan shall be laid in floor sloped towards the pan in a workman like manner , care being taken not to damage the pan in the process of fixing. It shall be fixed on a base of cement concrete 1: 3: 6 mix. (1 cement : 3 coarse sand : 6 stone ballast 40 mm and down gauge) taking care that the cushion is uniform and even without having any hallows between the concrete and pan. the joint between the W.C. pan and the trap shall be made with cement mixed with water proofing compound and made leakproof.

Flushing Cistern For Ipwc :

The flushing of W.C. pan shall be done by pull and let go flushing cistern of cast iron mosquito proof of 13.61 litres capacity together with cover , C.I chain and pull of specified quality , ball valve with copper flat and necessary unions etc., for connection with inlet and outlet pipes and overflow. It shall be valveless syphon type(IS: 774-1964).

Brackets :

The cistern shall be fixed on cast iron or rolled steel cantilever brackets which shall be firmly embedded in the wall or fixed by using wooden plugs and screws or by rawl plugs to the satisfaction of the Engineer- in charge.

Overflow :

The cistern shall be provided with 15 mm (1/2") P.V.C. overflows pipe with fittings which shall terminate into mosquito proof coupling of approved Municipal design with 0.5 mm dia. perforation.

Flush Pipe :

The outlet of flush pipe from the cistern shall be of 32 mm (1.1/2") P.V.C pipe or galvanised iron pipe a specified in the schedule of quantities, this shall be connected to the pan by means of an approved type of joint.

Stop Cock :

This shall be of „Leader‟ make or as of specified in the schedule of quantities.

2. **ANGLO INDIAN TYPE W.C. PAN :**

The W.C. Pan shall be of white Vitreous China and shall be of Hindustan sanitary ware „Parryware‟ or equivalent approved make , these shall be fixed to floor with rawl plugs and brass screws.

Seat & Lid :

These shall be of black plastic hygienic seat and lid or as specified with rubber buffers, CP brass hinges and screws of „Commander‟ or „Bestolite‟ or equivalent approved make.

Flushing Cistern For Epwc :

Unless otherwise specified in the schedule of quantities, these shall be low down PVC (10gallons) capacity with internal fitting and PVC brass flushing handle. These shall be connected to the W.C. Pan with 32 mm. (1.1/2‟‟‟)dia. PVC flush bend with unions complete in all respects. Cistern shall have 15 mm. (1/2‟‟‟) dia. PVC overflow pipe.

3. **URINAL :**

The urinal basin shall be flat back of white vitreous China of specified size. It shall be fixed in position by using wooden plugs and screws at a height of 650 mm. from the floor level to the top lip of the urinal. Each urinal shall have 40 mm. dia. outlet with C.P. brass hinged domed grating.(IS : 2556 (Part VI)-1697.

Trap :

Each basin shall have 40 mm. dia. C.P. brass „P" or „S" trap complete with unions of approved make. This shall be further connected to 40 mm. lead of G.I. waste pipe as specified in the schedule of quantities ,including wiped plumber joint complete with unions.

Flushing Cistern For Urinal :

These shall be automatic flushing cisterns of cast iron or as specified in the schedule of quantities complete with valveless syphon fittings conforming to IS : 774-1960. this shall be supported on brackets of standard pattern and fixed to rawl plugs, embedded in he wall with brass screws.

Angle Valve :

The cistern shall be fed with 15 mm. (1/2") C.P. brass inlet tube and angle valve of EGO make complete with C.P. brass union unless otherwise specified in the schedule of quantities.

the capacity of the flushing cistern and size of the flush pipe for the number of urinals shall be as follows :-

No. of Urinals	Capacity of Flushing Cistern	Main	Size of distribution
1.	5 Litres	-	15 mm
2.	10 Litres	20 mm.	15 mm.
3.	10 Litres	25 mm.	15 mm.
4.	15 Litres	32 mm.	15 mm.

The main and distribution pipes fittings and clamps shall be of C.P brass unless otherwise specified in the schedule of quantities , distribution pipes shall feed the urinals with C.P. brass spreaders of approved make.

Painting :

In case of cast iron flushing cisterns ,painting shall be done as specified in the Bill of quantity.

LAVATORY BASIN / LABORATORY SINK / DOCTOR'S SINK /BED SINK :

Lavatory Basin :

These shall be of white vitreous China with single or two three holes as specified in the schedule of quantities and as per manufacturers specification. These shall be supported on a pair of C.I brackets of approved design. These shall be supported on a pair of C.I brackets of approved design. These should conform to the provisions of IS : 775- 1962.

Fittings :

Each basin /sink shall have single or pair of pillar tap/special taps for the type of the sink specified and other fittings as specified , of „ESSCO‟ or equivalent make 32 mm (1.1/2”) C.P. brass waste (CP) . C.P. brass angle valve with inlet connection of C.P. brass chain and rubber plug.

Waste Connection :

Waste pipe shall be of 1.1/2” dia. (32 mm.) P.V.C. of approved make complete with unions. This shall discharge into a floor trap.

Puff Pipe :

This shall be galvanised iron termination with a brass perforated cap screwed on it.

5. **STAINLESS STEEL SINKS AND DRAIN BOARD FOR LABORATORY/ PATHOLOGY :**

These shall be of specified size of pressed stainless steel 2 mm. thick sheets and shall have 1.1/4” dia. C.P. brass „P‟ or „S‟ trap (32 mm.).

Fixing :

These shall be supported on C.I cantilever brackets or placed on wooden or marble counter. The joint between the masonry or wood shall be fixed with mastic filler to make it absolutely water tight. The draining board shall be sloped towards the sink in order to drain out all the water in the sink.

Fitting :

Sinks shall be provided with 1/2”(15 mm C.P. brass valve) mixing fitting „ESSCGO‟ or equivalent make complete with swinging spout.

Waste Connection :

The waste pipe shall be of PVC 1.1/2” (32 mm.) dia. discharging upto floor trap. The rates shall include the cost of all materials and labour involved in all the operations described above.

Bed Pan Sink :

Should be of mosaic of size 600 mm. x 450 mm. x 250 mm. with C.I brackets, „P‟ trap ,high level 100 litres capacity C.I. cistern with C.I bracket, discharge pipe , C.P. hot and cold water mixture inlet pipe and spray nozzle complete. Two coats of painting to be applied over cistern & C.I. bracket.

(B) **TOILET REQUISITES** :

Mirror :

Mirrors shall be of 5.5 mm. thick plate glass „Atul‟ or approved equivalent make. The glass shall be uniformly silver plated at the back. Silvering shall have a uniform protective coating of red lead paint. The mirror shall have fibre glass frame of approved quality and colour. The mirror and its backing shall be fixed on the wall face to wooden cleats with C.P. brass screws and washers.

Glass Shelf :

The shelf shall be of glass of approved quality with edges rounded off. The size of the shelf shall be as specified. The shelf shall have aluminium guard rail with rubber washers in positions resting on glass plate and C.P. brass brackets with shall be fixed with C.P. brass screws to wooden plugs firmly embedded in the wall.

Toilet Paper Holder :

Toilet paper holder shall be of white Vitreous China or as specified. It shall be recessed in wall.

C.I Spun Soil Waste And Vent Pipes And Fittings :

All soil, waste and vent pipes and fittings shall be of cast iron conforming to the latest Indian standard specifications for heavy grade C.I. pipes. The pipes shall have spigot and socket ends, with bead on spigot and shall be without ears. The standard weights and thickness of pipes shall be given below with a tolerance upto 4 per cent.

Nominal dia	Barrel	Socket		Thick-ness	Approximate Mass in Kg. for effective length in Metres of				
(ON)	(DE)	(DI)	(P)	(E)	3.00	2.50	1.830	1.750	1.500
50	57-3.0	73-3.0	60.10	3.5	14.4	11.3	9.2	8.5	9.2
75	33-3.0	99-3.0	65.10	3.5	20.0	16.8	18.8	12.7	12.2

100	109-3.5	126-3.0	70.10	4.0	30.0	25.6	21.0	19.2	18.4
150	161-4.0	179-3.0	75.10	5.0	56.0	47.0	38.5	35.5	34.0
					0.5	0.25	0.15		
					2.9	1.9	1.4		
					4.3	3.5	2.1		
					6.5	4.0	3.2		
					12.0	5.0	5.8		

These shall be free from cracks and other flaws. The interior of pipes and fittings shall be clean and smooth and painted inside and outside with Dr. Angus Smith˝s solution of other approved anti-corrosive paint.

The access door fittings shall be of proper design so as not to form any cavities in which filth may accumulate. Doors shall be provided with 3 mm. (1/8”) rubber insertion packing and when closed and bolted they shall be fully water tight.

Fixing :

The pipes and fittings shall be fixed to walls by using proper holder bat clamps , the pipes shall be fixed perfectly vertical or in a line as directed. The spigot end and the shoulder of the socket leave no annular space in between. All soil pipes shall be carried up above the roof and shall have HCI terminal guard. Connections between main pipe and the branch pipes shall be made by using proper branches and bends invariable with access-doors for cleaning. All vertical pipes should be covered on top with a wire down. The pipes and fittings should be firmly attached to the wall at least 5 mm. clear of the wall & should be strongly supported at the foot upon a bed of concrete.

Lead Caulked Joints :

The annular space between the socket and spigot will be first well packed in with spun yarn leaving 25 mm.(1”) from the lip of the socket for lead . the joint may be leaded by using proper leading rings or if they are not available , by wrapping a ring of hemp rope covered with clay round the pipe. The lead shall be rendered thoroughly fluid and each joint filled in one pouring. Before caulking , the projecting lead shall be removed by flat chiesel and the joint caulked round with proper caulking tools and a hammer of 1 to 1.1/2 kg (2 to 3 pounds) in weight in such a manner as to make the joint quite sound. After being well set, the joint is to be flush , neat and even the sockets.

Testing :

All HCI pipes and fittings including joints will be tested by a smoke test and left in working order after completion. The smoke test shall be carried out as stated under. No extra payment will be made for the tests. Smoke shall be pumped into the brains at the

lowest end from a smoke machine which consists of a blow and burner. The materials usually burnt are greasy cotton waste which form clear pungent smoke which is easily detectable by sight as well as smell if leaking at any point of drain. the contractor will have to rectify all defects traced in such tests at his own expense to the complete satisfaction of the Engineer-in-charge.

Floor Traps :

The traps shall be of self cleaning design provided with 25 mm. (1") puff pipe where the length of the waste is more than 1.5 M (5""-0"") of the floor trap, is connected to a waste stack with bends. The other specification for these shall be the same as those for HCL soil and vent pipes and fittings.

Waste Connections :

Waste from lavatories, floor traps , sinks and baths shall separately discharge over the gully trap on the ground floor and shall be separately connected to waste stack on higher storeys.

Every starting manhole will have a 100 mm. (4") HCI vent terminating at 1 Metre (3 feet) above parapet of nearest buildings.

Anti- Syphonage Pipes :

Anti-syphonage pipe shall be HCI pipes with lead caulked joints. The main anti-syphonage pipe shall be 50 mm. (2") internal diameter or as specified.

Painting :

All the exposed HCI pipes and fittings shall be painted with two coats of synthetic enamel paint of approved quality, manufacture, colour and shade to match the surroundings. The cost of such painting should be included in the Contractor"s rates for pipe work.

The surface of pipes and fittings to be painted shall be cleaned thoroughly , Red lead or other primer shall be painted as specified and allowed to dry. the finishing shall be done by painting 2 or more coats with paint in an approved colour and shade.

C. **LEAD PIPES :**

All lead pipes shall be hydraulic drawn and of equal substance throughout. When not supported on bearer, all lead pipes shall be supported by strong lead tracks at least 40 mm. (1.1/2") wide soldered on to the pipes at suitable intervals. They should conform to IS : 404.

Wiped Solder Joints:

All joints of lead pipes shall be wiped solder joints and described :-

The pipe ends to be jointed shall be cleaned with wire brush and freed from oxide if any. Chalk shall then be rubbed to kill the greasy nature of the lead. After this, plumbers black shall be applied. The length of the joints given below then be marked on the pipe. A fine shaving of lead shall be removed from this lengths with a shave hook. Tallow shall be then smeared over the prepared surfaces.

The molten solder , an alloy composed of 3 parts of tin and 7 parts of lead , shall be poured in a thin stream from laddle moved in an elliptical direction over the joint position including a portion of the soilded pipe at each end beyond the mark. When sufficient solder has been poured the joint shall be wiped with a pad of wiping cloth with long continuous movements in one direction only so as to leave neatly formed elliptical shaped joint. Surplus solder remaining on the joint shall be removed with a tool called draw off.

The length of the wiped solder joining shall be as follows :-

SIZE OF PIPE	**LENGTH OF JOINT**	
	Minimum	**Maximum**
15 mm (1/2”)	60 mm (2.1/2”)	70 mm (2.1/4”)
20 mm. (1/4”)	65 mm. (2.1/2”)	70 mm (2.3/4”)
25 mm .(1”)	70 mm. (2.3/4”)	75 mm (3”)
32 mm (1. 1/4”)	70 mm (2.3/4”)	80 mm (3.1/4”)
40 mm. (1/2”)	70 mm (2.3/4”)	80 mm (3.1/4”)
50 mm (2”)	70 mm (2.3/4”)	90 mm (3.1/2”)
75 mm (3”)	75 mm (3”)	90 mm (3.1/4”)
100 mm (4”)	80 mm (3.1/4”)	90 mm (3.1.2”)

The joints shall be water tight , air tight and shall be free from tears, burns strings , ribbeds or dropenings.

Lead Pipe Connection :

The joints between lead pipe and C.I or stoneware pipe shall be made under :-

One end of the brass ferrule or thimble shall be slipped into or over the lead pipe and jointed to it by means of a wiped solder joint. The other end of the ferrule shall then be inserted into the socket of the cast iron or stoneware pipe. In the case of former , the joint shall be made with molten lead (lead caulked) and in case of the latter with cement mortar as in stoneware pipe drains.

The joints between outgo of a WC pan and lead pipe shall be made as under :-

The lead pipe shall be slipped into a brass socket and jointed to it by a wiped solder joint.

Painting :

All exposed lead pipes shall be painted as in HCI pipes and fittings. the cost of such painting should be covered in the Contractor‟s rates for the lead pipes.

D. **WATER SUPPLY :**

1. **G.I. PIPES AND FITTINGS :**

The pipes shall be of galvanised steel, welded and seamless screwed and socketed and shall conform to latest Indian Standard specifications for medium quality.

The details of pipes regarding nominal bore thickness and weight in lbs. per R. ft. are follows :-

Nominal bore Sizes	Thickness of pipes. S.W.G.	Weight of pipe in lbs. per Rft.	
		'B' Class	'C' Class
15 mm (1/2"")	12	0.831	0.987
20 mm (3/4")	11	1.132	1.425
25mm (1")	10	1.664	2.027
32mm (1.1/4")	9	2.375	2.840
40 mm (1.1/2")	8	3.015	3.550
50 mm (2")	8	3.836	4.530
65 mm (2.1/2")	7	3.375	6.375
75 mm (3")	7	6.354	7.545

The pipes shall be tested to a pressure of 50 kg/sqm. (700 lbs. per sq. inch). these shall have threads and the sockets, paralleled threads.

Laying & Fixing :

Where pipes have to be cut or re-threaded ,ends shall be care-fully filled out so that no obstruction to bore is offered.

In jointing the pipes , the inside of the sockets and the screwed end of the pipe shall rubbed over with white lead and few turns of hemp yarn wrapped round the screwed end of the pipe which shall then be screwed home in the socket with a pipe wrench. Care must be taken that all pipes and fittings are kept at all times free from dust and dirt during fixing.

Internal Work :

For internal work, G.I pipes and fittings inside and outside the walls shall be fixed either visible (not in chase) by means of standard pattern holder bat clamps keeping the pipe 12 mm (1/2") clear of the wall every where or concealed as specified in Bill of Quantity .

When it is imperative to fix the pipe in front of house or in any conspicuous position where it looks unsightly chasing may be adopted.

All pipes and fittings shall be fixed truly vertical and horizontals or as directed by the Engineer - in- Charge.

External Work :

For external work G.I pipes and fittings shall be laid in trenches. the width of the trench shall be the minimum width required for working the pipes laid underground level . they shall not be less than 60 CMS (2 feet) from the ground level, and wrapped with gunny cloth dipped in hot bitumen. The work of excavation and refilling shall be done in accordance with the instruction of the Engineer- in- Charge.

Painting :

All internal G.I pipes and fittings shall be painted with two coats of synthetic enamel paint of approved quality manufacture, colour and shade as specified under HCL pipes and fittings. the cost of such painting shall be included in the Contractor‟s rates.

Testing :

All G.I pipes and fittings shall be tested to a pressure of 7 kg. per sqm. (100 lbs. per sq. inch) to ensure that pipes have proper threads and that proper materials (such as white lead and hemp) have been in jointing . All leaky joints must be made leak-proof by tightening at Contractor‟s expense.

2. **BRASS WATER FITTINGS** :

All water fittings shall be of standard manufacture and shall be in all respects comply with the latest Indian Standard Specifications. the brass fittings shall be fixed in the pipe line in a workmanship like manner. Care shall betaken to see that joints between fittings and pipes are made leakproof . the fittings and joints shall be tested to pressure of 21 kg per sqm. (300lbs. per sq. inch) unless otherwise specified. The defective fittings and the joints shall be repaired or replaced.

3. **SHOWER ROSE :**

The shower rose shall be of specified quality with flat bottom of specified diameter with uniform perforations. the inlet size shall be 15 mm. (1/2”) or 20 mm (1/4”) as specified . A stop cock of the requisite size shall be provided to control the inlet water supply to the shower rose.

E. **DRAINAGE :**

a) **STONE WARE PIPE** :

Pipes : All pipes must be new and perfectly sound, free from fire cracks and imperfection of glazing, cylindrical straight and of standard nominal diameter, length and depth of socket. They shall be hard burnt stoneware of dark grey colour and thoroughly salt glazed inside and outside. They should conform IS: 651-1965.

b) **TRENCHES FOR S.W PIPE DRAINS** :

Excavation : The trenches for the pipes shall be excavated to lines and levels as directed. The bed of the trench shall be truly and evenly dressed throughout from one change of grade to the next.

The gradient is to be set out by means of bending rods and should the required depth be exceeded at any point the trench shall be refilled by means of cement concrete of the specification of the bed concrete , at the contractor‟s own expense. the bed of the trench if in soft or made up earth shall be well watered and rammed and depressions thus formed filled with sand or other suitable materials as directed by the Engineer-in charge before laying the bed concrete.

If rock is met with, it shall be removed to 15 cms. (6”) below the level of the pipe and the trench will be refilled with concrete, sand or other suitable material as directed by the Engineer-in-charger to bring it to required bed level. the excavated materials shall be kept away from the edge of the trench at a distance equal to 1 Metre (3 ft.) or equal to half the depth of the trench which -ever is greater.

The trench shall be kept free from water. Shoring and timbering shall be provided wherever required.

The trench width shall be the nominal diameter of the pipe plus 36 cms. (15”) but it shall not be less than 52 cms. (21”) in case of all kinds of soils excluding rock and not less than 92 cms.(3 feet) in case of rock.

Wherever the drain runs deeper , the width of the trench in the upper reaches may be increased as per the directions of the Engineer-in charge.

Road Crossings :

All road crossings shall be excavated half at a time , the second half being commenced ,after the pipes have been laid in the first half and the trench refilled. The trench at the existing road crossings shall be filled in with mud concrete for the full depth except for the 15 cms (6”) layer ,which shall be filled with cement concrete 1:2: 4 or as directed.

Protection Of Existing Services :

All pipes , water mains , cables etc., met within the course of excavation shall be carefully protected and supported. Such mains will be hung from timbers placed across the trench.

Care shall be taken not to disturb the electrical and communication cables, removal of which if necessary shall be arranged by the Engineer- in - charge.

Lighting And Watch :

The open trenches shall be provided with requisite fencing and watchman to guard against accidents. Red flags during day and red light during night shall be provided at the ends and at intervals along the sides of the trenches.

Sign boards with necessary wording such as "SLOW, ROAD CLOSED" etc. shall be provided at least 30 metres ahead of road crossing where the work is in progress. The precautions will be continued till the surface is restored.

Temporary bridges or planks shall be provided over the trenches for keeping open the access to private or public property.

Refilling :

Refilling in trenches for pipes shall be commenced as soon as the joints and concrete have been passed. The refilling on the top and around the drain shall be done with great care and in such a manner as will obtain the greatest amount of compactness and solidity possible . For this purpose the earth shall be laid in regular layers of 15 cms (6") watered and rammed at each layers. All surplus earth shall be disposed off as directed by the Engineer - in- Charge.

c) **CONCRETING :**

All C.I. pipes shall be laid on a bed of 15 cms. (6 ") thick cement concrete as specified with projection on each side of the pipe to the full width of the trench.

The pipes with their crown level at 1.22 Metre (4 ft.) depth and less from ground shall be covered with 15 Cms. (6") thick concrete above the crown of the pipe and slipped off to give a minimum thickness of 15 Cms. (6 ") alround the pipe.

Pipes deeper than these shall be concreted upto haunches level with the top of the pipe.

d) **LAYING AND JOINTING S.W. PIPES** :

Laying :

The pipes shall be carefully laid to the levels and gradients shown on the plans and sections. Great care shall be taken to prevent sand etc., from entering the pipes. The pipes between two manholes shall be laid in straight line without vertical or horizontal undulations.

The pipes will be laid “socket up” the gradient . The body of the pipe shall for its entire length rest on an even bed.

Jointing :

The cement mortar joints shall be cured at least for seven days.

Testing :

All joints shall be tested to a head of 61 Cms. (2˝) of water above the top of the highest pipe between two manholes.

The lowest end of the pipe shall be plugged watertight . Water shall then be filled in manhole at the upper end of the line . The depth of water in the manhole shall be 61 cms. (2 „) plus the diameter of the pipe. The joints shall then be examined. Any joint found leaking or sweating shall be remade or embedded into 15 Cms. (6”) layer of cement concrete (1: 2 : 4) in length and section re -tested, at the Contractor˝s expense until satisfactory results are obtained.

e) **GENERAL** :

Storm Water Drains :

When S.W. pipes are used for storm water drainage, no concreting will be necessary. The cement mortar for jointing will be 1;1 or that as specified in the Schedule of Quantities. Testing of joints also will not be required.

Precaution :

To avoid logging of drains , both ends shall be kept plugged until the construction of manholes is completed in every respect. On completion , care shall be taken that each plug is removed and the face of the drain made smooth.

Measurements:

The measurements for providing , laying and jointing S.W. pipes shall be recorded for the finished length of the pipe line i.e. , from inside of done manhole to the inside of other manhole.

f) **S.W.GULLY TRAPS :**

This must be new, perfectly sound free from fire cracks and other imperfections of glazing of standard nominal diameter and other dimensions . It shall be made of hard burnt stoneware of dark grey colour and thoroughly salt glazed inside and outside.

Each gully traps shall have a C.I. piping 15 x 15 Cms. (6" x 6") and one water tight C.I. cover with frame 30 x 30 Cms. (12" x 12") (inside dimensions) with machine seating faces or as specified.

Excavation :

The excavation for gully traps shall be done true to dimensions and levels as indicated on plans or as directed by the Engineer-in- Charge.

Fixing :

The gully trap shall be fixed on cement concrete foundation 70 Cms. (2"3") square and not less than 10 Cms. (4") thick.
The mix for the concrete will be 1 :5 : 10 (1 Cement : 5 Sand : 10 Stone ballast) 40 mm (1.1/2" gauge) or as specified. The jointing of gully outlet to the branch drain shall be done similar to jointing of S.W. pipes.

Masonry Chamber :

After fixing and testing the gully and branch drain , a brick masonry Chamber 30 x 23 Cms 9 12" x 9") (inside in first class brick in cement mortar 1:5 shall be built with 11 Cms. (4.1/2") thick alround the gully trap from the top of the bed concrete upto ground level . The space between the Chamber walls and the trap being filled in with cement concrete of the specifications of bed concrete . The upper portion of the Chamber i.e. above the top level of the trap shall be plastered inside with cement mortar 1:3 (1 cement : 3 sand) finished with floating coat of neat cement. The corners and bottom of the Chamber shall be rounded off so as to slope towards the grating.

C.I. Cover :

C.I. cover with frame 30 x 23 Cms. (12" x9") or as specified with mechanical seating faces shall then be fixed on the top of the brick masonry with cement concrete 1 : 2 : 4 and rendered smooth. The finished top of cover shall be left 15 Cms. (6") above the adjoining ground level so as to exclude the surface water from entering the gully trap.

F) **MANHOLES , GULLY CHAMBER ETC. :**

1. **Manholes :** (The size of Manholes) : The size specified shall be in the internal size of the manhole. The work shall be done strictly as per drawings and specifications. The following specifications shall be adopted.

Excavation: the manhole shall be excavated true to dimensions and levels, shown on the plan or as directed by the Engineer-in-Charge.

Brick Work : The brick work shall be with best quality brick in cement mortar 1:6 , brick work in arches shall be with 1st class brick in cement mortar 1:6 , brick masonry round the pipes shall also be with 1st class brick in cement mortar 1;6 , the joints shall be made thoroughly leakproof.

Bed Concrete : The manhole shall be built on a bed of 15 Cms. (6") thick cement concrete (6 : 3 : 1) with jhama Khoa over a layer of brick flat soling.

Plaster :

Inside of the walls be plastered with 12 mm. (1/2") thick cement plaster 1:3 (1 cement : 3 coarse sand) finished with a floating coat of neat cement.

In wet ground , 12 mm. (1/2") thick cement plaster of the above specifications shall be done on the outside surface of the walls also. This plaster shall be waterproofed with addition of 1 kilogram of „Accoproof" to50 kilogram (1bag) of cement with addition of any other equal and approved water proofing compound. The plastering shall be done upto 30 cms.(1 foot) above the wet soil line. Extra shall be paid for plastering the outside surface wherever directed.

Pointing :

Pointing shall be done with cement mortar 1:2.

Benching :

The channels is and benching shall be done in cement concrete 1:2:4 and rendered smooth with neat cement.
The following sizes of the channels shall be adopted for the benching :-

Size of the Drain	Depth at the Centre	Depth at sides i.e. , at walls
100 mm. (4") 150 mm. (6") 250 mm. (9") 300 mm. (12") 400 mm (15") 450 mm. (18")	15 Cms (6") 20Cms (8") 28 Cms(11") 35 Cms(14") 43 Cms (17") 50 Cms (20")	25 Cms (10") 30 Cms(12") 38 Cms (15") 45 Cms (18") 53 Cms (21" 61 Cms(24")

R.C.C. Work :

R.C.C. work for slabs or lintels shall be in cement concrete 1:2:4 with steel reinforcement as per details. Plain concrete ,if used for fixing manhole covers , shall be of the above specifications.

Foot Rests :

These shall be of M. S square rod 22 mm. (7/8") or as specified and shall be galvanised or painted with coal tar. These shall be embedded in masonry in cement mortar at least 23 Cms. (9") while the brick work is in progress. These shall be fixed 30 Cms. (1foot) apart vertically and staggered laterally and shall not project more than 11 Cms., (4.1?2") from the wall.

C.I. Manhole Covers :

The C.I covers shall be of tough homogeneous cast iron of heavy or light type as specified . the sizes specified , are the clear internal dimensions. The approximate weights of the various types of manhole covers with frames and their internal size will be as per specification in schedule of quantities & conform to IS : 1726-1966. Variations in weight ton the extent of 6 percent on either sides shall be permissible. the covers used in manhole on sewer lines shall invariably bear the work „SEWER" on the top and those used for storm water drains shall bear the word „S.W.D." .These markings shall be done during casting of the covers.
The frame of manhole cover shall be embedded firmly in the R.C.C slab or plain concrete as the case may be on the top of the masonry.
After the completion of the work , manhole covers shall be sealed by means of thick mortar greased. All exposed surfaces of the frames and covers shall be painted with coal tar. The cost of such paintings should be included in the Contractor"s rates for the manhole cover.

Plain Manhole :

90 cms. x 45 cms. (3" x 1"-6"). This type of manhole is generally constructed within compounds for house drainage only. Due to shallowness and narrowness the manhole is provided with cover with bigger opening to facilitate cleaning and repairs. Cover of size 90 Cms. x 45 Cms. (3" x 1"-6") shall be used.

Plain Manhole :

1.2 X 0.9 M (4" x 3") . This type of manhole is constructed for main drainage work for depth less than 2.4 Meters (8").

When the manhole is built on the footpath ,this shall be provided with 45 Cms. (18") internal diameter light type C.I cover , when it is built within the width of the road under traffic, it shall be provided with 53 Cms. (21") internal diameter heavy type C.I cover.

Levels Of Invert :

Sewers of unequal sectional area should not joint with level invert in a manhole. The invert of the smaller sewer at its junction with main shall be at least 2/3rd dia. of the main above the invert of the main . The branch sewer should deliver sewage in the manhole in the direction of main flow and the junction must be made with ease so that flow in the main is not impeded.

Measurements :

The depth of the manhole wall be reckoned from the invert level of the channel to the top level as to the C.I cover . The depth shall be measured correct to nearest 25 mm.

House Connections :

No drain from house fittings e.g. gully trap or soil pipe etc., to manhole shall exceed a length of 6 Meters (20 feet) unless it is unavoidable.

2. **DROP CONNECTIONS :**

In case where branch pipe sewer enters the manholes on main pipe sewer at a higher level than the main sewer , a drop connection should be provided.
C.I . Inspection bend shall be fixed in position at right angle to the drop pipe at the level of the inlet branch drain. The plain C.I shoe at the bottom shall be fixed in the benching cement concrete 1:2:4 (1 cement : 2 sand : 4 stone ballast 3/4" gauge) so as to discharge into the channel. the joints shall be lead caulked as per specifications for the cast iron pipes for water supply.)

C.I. PIPE DRAINAGE :

1. **C.I. DRAINAGE :**
C.I. pipe drainage shall be adopted in the case mentioned below :-

a) When the drain passes under a structure.

b) When the drain passes under a road which is subject top heavy traffic and where the covering cushion is not considered sufficient.

c) When the drain passes through a place where it is subjected to vibrations.

d) In hilly places where the slopes are very steep.

e) When drainage lines run on the surface or above ground.

2. **TRENCHES :**
Specifications for trenches for stoneware pipe drains will apply in this case.

3. **PIPES :**
The pipes used shall conform to the Indian Standard specifications for class "A" pipes.

4. **FITTINGS :**
C.I. trap with hopper , C.I inspection bends C.I. inspection Chambers etc., shall conform to Indian Standard specifications for C.I fittings.

5. **LAYING :**

For laying C.I pipes and fittings , specifications for C.I water mains will apply .

The joints for pipes and fittings shall be lead caulked joints under water supply. the joints shall be leakproof.

All inspection doors etc., shall be provided with felt washers and strong brass bolts and nuts.

Testing :

Testing of joints for C.I pipes and fittings shall be done by smoke test as specified under C.I pipes and fittings.

Masonry Chamber :

C.I inspection chambers and bends for underground shall be enclosed in masonry chambers.

NOTE :

In case of non- availability of any particular brand of material or equivalent as specified in the Bill of Quantities bidder could also supply any other equivalent approved brand or material or equipment conforming to the latest I.S specifications.

WATER SUPPLY :

TUBE WELL :

1. SCOPE OF WORK .

The work comprises of sinking and developing 80/100 mm. dia. tubewell with 80/100 mm. dia. brass sheet jacketed strainer (Rex popular /Rex special quality) , 80/100 mm. dia. I.S.I brand medium grade G.I pipe upto a suitable depth dimension including 150 mm. dia. I.S.I brand medium grade G.I. housing pipe all as specified in the Bill of Quantity , including all other apartment works including supplying and fixing approved quality pumps as described and setforthin. the Bill of Quantities together with all additional or varied works which may, hereafter , be required.

2. METHOD OF SINKING .

The tube well shall be sunk by water jet method. The pipes and strainers shall be lowered after full boring is done in such a way that the strainers remain in the water bearing strata. The minimum of 3 metres length of 100 mm. G.I. Pipe with a cap shall be provided below the strainers. The suitability of water bearing strata will be judged by the Engineer from the sample of sand obtained during boring. the perforated cap is to be sealed from top with suitable plug and suitable marble/glass balls after the completion of work.

3. Most careful records of each day's sinkage of the tubewell and of the strata passed through shall be kept by the Contractor. These records shall be furnished to the Engineer on a tracing cloth together with samples of strata, properly marked , in a wooden box with glass cover and looking arrangement.

4. WATER BEARING STRATA.

Suitable water bearing strata at 50 M.- 150 M. from ground level is expected in this area but as guarantee can not be given to its accuracy, the Contractor shall allow in his tender to sink the well to any depth the Engineer may direct in order to obtain the required yield consistent with its suitability for drinking and cooking purposes.

5. STRAINERS.

The strainers shall be brass sheet Jacketed Strainer of approved quality. 100 mm. dia. in 6” feet length.

6. Should it be considered necessary at any time to reduce the total quantity of work to be carried out under the contract , the Contractor will be cancelled. No claim to any payment or compensation whatsoever on account of any profit or advantage which might have been derived from the execution of work in full but which he might not derived in consequence of the full amount of work not having been carried out.

7. PUMP , MOTOR AND ACCESSORIES.

Supply and installation of submersible pumping set, conforming to I.S.: 8034 of 1976 or latest , of reputed manufacturer for lifting water from 100 mm. /150 mm. dia tube well. the pump should have the capacity of lifting water 140/150 litres per minute against a total lead of 35 m - 40 m with 50 mm. dia. outlet . This also covers supply and installation of suitable capacity starter for motor, with single phase preventer , timer and water level guard. Arrangement for proper suspension of pump inside well and covering of well afterwards with M.S. Steel cover are to be provided.

7.1 PUMP.

Pump should have closed grain cast iron casting without blow holes, sand holes etc. with bronze impellers, stainless steel motor and pump shaft and shaft sleeves, wearing ring, pump coupling and pivot. The column pipe shall be of black steel of heavy gauge. Suitable arrangement for tieing up of pump with clamp and steel wire roper or nylon rope shall be provided as and additional safety for falling of pump.

7.2 MOTOR.

Motor should be suitable for 400 + 10% volts , 3phase, 50 cycles/ sec. supply system , 2900 r.p.m. with continuous rating . It should be totally enclosed , copper wound , squirrel case induction motor, water cooled and water lubricated and shall conform to I.S : 9283 of 1979 or latest. The thrust bearing should be of tilting type shoes, water lubricated with lifting thrust pads. The thrust pads should be made of copper metal alloy with water lubrication and proper bearing properties. The thrust plate resting on pads should have appropriate surface to ensure proper lubrication with water. Adequate heavy duty sealing arrangement and also a sand guard should be provided in the motor to prevent tube well impurities from entering the motor bearings.

7.3 CONTROL GEAR.

The control gear should be automatic push button manual operation with triple pole hand re-set adjustable Thermal or Solemid type overload relay in definite range, under voltage release , single phase preventor, suitable ammeter and timer. Control gear should be suitable for operation with the timer according to adjustment.

7.4 ACCESSORIES.

The following accessories are to be supplied with pump set conforming to relevant I.S.S.:-

a)	Column pipe	25 Metre	NB:- Rate for column pipe per Metre is also to be quoted separately)
b)	Delivery sluice valve	One	
c)	Pressure gauge	One	

d)	Triple pole hand operated isolator	One	
e)	Triple pole hand operated isolator	One	
f)	Weather proof flexible 3 core copper wire of suitable size	40 -60 Metre	(Rate to be quoted in per metre length).
g)	Automatic water level controller	One	
h)	Steel wire rope or Nylon rope 25 mm. dia	30 Metre	(Rate to be quoted in per metre length).

Manufacturer‟s test certificates of materials whatsoever applicable , along with curve of pumps are to be furnished.

7.6 GUARANTEE

The set to be guaranteed for trouble free operation for a period of 12 months from the date of installation. Any defect may be development or be noticed during that period shall be repaired by supplier free of charge at site of installation.

DRILLING & DEVELOPMENT OF DEEP TUBEWELLS :

TUBEWELL DRILLING :

1. **Scope of the work** : The work comprises of drilling & development of deep tubewell upto a desired depth and all other allied works as described and set forth in the specification and schedule of work together with additional or varied works together which may be required in accordance with relevant clauses or contract.

2. **Selection of sites and preliminaries** :

A. The work will be executed anywhere in West Bengal. the intending tenderer may, if required, visit and study the site of work as to the nature and location of work from an aspects before execution of agreement. Pin - pointed sites for drilling the tubewell will be made available to the contractor by the Engineer -in-charge have access to two site of work with his plants and machineries . The contractor will have to make his own arrangement , if necessary, to carry his machineries upto the pin-pointed sites for drilling purpose. If this necessiate any approach road, temporary culverts, causeway etc. the same shall be done by the contractor himself at his own cost, & no extra payment or compensation thereof shall be payable to contractor on these account. Pin-pointed sites allocated to the contractor will not normally be charged, but in case sit is necessary, The department, reserves two right to do so. The contractor shall have no claim for such change of site.

B. it will be contractor‟s responsibility to procure water for drilling operations and drinking & other purposes of his working personnel.

C. Sufficient land shall be made available to the contractor for the operation, tide the final yield test of a tubewell is done. After the completion of the work, the contractor shall remove all plants and machinery & supplies and shall dress and level the ground as directed by the Engineer-in-charge.

D. The contractor shall have to furnish in writing to the Engineer-in-charge , a programme of drilling of tubewell within a week aft after taking over the pin-pointed site .

3. **Variation in Tendered Amount** :

The quantities of work given in the schedule are approximate and subject to variation, depending upon the ground strata and other conditions under which the works are actually carried out. Any variation thereof , shall not form the basis of disputes regarding the rates to be paid or give rise to any claim for compensation.

4. **Materials and Transport** :

The contractor shall make his own arrangement for transportation of all materials supplied by the dept. or by the contractor, to the site. The materials to be supplied by contractor

must be of best quality and the samples of which are subject to approval of the Engineer-in-charge.

All temporary construction at site for work and dismantling of the same after the work, will be done by the contractor, at his own cost. The surplus or rejected materials, if any, should be removed from site of work by the contractor at his own cost after completion of work or as directed. All surplus materials issued by the dept. should be returned by the contractor to the departmental store , as directed by the Engineer-in-charge.

5. **Drawing & Records** :

Most careful records of each day"s drilling and of the strata passed through shall be kept by the contractor . Samples of underground for formation shall have to be collected by the contractor from the discharge at every 3.00 metros and at every charge in the nature of strata. The collected samples are to be kept in suitable samples boxes with depth record and necessary description .

Electrical resistivity logging is to be run in the completed bore and the field data is to be processed and the inferences there on are to furnished by a competent geo-hydrologist.

These records alongwith an assembly chart of tubewell shall be given to the Engineer-in-charge or his representative at site for record. The cost of the Resistivity Test only will be paid to the contractor. No other costs on this account will be paid.

6. **Testing Instruments** :

The contractor shall supply and always maintain in good condition at site. The Orifice meter and other testing instruments of approved make including steel tube and such other instruments and appliances as are necessary for proper control of work during it execution. The contractor shall provide necessary equipments for sieve analysis of the sample of sand & perform sieve analysis of the sand of the selected aquifer and submit report to the Engineer-in-charge at his own cost.

7. **Fees payable by the Contractor** :

All quarry fees, royalties, Octoroon, duties, taxes etc. payable on any material brought for use at work site shall be borne by the contractor.

8. **Method of Drilling** :

i) The tubewell shall be sunk either by casing boring /reverse circulation rig or be direct rotary rig, preference should however be given to the use of Direct Rotary Rig.

ii) In case of drilling with direct rotary rig, the circular of the pilot bore should not be less than 225mm ;
to increase the pilot bore the designed diameters for Housing pipe , well pipe etc. reaming operation shall be done as provided in the schedule.

Tubewell Assembly :

A. The tubewell assembly shall comprise of following items of E.R.W. plain pipes ISI specification in lengths of 5..5 metres to 12 metres at random, mainly between 9 metres to 12 metres , ends levelled suitable for welding . Test pressure 60 atmosphere and as per break-up given in the schedule of quantities :-

i) Housing pipe -
ii) Blank pipe -
iii) Fibre glass strainer -
iv) Standard Reducer -
v) Bottom plug -
vi) Centre guide -
vii) Housing clamp -
viii) Top Cap -

B. **Housing pipe** : - The Housing pipe shall be kept generally 0.60 metre above ground floor level but may be more in submerged low lying areas as directed by the Engineer-in-charge.

C. **Strainer** : - Fibre glass strainer 1.80 metres to 2.40 metres in length shall be supplied to the contractor from any Departmental store, Contractors shall be responsible for the safe transport of the same to the work-site and shall lower the same in the bore of the tubewell, Contractor, before taking delivery of the strainer shall satisfy himself that there are in good condition. any complain regarding the quality or condition of the same at any later date shall not be entertained. The rate of lowering strainers shall be inclusive of all labour , materials and carriage of the same to work site.

D. The reducer , bottom-plug , centre guides, Top cap and housing clamps shall be used according to design and drawing as approved by the Engineer-in-charge.

During drilling operation the representative of the Engineer-in-charge shall remain present at site and take log records of strata encountered and the final log chart shall bear the signature of the representative of the contractor and the Engineer-in-charge.

After drilling the bore and examining the log chart the contractor shall design the tubewell assembly & the design shall be submitted for approval to the Engineer-in-charge.

It is only thereafter that the contractor shall start lowering the assembly inside the drilled bore, representative of the EIC shall always remain present during lowering of the tubewell assembly and he shall have to submit a written document both signed by himself and by the contractor to the EIC that assembly as per design has been lowered in his presence. In case of any difference of opinion about the design of the tubewell assembly the decision of the EIC shall be final.

Depending on the sub-stratum formation the tubewell assembly may have to be composed with non-standard length of pipes , both for housing and tubewell pipes. The contractor will be paid according to the actual length of pipe used in the assembly and lowered in the bored hole.

Gravel treatment of tubewell :

After the tubewell assembly has been lowered in the bore hole , gravel has to be inserted in the annular space between the well pipe and the bore hole.

The contractor shall make arrangements for gravel treatment with clean and washed gravel with uniformity co-efficient of „two" or less and in that context 90 % of the gravel to be retained on the sieve mesh corresponding to the slot opening to be used in the tubewell.

The gravel filling should be started from the bottom of the bore hole and should be continuously worked upto 30 metres above the top level of the strainer. Thereafter, the gravel filling should be done from that point upto the ground level.

The contractor shall be paid for gravel treatment in forms of cubic metre of gravel right from the bottom of the borehole upto ground level irrespective of the position of the tubewell assembly.

11. **Verticality** :

The housing pipe shall be placed verticality inside the borehole and a tolerance of not more than 25 mm in 30 Metres in case of housing pipe will be permitted as deviation from the plumbs . Vertically test must be arranged by the contractor with standard equipment at his cost.

12. **Development of tubewell and yield test** :

Unless otherwise mentioned elsewhere of the tender document , the operation shall be as follows :
The contractor shall develop the tubewell by Air compressor and also by pumping with oversize turbine pump of 2 cusec capacity as per direction of EIC . The following procedure shall be strictly adhered to during development.

i) Air surging by Air compressor of not less than 320 cfm in capacity shall be intermittent and not continuous. air shall be sent for 10 minutes at a stretch followed by an equal period of shut down.

ii) After renewal of the silty materials an oversight turbine pump of the contractor shall be lowered into the tubewell & burging by pump shall be conducted in the same manner as in the case of Air compressor to remove any remaining silty materials. Pumping shall be prolonged before the aquifer performance test in conducted, so that the well may be cleared of all finer materials to give the maximum yield of water with a minimum draw down.

iii) The development shall be considered as complete when the exported discharge of water is fin the range of 10,000 gph to 20,000 gph (variation depending on the physical characteristics of the sub-station formation) is obtained from the tubewells and the water is free from sand at the operational test run with a tolerance of 10 PPM of sand by volume in a sample collected after an hour of continuous run.

The EIC or his authorised representative shall remain present during the process of development and shall have to issue a written completion certificate to the contractor that the development has been made as per clause 12 (iii)

13. **Final Test** :

After the tubewell has been satisfactory developed the contractor shall arrange to conduct and record the following tests and measurement at his own cost and equipment.

a) Static water level measurement by direct method before starting of pumping.

b) Discharge measured by use of orifice gauge or "V" notch weir after the development is completed;

c) The variation of water level during i.e. draw-down measured by use of depth gauge or directly with tape ;

d) Quantity of sand by use of standard measure glass as per clause 12 (iii) ;

e) Final measurement of tubewell assembly by sounding method . These tests have to be conducted under the supervision of EIC or his authorized representative ;

14. **Successful and unsuccessful tubewell** :

a) A successful site will be stipulated by the existence of at least 30 metres of good granular aquifer material on an average with slight marginal variations to be indicated by the EIC or his representative . In case of stipulated thickness of aquifer , the site will be treated as abandoned and only drilling cost will be paid ;

b) Department , however, reserves the right to order for lowering the tubewell assembly in to the borehole where the length of aquifer is less than 30 metres particularly in dry areas where any a quantity of discharge below minimum is considered beneficial for drinking purpose.

15. **Supervision** :

All works such as drilling, recording of formation log, designing of tubewell and its lowering . developing , gravel packing and conduction all tests as specified therein before must be conducted strictly under the supervision of the EIC or his authorized representative.

16. **Mode of Measurement** :

the contractor shall be paid an actual measurement of finished work on the basis of quoted rates. A minimum yield of 47,100 lph with maximum depression of 4.5 metros is to be

guaranteed by the contractor provided coarse or medium sand is tapped upto 30 metres. In cases the length of good water bearing strata as defined above is less, the guaranteed yield proportionately decrease . If inspite of full length of strata topped , the yield is less than the specified yield , deduction shall be made from the bill @ 100/- per 4500 lph upto 50% of the specified yield, beyond which it is rejected . In the event of the tubewell being rejected, the contractor shall be paid for the drilling charges only as per schedule of rates, and the pipe shall extruded by the contractor free of charges. In case any pipes are left in the wall, its cost will be recovered from the contractor. However , the EIC can waive off the deduction if he is satisfied that the contractor has taken due precautions and the snapping is not on account of negligence on the part of the contractor.

17. In course of execution of work, if it is felt by the EIC that additional works, not covered by the schedule of works have to be taken up, contractor shall take such additional works on written order of the EIC and the rates of such item should be treated as supplementary rates and should be worked out by the contractor and the EIC with final concurrence of the Managing Director, WBMSCL.

18. **Time Period** :

Time is the essence of the contract and the work has to be completed in all respect within the specified time from the date of work order.

19. **Warranty** :

For a period of 3 (three) months after the completion and acceptance of the work, the contractor shall be responsible for any defects which may under proper use, develop from faulty construction, design or workmanship of the work including defects in materials supplied by the contractor , erection and installation , the contractor shall remedy all such defects at his own cost when called upon to do so.

20. 75% payment will be made after the tubewell has been installed and satisfactory yield test has been given and its water has been accepted as being potable and bacteriological safe.
15% will be paid on satisfactory completion of the work in all respects i.e. after the removal of plants and materials from the work-site (both of contractor & the department) while 10% retained as security deposit which will be paid after the maintenance period is over. All damages as must be made good and the site is restored to its original condition after completion.

21. All rates quoted shall be inclusive of all taxes.

LIST OF APPROVED MAKES / VENDORS

Sl. No.	Materials	Manufacturers / Agencies
1	Batch Mix Concrete (BMC) / Ready Mix Concrete (RMC)	The contractor to install his own computerized batching plant of suitable capacity and arrange for Transit Mixers, pumps etc. as per approval of Engineer – In- Charge Or The RMC shall be procured from the source as approved by Engineer – in Charge from Lafarge/ACC/Ambuja/Ultratech
2	Ordinary Portland Cement (Minimum 43 Grade)/ Portland Puzzolona Cement	ACC / Ambuja / Lafarge/Ultratech
3	Reinforcement/ Structural Steel (Each LOT shall accompany manufacturer's Test Certificate)	SAIL, TISCO
4	Stainless Steel sink	Parryware,/HINDWARE/Cera/Tata
5	White Cement	Birla White/ Grasim
6	Sand	Sand conforming to BIS with due approval
7	Bricks, Stones slabs, Lime, Neeru Stone aggregate	Sample to get approved before use
8	Double Charged Vitrified Tiles	Johnson, Kajaria
9	Flush doors	Greenply /Century Ply/Sylvan
10	Fire doors	Ahura Mazda, Sakti Mate, Saktiman
11	Stainless Steel Fittings (Door, Window etc.)	Godrej
12	Hydraulic floor Spring	Godrej, Garnish, Hardwyn
13	Aluminium Extruded Sections	Hindalco / Jindal
14	Aluminium Fabricators	M/s. International glass House, M/s. AGV Alfa Lab Ltd.,M/s. Consolidated Engg. Company / M/s. Ajit (India) Pvt. Ltd./ Calco / Al karma
15	Paints, Distempers	Akzonobel, Berger, Asian
16	Glazing	Float Glass of Modiguard ,Saint Gobain
17	Water proofing Works	As approved by E-in-C

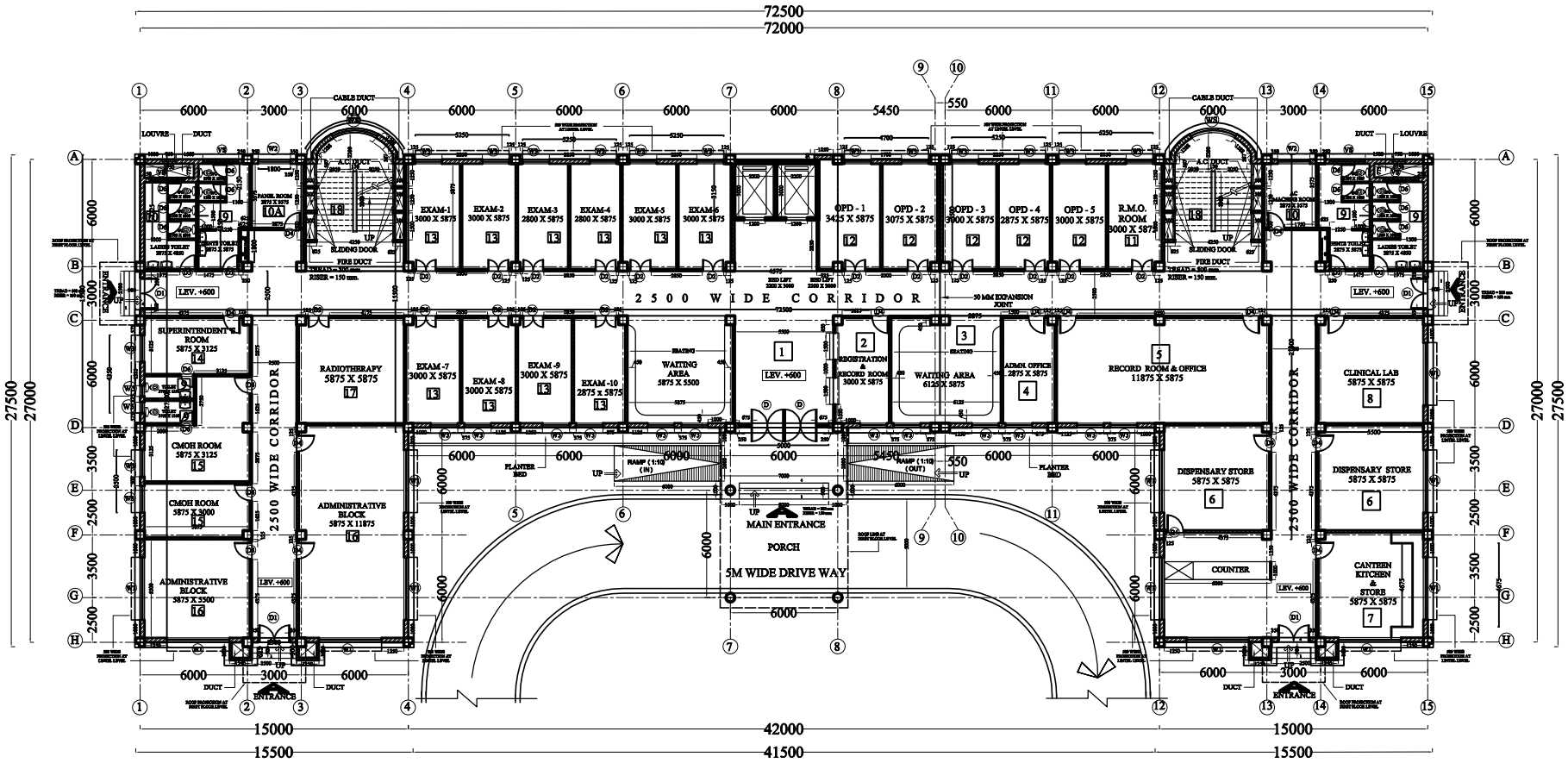
18	Hydraulic Door Closers	Godrej, Garnish
19	Water Proofing Cement Paint	Berger,Akzo Nobel
20	Ceramic Glazed Tiles	Kajaria, Johnson
21	Super plasticizer	SIKA, Fosroc
22	Epoxy Flooring	Fosroc, BASF
23	False Ceiling (a) Mineral Fibre (b) Metal	a. Armstrong b.Armstrong/Hunter Douglas(Luxalon)
24	Cast Iron Pipe and Fittings (Soil Pipes)	Electro Steel/IISCO/BIC
25	RCC Pipes	Indian Hume Pipe / Pragati Concrete Udyog
26	Stoneware Pipes & Fittings Cast	Parry/Hind (Conforming to ISI)
27	Cast Iron Pressure Pipes & Fittings	Electrosteel/ISSCO
28	GI Pipes (ISI marked)	Jindal / Tata / SAIL (Heavy Duty)
29	GI Fittings (ISI marked)	'R' Brand KS/UNIK (Heavy Duty)
30	Brass ball Valves & Fittings	Zoloto/Sant/Uniflow/R Brand
31	CI Sluice Valves, Check valves	IVC (Calcutta) Kirloskar/ Zoloto/Sant/Deepak
32	CP Brass Sanitary and water supply Fittings	Jaquoar/Essco/CERA/Parryware/Hindware/Marc
33	Vitreous China Sanitary ware	Parryware/Cera /Hindware/Jaquor/Essco/Marc
34	WC Seats & Covers	Parryware/Cera /Hindware/Jaquor/Essco/Marc
35	Curtain/Wall/Structural Glazing	Specialist Agency to be employed with Prior Approval of E-In-C
36	Plywood Products, Parcticle Boards & Veneers	Greenply /Century
37	Adhesive	Pidilite, Araldite
38	Plastic Laminates	Formica, Greenlam, Bakelite HYLAM, Sunmica
39	Powder Coatings	Berger/Akzonobel

40	Tile Joint Filler	Kajaria/Johnson
41	Resin Bonded Glass Wool	Crown Fibre Glass/Rock lloyd
42	M.S. Pipe	Jindal / TATA
43	Water Proofing	Fosroc / Sika / Cico
44	Silicon Sealant	Silicone, SIKA, Pidilite
45	Anchor Fastener	Hilti, Bosch
46	Formwork Release Agent	Fosroc, MBT, MC Baucheme CICO, ADO Conmat
47	CP Waste, Spreaders for Urinals	Jaquoar/Essco/CERA/Parryware/Hindware/Marc
48	Sensor Operated Auto Flushing System Urinals	Jaquoar/Essco/CERA/Parryware/Hindware/Marc
49	SFRC Manhole Covers	KK/SK Precast Concrete/ Advent concreteovision
50	UPVC Pipes/Fittings	Supreme/Prince/ Finolex/Ajay/Oriplast
51	Mirror	Modifloat/Saint Gobain
52	Flush Valves	Jaquoar/Essco/CERA/Parryware/Hindware/Marc
53	Polyethylene Water storage Tank	Sintex / Rotex / Duro plast/ Patton
54	Floor Mounted EWC	Jaquoar/Essco/CERA/Parryware/Hindware/Marc
55	R.O. System	As per discretion of E- I-C
56	Geyser	Venus/Voltas/Bajaj
57	Hand Drier	Venus/Voltas/Bajaj
58	Paver blocks	Ultra/Multiwin/Buildmat
59	Wall Putty	Birla,JK
60	AAC Block	Biltech/ICON/Koncrete
61	Block jointing thin set adhesive	Ultratech/SIKA/ACC
62	Cast Iron Butterfly Valves & Fittings	Premier/ Zoloto/Sant/Intervalve/Deepak
63	BATTERIES	EXIDE / STANDARD / AMARON
64	BATTERY CHARGER	KELTRON/ NELCO/ EXITE/ HBL NIFE
65	DIESEL ENGINE FOR FIRE PUMPS	CUMMINS / CATERPILLAR / KIRLOSKAR / ASHOK LEYLAND
66	FIRE PUMPS	KIRLOSKAR / MATHER &PLATT / KSB/ CROMPTON GREAVES
67	ELECTRIC MOTORS	KIRLOSKAR / SIEMENS / CROMPTON GREAVES / ABB / MARATHON

68	GI PIPES	TATA / JINDAL / SURYA ROSHNI / ZENITH /BANSAL
69	SUPPORTS	HITECH / SAKTHI
70	PIPE FITTINGS – BUTT WELDED	REPUTED MAKE (AS PER IS 1239, Part 2 , Heavy grade)
71	PIPE FITTINGS – SOCKET WELDED	REPUTED MAKE / VENUS / BHARAT FORGE / RAJENDRA FORGE / ASIAN VALVES & TUBES / VS (VIJAY CYCLE AND STEEL INDUSTRIES) / BM (B.M. METER PRIVATE LIMITED)
72	PRIMER, COATING & WRAPPING	IWL (PYPKOTE) / INDOLIT / RUSTEC / EQUIVALENT
73	PAINT	BERGER / ICI / ASIAN PAINTS / NERROLAC / NIPPON / J & N
74	SLUICE VALVE	KOLEY / KALPANA / KARTER / C&P / H.SARKAR / DURGA / KIRLOSKAR / SANT / VENUS / UPADHAYA
75	NON RETURN VALVE	KOLEY / KALPANA / KARTER / C&P / H.SARKAR / DURGA / KIRLOSKAR / SANT / VENUS / UPADHAYA
76	BUTTERFLY VALVE	KOLEY / KALPANA / KARTER / C&P / AUDCO / INTERVALVE / BDK /ADVANCE / H.SARKAR / CRAWL & RAY
77	BALL VALVE	LEADER / SANT / ZOLOTO/ ITAP / NETO / HAWA / RB
78	RUBBER EXPANSION BELLOWS	CORI / KANWAL / RESISTOFLEX
79	STRAINER	PROCEDYNE / SANT / EMERALD /H.SARKAR / VENUS / UPADHAYA / ZOLOTO
80	HYDRANT VALVE, BRANCH PIPE & NOZZLE	ASCO / GEI / FIRE SHIELD / GUARDS / NEWAGE / SUKAN / WINCO / SHAH BHOGILAL / MINIMAX / GHOSH / SAFEX
81	FIRE HOSE	CRC / BRG / FIRE SHIELD / NEWAGE / PADMINI / SAFEGUARD
82	HOSE REEL DRUM	ZENITH ENGINEERS / REPUTED MAKE / NEWAGE / EVER SAFE / SHAH BHOGILAL / SAFE FIRE / SAFEX / USHA FIRE / SAFEX
83	HOSE BOX	ZENITH ENGINEERS / REPUTED MAKE
84	PRESSURE GAUGE	H.GURU / FIEBIG / WAREE / WIKA / GENERAL INSTRUMENTS
85	PRESSURE SWITCH	INDFOSS / DANFOSS / SWITZER / VERMA TRAFAG
86	SPRINKLERS	TYCO / VIKING / RELIABLE / FIRESAFE / HD FIRE /BEST/GRINELL
87	SPRINKLER FLEXIBLE DROPS	EASYFLEX / DONGA FLEX / RAPIDROP / DEIJIN / HD FIRE
88	ALARM VALVE	HD FIRE / TYCO / VIKING / RELIABLE / FIRESAFE (UL APPROVED)
89	FLOW SWITCH	SWITZER / SYSTEM SENSOR
90	FIRE BRIGADE INLET	ASCO / GEI / FIRE SHIELD / GUARDS / NEWAGE / SUKAN / WINCO / SHAH BHOGILAL / MINIMAX / GHOSH / SAFEX
91	AIR RELEASE VALVES	LEADER / NEWAGE / SHAH BHOGILAL / EQUIVALENT/WINCO

92	FIRE EXTINGUISHER	FIRE SHIELD / OMEX / FIRE LITE / SAFEX / MINIMAX / ZENITH/ ALERT / USHA FIRE / SAFE FIRE / SAFEGUARD
93	PHOTOLUMINESCENT SAFETY SIGNAGES	GLO-LITE / AUTO GLO / BIJOLI STUDIO/ KLIK
94	SWITCH GEAR	L & T / SIEMENS/SCHNEIDER
95	CABLE END TERMINATION	DOWELL / COMET
96	FIRE SEALANT MATERIAL	PROMAT / FIRE MASTER (MMTCL) / 3M / HILTI / VIJAY SYSTEM ENGINEERS (VSE) / NELSON FIRE STOP

Indicative Site Plan



GROUND FLOOR PLAN

AREA= 1453 SQM.

NOTE :

1. THE BUILDING HEIGHT = 3600 MM (FL TO FL)
2. COVERED AREA IN GROUND FLOOR = 1454 Sq.m.
3. COMMON AREA IN GROUND FLOOR = 495 Sq.m.
4. SERVICE AREA IN GROUND FLOOR = 959 Sq.m.

DOOR SCHEDULE :

MKD	WIDTH	HEIGHT	REMARKS
D	1800	2100	DOUBLE LEAF DOUBLE SWING GLASS DOOR WITH ALUMINUM FRAME
D1	1800	2100	DOUBLE LEAF SINGLE SWING FLUSH DOOR
D2	1200	2100	DOUBLE LEAF SINGLE SWING AL. DOOR
D3	1200	2100	SINGLE LEAF SINGLE SWING FLUSH DOOR
D4	1000	2100	SINGLE LEAF SINGLE SWING AL. DOOR
D5	900	2100	SINGLE LEAF SINGLE SWING FRP DOOR
D6	750	2100	FRP DOOR/SOLID PVC DOOR

WINDOW SCHEDULE :

ALL WINDOWS TO BE FLUSHED WITH THE INSIDE SURFACE OF THE EXTERNAL WALL

MKD	WIDTH	HEIGHT	SILL	LINTEL	REMARKS
W1	3500	1350	750	2100	AL.SLIDING GLAZED WINDOW
W2	1800	1350	750	2100	AL.SLIDING GLAZED WINDOW
W3	1500	1350	750	2100	AL.SLIDING GLAZED WINDOW
W4	1000	1350	750	2100	AL.SLIDING GLAZED WINDOW
W5	600	600	1500	2100	AL. SIDE HUNG GLAZED WINDOW
W8	2500	1350	750	2100	ALUMINIUM FIXED GLAZED WINDOW
V8	2000	600			LOUVRE WITH EQUALIST BELOW BEAM SOFFIT

REVISION	DATE	REMARKS

WEST BENGAL MEDICAL SERVICES CORPORATION LTD.

PROJECT: AYUSH HOSPITAL AT PASCHIM MEDINIPUR

FOR APPROVAL

DRAWING TITLE: GROUND FLOOR PLAN

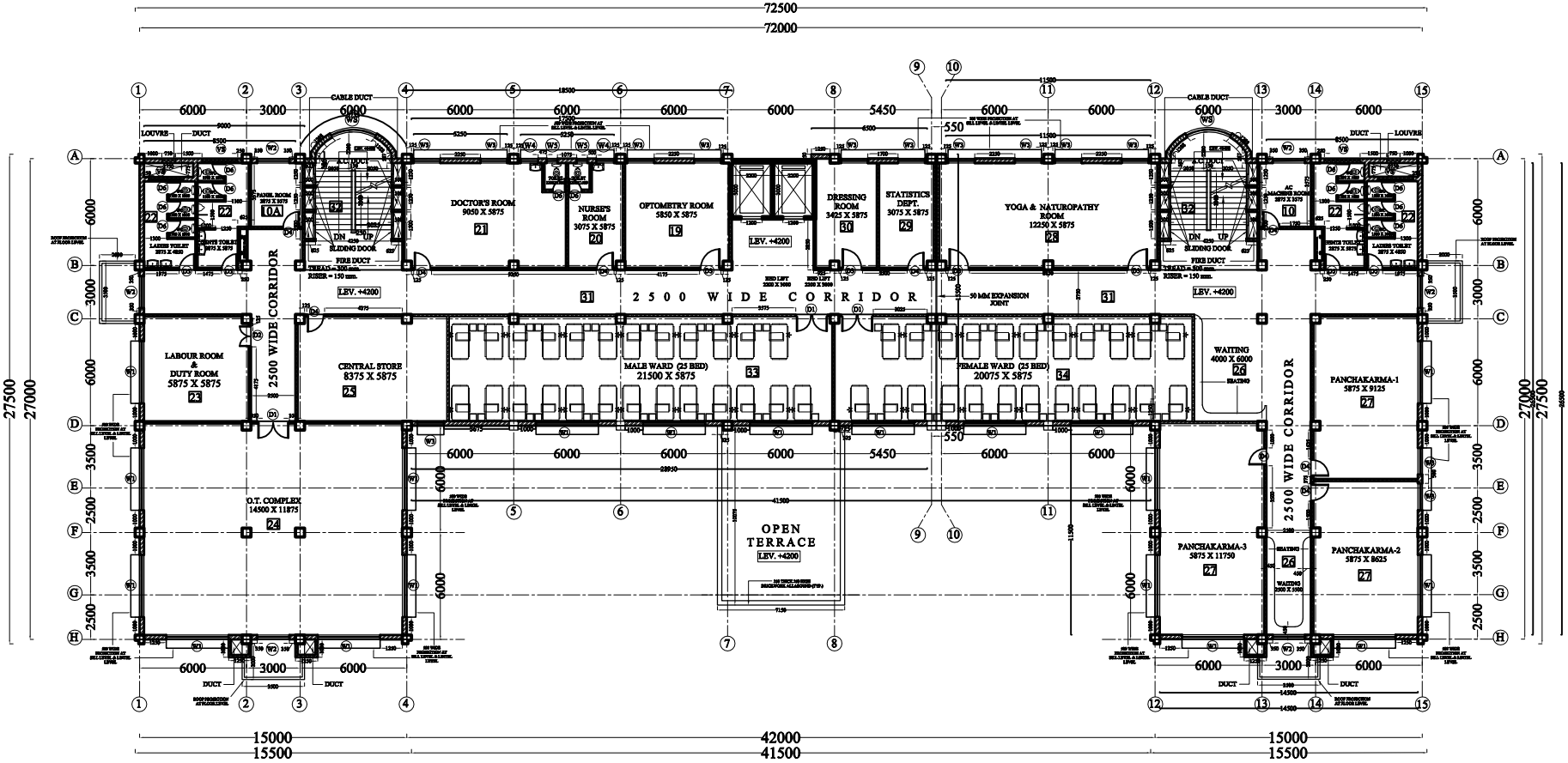
Checked by:- _____

M.RAKSHIT (Consultant Architect)

ARCHITECT:
HAVEN CONSULTANTS PVT. LTD.
142,LAKE EAST 6TH ROAD,
SANTOSHPUR, KOL-75.

Scale-1:100 | Date:09.02.2018

Drg. no. HCPL/AYUSH-02/2018



FIRST FLOOR PLAN
AREA= 1453 SQM.

NOTE :

1. THE BUILDING HEIGHT = 3600 MM (FL TO FL)
2. COVERED AREA PER FLOOR = 1453 Sq.m.
3. COMMON AREA IN FIRST FLOOR = 495 Sq.m.
4. SERVICE AREA IN FIRST FLOOR = 723 Sq.m.

DOOR SCHEDULE :

MKD	WIDTH	HEIGHT	REMARKS
D	1800	2100	DOUBLE LEAF DOUBLE SWING GLASS DOOR WITH ALUMINUM FRAME
D1	1800	2100	DOUBLE LEAF SINGLE SWING FLUSH DOOR
D2	1200	2100	DOUBLE LEAF SINGLE SWING AL. DOOR
D3	1200	2100	SINGLE LEAF SINGLE SWING FLUSH DOOR
D4	1000	2100	SINGLE LEAF SINGLE SWING AL. DOOR
D5	900	2100	SINGLE LEAF SINGLE SWING FRP DOOR
D6	750	2100	FRP DOOR/SOLID PVC DOOR

WINDOW SCHEDULE :

ALL WINDOWS TO BE FLUSHED WITH THE INSIDE SURFACE OF THE EXTERNAL WALL.

MKD	WIDTH	HEIGHT	SILL	LINTEL	REMARKS
W1	3500	1350	750	2100	AL.SLIDING GLAZED WINDOW
W2	1800	1350	750	2100	AL.SLIDING GLAZED WINDOW
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W4	1000	1350	750	2100	AL.SLIDING GLAZED WINDOW
W5	600	600	1500	2100	AL. SIDE HUNG GLAZED WINDOW
W8	2500	1350	750	2100	ALUMINIUM FIXED GLAZED WINDOW
V8	2000	600			LOUVRE WITH EQUAIST BELOW BEAM SOFFIT

REVISION	DATE	REMARKS

WEST BENGAL MEDICAL SERVICES CORPORATION LTD.

PROJECT: AYUSH HOSPITAL AT PASCHIM MEDINIPUR

FOR APPROVAL

DRAWING TITLE: FIRST FLOOR PLAN

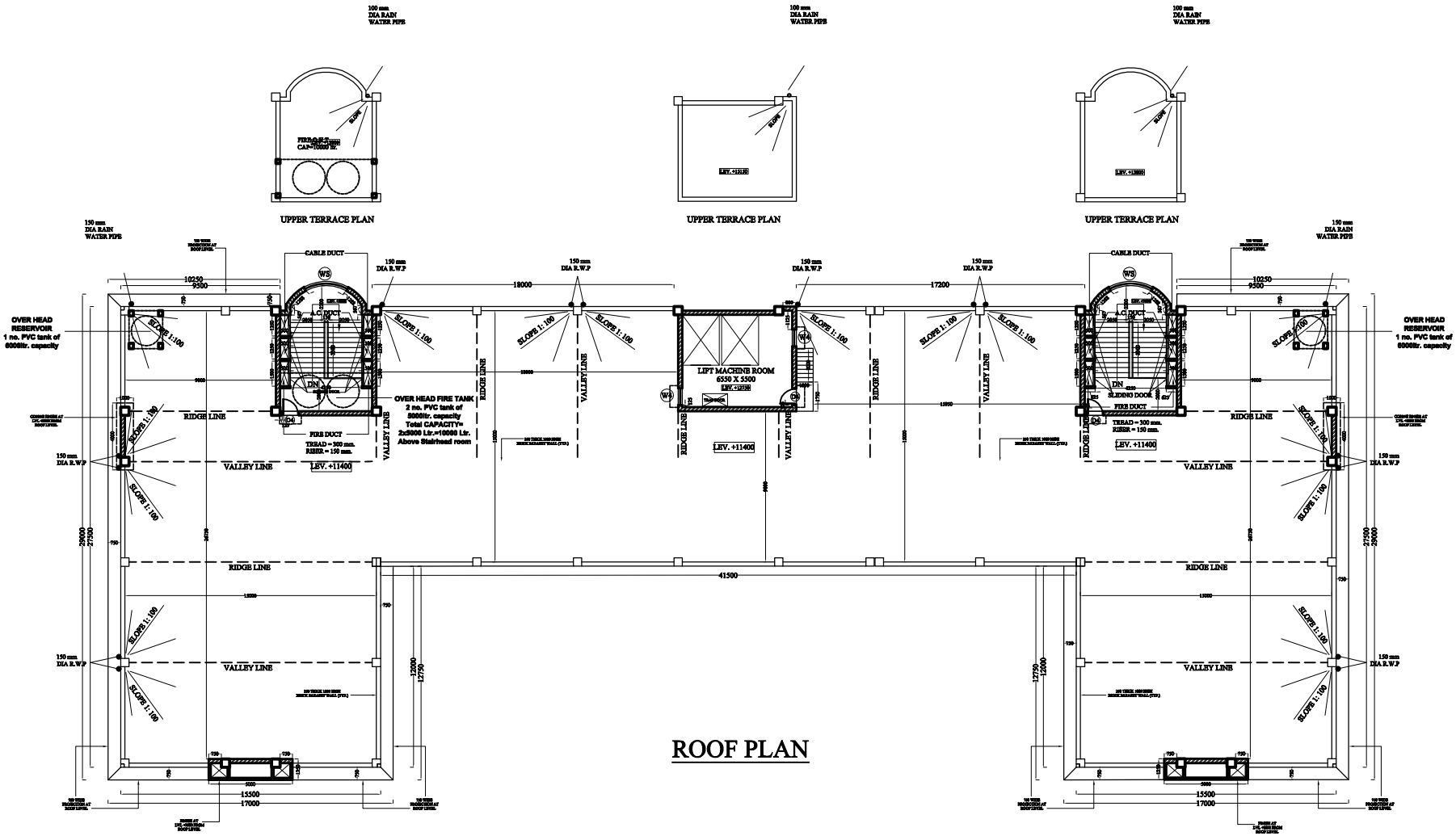
Checked by:- _____

M.RAKSHIT (Consultant Architect)

ARCHITECT:
HAVEN CONSULTANTS PVT. LTD.
142,LAKE EAST 6TH ROAD,
SANTOSHPUR, KOL-75.

Scale-1:100 | Date:09.02.2018

Drg. no. HCPL/AYUSH-03/2018



NOTE :

1. THE BUILDING HEIGHT = 3600 MM (FL TO FL)

2. COVERED AREA PER FLOOR = 1453 Sq.m.

DOOR SCHEDULE :

MKD	WIDTH	HEIGHT	REMARKS
D	1800	2100	DOUBLE LEAF DOUBLE SWING GLASS DOOR WITH ALUMINUM FRAME
D1	1800	2100	DOUBLE LEAF SINGLE SWING FLUSH DOOR
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D3	1200	2100	SINGLE LEAF SINGLE SWING FLUSH DOOR
D4	1000	2100	SINGLE LEAF SINGLE SWING AL. DOOR
D5	900	2100	SINGLE LEAF SINGLE SWING FRP DOOR
D6	750	2100	FRP DOOR/SOLID PVC DOOR

WINDOW SCHEDULE :

ALL WINDOWS TO BE FLUSHED WITH THE INSIDE SURFACE OF THE EXTERNAL WALL.

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W4	1000	1350	750	2100	AL.SLIDING GLAZED WINDOW
W5	600	600	1500	2100	AL. SIDE HUNG GLAZED WINDOW
W8	2500	1350	750	2100	ALUMINIUM FIXED GLAZED WINDOW
V8	2000	600			LOUVRE WITH EQUAIST BELOW BEAM SOFFIT

REVISION	DATE	REMARKS

WEST BENGAL MEDICAL SERVICES CORPORATION LTD.

PROJECT: AYUSH HOSPITAL AT PASCHIM MEDINIPUR

FOR APPROVAL

DRAWING TITLE: ROOF PLAN

Checked by:- _____

M.RAKSHIT (Consultant Architect)

ARCHITECT:
HAVEN CONSULTANTS PVT. LTD.
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SANTOSHPUR, KOL-75.

Scale-1:100 | Date:09.02.2018

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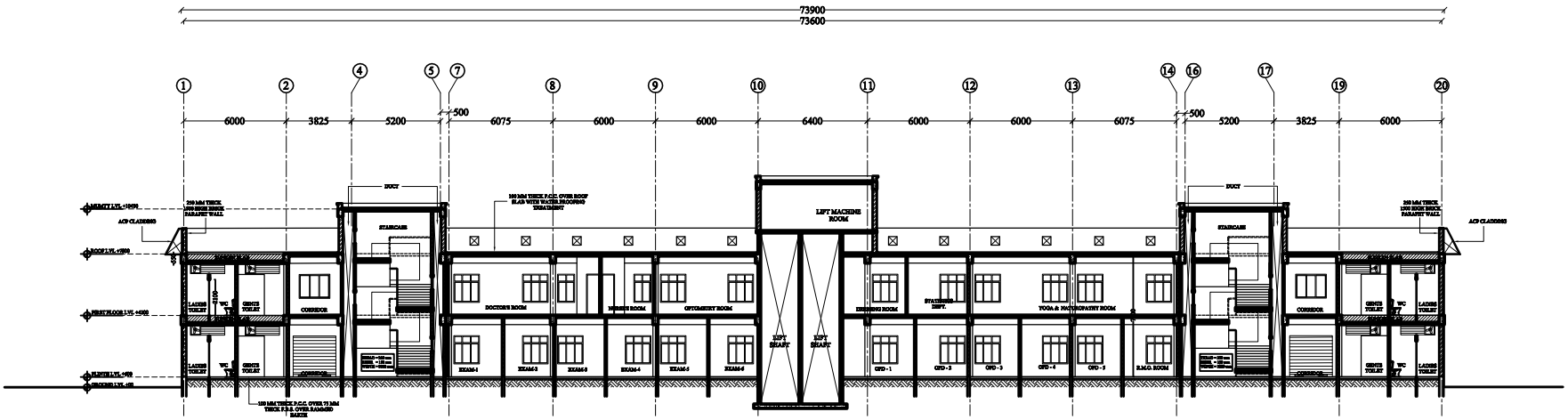
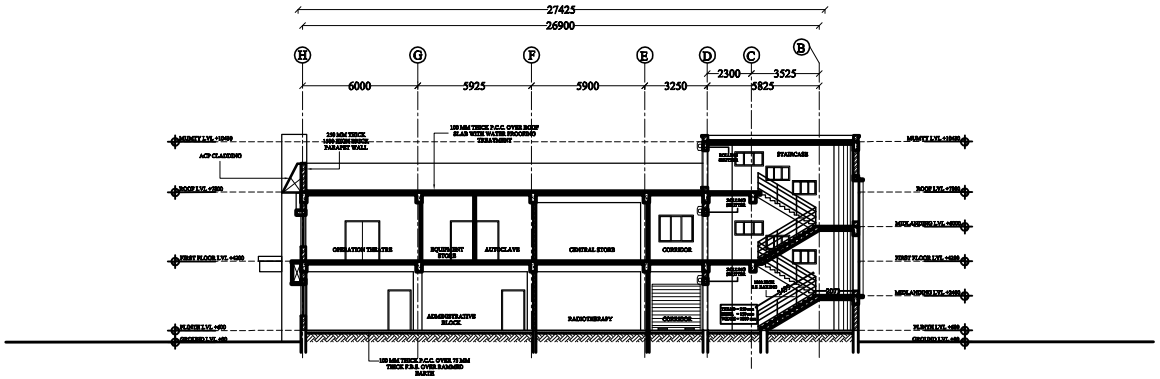


SECTION AT A-A



SECTION AT B-B

DOOR SCHEDULE :

MKD	WIDTH	HEIGHT	REMARKS
D	1800	2100	DOUBLE LEAF DOUBLE SWING GLASS DOOR WITH ALUMINIUM FRAME
D1	1800	2100	DOUBLE LEAF SINGLE SWING FLUSH DOOR
D2	1200	2100	DOUBLE LEAF SINGLE SWING AL. DOOR
D3	1200	2100	SINGLE LEAF SINGLE SWING FLUSH DOOR
D4	1000	2100	SINGLE LEAF SINGLE SWING AL. DOOR
D5	900	2100	SINGLE LEAF SINGLE SWING FRP DOOR
D6	750	2100	FRP DOOR/SOLID PVC DOOR

WINDOW SCHEDULE :

ALL WINDOWS TO BE FLUSHED WITH THE INSIDE SURFACE OF THE EXTERNAL WALL

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W1	3500	1350	750	2100	AL SLIDING GLAZED WINDOW
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W4	1000	1350	750	2100	AL SLIDING GLAZED WINDOW
W5	600	600	1500	2100	AL. SIDE HUNG GLAZED WINDOW
W8	2500	1350	750	2100	ALUMINIUM FIXED GLAZED WINDOW
V8	2000	600			LOUVRES WITH SUNKUNT BELOW SEMI HOOD

REVISION	DATE	REMARKS

WEST BENGAL MEDICAL SERVICES CORPORATION LTD.

PROJECT: AYUSH HOSPITAL AT PASCHIM MEDINIPUR

FOR APPROVAL

DRAWING TITLE: SECTIONS

Checked by:-

M.PAKSHIT (Consultant Architect)

ARCHITECT:
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14/2,LAKE EAST 6TH ROAD,
SANTOSHPUR, KOL-75.

Scale-1:100

Date:09.02.2018

Dg. no.: HCPL/AYUSH-05/2018