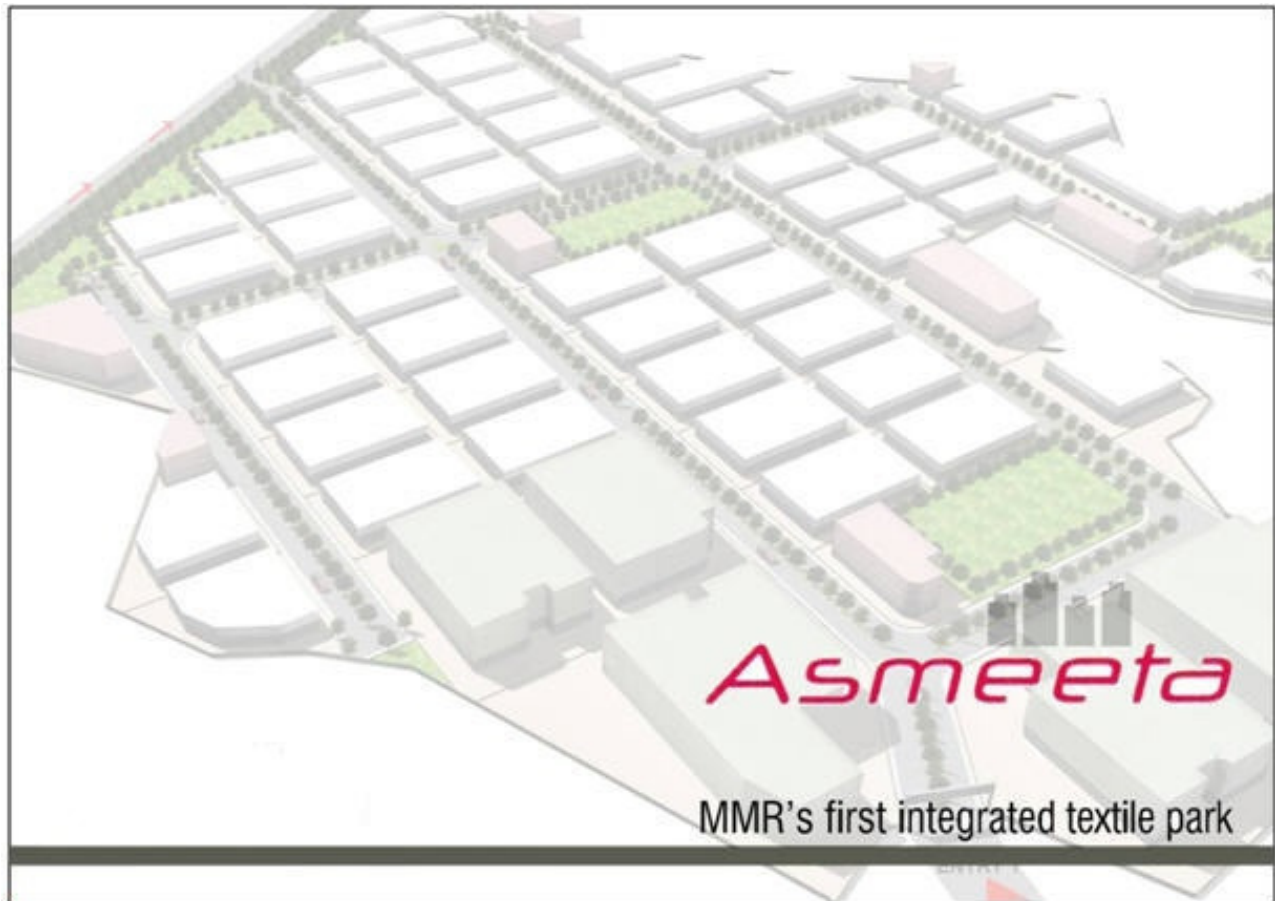


**TENDER FOR - PHASE II**

**CONSTRUCTION OF APPROACH ROAD, INTERNAL ROAD, STORM  
WATER DRAIN, LAND DEVELOPMENT WORKS AND OTHER ALLIED  
SERVICES**

**AT SARAVALI- KON M.I.D.C., BHIWANDI, MAHARASHTRA  
FOR**

**M/S. ASMEETA INFRATECH LTD.**



**MAGUS CONSULTING PVT. LTD.  
ARCHITECTS & CONSULTING ENGINEERS  
501, NEELYOG SQUARE  
GHATKOPAR (E)  
MUMBAI - 400 077.  
TEL - + 91 22 67354700  
FAX - +91 22 67354702  
EMAIL: [prakash.channe@magusindia.co](mailto:prakash.channe@magusindia.co)  
[anil.jadhav@magusindia.co](mailto:anil.jadhav@magusindia.co)**

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**SHORT TENDER NOTICE**

**For Appointment of Contractor for Construction of Approach Road, Internal Road,  
Storm Water Drain, Land Development Works And Other Allied Services  
AT SARAVALI- KON M.I.D.C., BHIWANDI, MAHARASHTRA  
FOR  
M/S. ASMEETA INFRA TECH LTD**

Saravali- Kon M.I.D.C., Bhiwandi, Maharashtra for M/s. Asmeeta Infratech Ltd. The project is approved under Ministry of Textile; Government of India for availing the Grant-in-Aid as per SITP Scheme and the project is under implementation stage. Now client invites sealed tenders in two bid envelope system from competitive contractors having proven track record of execution of similar works and meeting the below mentioned eligibility criteria for Construction of Approach Road, Internal Road, Storm Water Drain And Other Allied Services.

Sr. No.	Description/ Nature of Work	Eligibility Criteria	Tender Cost (Non Refundable) in Rs.	Earnest Money Deposit in Rs.	Last Date of Issue of tender	Last Date of Submission of tender
1	Land Development Works & Construction of Approach & Internal Roads of the Project & Storm water Drain	<ul style="list-style-type: none"> <li>- Average Annual Turnover of Rs. 5 crore in last 3 years.</li> <li>- Similar one work of Rs. 3.5 crore during last 3 years.</li> <li>-Minimum annual turnover not less than 3.5 crore in last 3 years.</li> </ul>	5000/-	200000/-	10 <sup>th</sup> October 2013 to 14 <sup>th</sup> October 2013  Up to 1300 hrs	15th October 2013 to 18th October 2013  Up to 1300 hrs

The detailed bid document containing Eligibility Criteria, Detailed Scope of Work, Instructions to Contractor, Method of Submission, etc. may be obtained from Engineering Department of Project Consultant M/S. MAGUS CONSULTING PVT. LTD., 501, Neelyog Square, Ghatkopar(E), Mumbai 400077. The duly filled sealed tenders shall be submitted to the same office on or before the dates given in above table upto 1300 hrs & shall be opened on the immediate working day i.e. Monday 21<sup>st</sup> October 2013.

M/s. Asmeeta Infratech Ltd will not be responsible for any delay in receiving the proposals and reserves the right to accept / reject any or all proposals without assigning any reason thereof. Conditional offers will not be accepted & liable for rejection.

sd/-

**Col. H Kundu**

## 1. PREFACE TO TENDER

- 1.1 M/s. Asmeeta Infratech Ltd Developers intend to develop the plot/plots of land by constructing Compound wall, road, storm water drain, land development works & allied services, as per the approved drawings.
- 1.2 The Textile Park site is located at Saravali- Kon M.I.D.C. The site is available and will be handed over to the contractor immediately on award of work. The Contractor may suitably programmed & conveyed to client the commencement of each work taking into account the space required for stacking of materials, materials godowns, machineries, labour hutments, water tanks before the commencement work.
- 1.3 The scope of work executed under this contract covers the following:

The scope of work to be awarded to you is to execute all items as per Schedule - 'A' for construction of subject work or any such items which are not indicated in Schedule - 'A' or in detail specification. The rates for items not included if required to be executed shall be finalised as per clause for Extra Items. Major components of work which are indicative and not exhaustive are listed below :

- All Excavation, backfilling etc works pertaining to Land Developing works
  - All Soling, PCC & RCC works
  - All type of Masonry works
  - All type of Plaster works
  - Metalling & Flexible (Bitumen) pavement works
  - Concrete Pavement Works
  - All Miscellaneous works
- 1.4 Time shall be the essence of the contract and the entire work shall be completed within 12 months from the date of handing over of the site, or the date of handing over of first part of the site, where site is to be handed over in parts.
  - 1.5 The contractor shall, within ten days of award of work, submit detailed programme for executing the works in C.P.M. & Pert in Bar Charts format, material procurement schedule, machinery deployment schedule, labor deployment schedule, staff deployment schedule & get it approved from the Developers.
  - 1.6 The contractor has to carry out his work strictly according to the drawings, specifications appended herewith and which together with the General conditions of contract, Special Conditions of Contract, Technical Specifications, Articles of Agreement etc. will form the Contract Document.
  - 1.7 The Architectural and Structural drawings and any other drawings will be issued at appropriate stage during the progress of the work. The developers reserve the right to issue further drawings indicating any other details of the construction required to be done.

- 1.8 The tenderers to note that the Developers will provide land only for stores godown, office, etc. as required for execution of the work. Space for labor accommodation will be agreed on site subject to management decision, if labor accommodation given on site then its removal, removing scraps, cleaning the location will be solely done by contractor after completion of work or as per instructions from EIC. Cost incurred for the same will not be paid to contractor.

## 2. INSTRUCTIONS TO TENDERERS

- 2.1 The tenderer shall submit a list of works executed by them and under progress along with necessary certificates from the owners /architects.
- 2.2 For Electrical, Sanitary, Water supply and Drainage works, the tenderers must possess respective licenses from the concerned authorities valid in Mumbai/ Maharashtra for doing such work, or associate another person/firm holding such license the details of which shall be indicated with the tender.
- 2.3 **Every Tenderer shall visit the site of the proposed work and fully acquaint himself with conditions as they exist so that they may fully understand the facilities, difficulties and restrictions, in the execution of the work under this contract.** The work is to be executed in phases and along with any other structures on the site. Tenderers shall also thoroughly inspect examine and be familiar with the drawings and the specifications. They should also inspect the source of materials, their quality and availability and cost. The materials must strictly comply with relevant ISI code and to the specifications approved by the Developers. The failure or omission of any tenderer to receive or to examine any forms, instrument or document or to visit the site and acquaint themselves with special conditions therein existing shall not in any way relieve them from any obligation in respect of their tender. By submitting a tender, the tenderer agrees that they have examined the site, surroundings, the nature of ground and sub-soil, the form and nature of site, the means of access to the site, the accommodation they may require elsewhere other than the site in general. The tenderer shall obtain-all necessary information at his own cost and risk, contingencies and other circumstances which may influence or effect their tender, quotation, study specifications and drawings, inspect the source of materials, their quality, availability and cost, and where the specifications and/or drawings required in any part of the work, a given result be produced to ensure that the specifications/drawings are adequate and the required result can be produced. No claim of any kind shall be entertained on account of ignorance in this respect.
- 2.4 The Tenderer is required to comply with the requirements of all statutes, rules, regulation and bye-laws of Government, Local bodies, Public Authorities.
- 2.5 No oral Interpretations will be made to and by any Tenderer as to the meaning of the drawings and specifications. Every request for such interpretation shall be in writing to consultant "Magus Consulting Pvt. Ltd." address mentioned above. Every interpretation made to the Tenderers will be in the form of an addendum. All such addenda shall become part-of the Conditions of Contract. Failure of the Tenderer to receive any such interpretation shall not relieve any tenderer from any obligation- under their tender as submitted.

- 2.6 Tenderers may during the tendering period and afterwards be advised by addenda and revised drawings, the additions, omissions or alterations in the specifications and drawings and change in the scope of work. All such changes shall be included in the scope of work covered by the tender and shall become a part of the specifications, drawings and conditions of contract.
- 2.7 The prices quoted shall include all taxes currently levied or taxes that become leviable during the pendency of the contract or extended duration till completion. The prices shall be for the complete execution of the work, and shall include overheads, profits, cost of labour, tools, plants, equipments, materials, taxes, Municipal/MIDC Charges or any other expenses involved either directly or indirectly in execution of the work, and nothing extra shall be payable beyond the quoted rate. The quoted prices shall include expenses for adequate safety measures to be taken by the Contractor to guard against any risk of accident, and to strictly comply with all relevant law related to Labour etc.
- 2.8 The tender must be filled in English and all entries hand written in ink. All prices are to be filled in words and figures, the amount for each item should be calculated and requisite totals given as sub totals and grand totals. Special care shall be taken to write the rates in figures as well as in words and the amounts in figures only, in such a way that interpolation is not possible. All corrections should be attested by the Tenderer with his initials. Tenders that contain any conditions other than those stipulated here, or tenders that are filled in manner other than that specified herein are liable to be rejected.
- 2.9 The rates quoted by the Tenderer in the tender shall include all charges for scaffoldings, hire of tools, plants, centering materials, water and electricity meter charges, temporary plumbing, heights leads and lifts, sheds for the materials marking out and clearing the site, watering charges, carriage, safety measures etc. and the rates quoted thus shall be deemed to be for the finished work to be measured at site. The rates quoted shall also include fees / charges to be paid to the local authorities to get permission to execute scope related to tenderers. The rates shall also be firm and shall not be subject to any change in material rates except cement & steel, labor wages, fuel rates & any variation in government taxes except VAT, labor shortages, fluctuations transportation cost or any conditions whatsoever. The Tenderers must include in their rates Sales Tax (Central and Local). Sales Tax on Turn Over, Sales Tax on Work contract, Excise Duty, Octroi and any other taxes and duties or other levies in existence or levied in future by the Central Government, State Government, Local Authority or any other Authorities. No claim in respect of Sales Tax (Central and Local) Sales Tax on Turn Over, Sales Tax on Works Contract, Excise Duty, Octroi or Taxes, LBT, duties or Levies etc. shall be accepted. The Developers shall deduct taxes at source as per laws/ rules in this regard, prevalent at the time of making payment.
- 2.10 The tenderer must obtain for himself on his own responsibility during the tendering period and at his own expense all the information which may be necessary for the purpose of making a tender and for entering into the contract and must examine the drawings and consider and inspect the site of the work and acquaint himself with all local conditions, means of access to the work, nature of the work and all matters pertaining thereto the existing foundations, surrounding etc. and all other matters concerning the execution of the work as required.

- 2.11 Every Tenderer shall submit a list of machinery tools and plants that he will bring for the proposed work and this shall be approved by the Developers.
- 2.12 Successful tenderer who will get contract, must not sublet any portion of the contract to sub contractor without the written consent of the Developer, falling which the Developer may serve a notice rescinding the contract where upon the initial Security Deposit and Retention Money shall be forfeited by the Developer and the contract revoked.
- 2.13 The Tenderer whose tender is accepted will be required to enter into an agreement on stamp paper of appropriate value with the Developer.
- 2.14 The Contractor whose tender is accepted shall be required to furnish by way of initial Security Deposit, for the due fulfillment of this contract, such sum as mentioned in the tender.
- 2.15 No interest will be payable on the Earnest Money Deposit. Initial Security Deposit and the Retention Money held by the Developers.
- 2.16 This amount would be returned (less deductions, if any) to the Contractor thereafter upon issue of Final Completion Certificate on expiry of Defect Liability Period. In the event any defects occur during the period, they shall be dealt with as provided in the general conditions of the contract.
- 2.17 If the successful Tenderer fails to complete and sign the agreement within 15 days of letter of award, his Earnest Money will be forfeited to the Developers.
- 2.18 EMD for Unsuccessful bidders will be returned within 15 days of opening of tender. EMD of successful bidders will be released when bidder signs the agreement.
- 2.19 The offer shall be given by the Tenderers in the form attached to the tender documents.
- 2.20 These Preface to Tender and Instructions to Tenderers shall form part of the contract.
- 2.21 The tenderer shall submit the tender on date mentioned in Notice Inviting Tender at consultant's office mentioned below. Any tender received after this date and time shall not be accepted.

Consultant's Address :

**MAGUS CONSULTING PVT. LTD.**  
**ARCHITECTS & CONSULTING ENGINEERS**  
**501, NEELYOG SQUARE**  
**GHATKOPAR (E)**  
**MUMBAI - 400 077.**  
**TEL - + 91 22 67354700**  
**FAX - +91 22 67354702**

Tenders shall be packed, marked and sealed and submitted in original with documents listed below.

**Cover “A” shall contain**

- a) **Earnest Money Deposit - EMD** in favor of M/s. Asmeeta Infratech Ltd.
- b) The Tenderer has accepted all conditions of this tender and undertaking that Tender Form is duly completed, signed and sealed for entering into agreement.
- c) Contract Conditions, addenda / corrigenda / clarification issued before due date of tender, Technical Specifications and tender drawings duly signed and sealed (in token of acceptance of documents)

**Cover “B” shall contain**

- a) Bills of Quantities duly priced completed, signed and sealed for entering into agreement.



**FORM OF BANK GUARANTEE in LIEU OF RETENTION MONEY**

1. In consideration of \_\_\_\_\_ having its office \_\_\_\_\_  
\_\_\_\_\_ in the State of Maharashtra (hereinafter called “Developers” which expression shall unless repugnant to the subject or context include its successors and assigns) having agreed under terms and conditions of contract (vide its acceptance letter no \_\_\_\_\_ dated \_\_\_\_\_ made between \_\_\_\_\_ (Contractor) and in connection with \_\_\_\_\_ (hereinafter called the said Contract) to accept Deed of Guarantee and Indemnity as herein provided for Rs. \_\_\_\_\_ from the \_\_\_\_\_ in lieu of the Retention Money formed by way of deduction to be made from the Contractor’s bills for the due fulfillment by the said Contractor of the terms and conditions contained in the said contract, the \_\_\_\_\_ (hereinafter referred to as said Bank) and \_\_\_\_\_ having our office at \_\_\_\_\_ do hereby undertaken and agree to indemnify and keep indemnified the from time to time to the extent of Rs. \_\_\_\_\_ (Rupees \_\_\_\_\_ only) against any loss or damage, costs, charges and expenses cause to or suffered by or that may be caused or suffered by the Owner by reason of any breach or breaches by the said Contractor or any of the terms & conditions contained in the said Contract and/or in respect of all its claims for money and/or materials found due and recoverable from the said Contractor in respect of the said contract and to unconditionally pay the amount claimed as such by the Developer on demand and without demur to the extent aforesaid.
2. We, the said Bank further agree that the Developer shall be the sole judge as to whether the said Contractor has committed any breach or breaches of any of the terms and conditions of the said contract and the extent of loss, damage, costs, charge and expenses caused to or suffered by or that may be caused to or suffered by the Developer on account thereof and the decision of the Developer/that the said Contractor has committed such breach or breaches and as to the amount or amounts of loss, damage, costs, charges and expenses caused to or suffered by or that may be caused to or suffered by the Developer from time to time shall be final and binding on us.
3. The Developer shall have the fullest liberty without affecting in any way the liability of the Bank under this Guarantee or Indemnity from time to time to vary any of the terms & conditions of the said contract or to extend time of performance by the said Contractor to postpone for any time and from time to time any of the powers exercisable by It against the said Contractor & either to enforce or forbear from enforcing any of the terms and conditions governing the said Contract or securities available to the Developer and the said Bank shall not be released from Its liability under these presents by any exercise by the Developer or any Indulgence by the Developer to the said Contractor or if any other matter or thing whatsoever, which under the law relating to sureties would but for this provision have the effect of so releasing the Bank from Its such liabilities.

4. It shall not be necessary for the Developer to proceed against the Contractor before proceeding against the Bank and the Guarantee and Indemnity herein contained shall be enforceable against the said Bank, notwithstanding any security which the Developer have obtained or obtain from the Contractor shall at the time when proceedings are taken against the Bank hereunder be outstanding or unreleased.
5. Notwithstanding anything contained in any of the foregoing clause the liability of the Bank under this Guarantee shall not exceed Rs.\_\_\_\_\_ (Rupees \_\_\_\_\_). The Guarantee shall remain in force till \_\_\_\_\_. Unless a claim or demand under this guarantee is made or presented to the Bank within six months from the expiry date, all the rights of the owner under this guarantee shall cease and the Bank shall be released and discharged from all liability hereunder.
6. We, the said Bank lastly undertake not to revoke this guarantee and Indemnity during Its currency except with the previous consent of the Developers in writing & agree that any change in the constitution of the said Contractor or the said Bank shall not discharge our liability hereunder.

For and on behalf of the Bank

(Name and Designation)

The above guarantee is accepted by the Owner

Name and Designation

Dated:

## GENERAL CONDITIONS OF CONTRACT

### TENDER FORM

To,

M/s. Asmeeta Infratech Ltd Textile Park

**SUB: - Construction of Approach Road, Internal Road, Storm Water Drain, Land Development Works And Other Allied Services for Asmeeta Infratech Ltd Project at Saravali- Kon M.I.D.C., Bhiwandi.**

Dear Sir,

- (a) Having examined the conditions of Contract, Specifications, Bills of Quantities and Drawings for the execution of the above mentioned Works, we, the undersigned, offer to execute completely and maintain the whole of the said Works in conformity with the condition of Contract, Specifications, Bills of Quantities and Drawings.
- (b) Earnest Money Deposit (EMD) as mentioned in the form of D.D. / Pay order in favour of Employer as detailed in Tender Conditions is enclosed.
- (c) We agree to abide by this tender for the period mentioned from the opening date fixed for receiving the same and it shall remain binding upon us for a mutually extended period agreed in writing by us.
- (d) If our tender is accepted, we undertake to commence, complete and deliver the whole of the Works, comprised in contract within specified periods from receipt of Employer order in writing.
- (e) If our tender is accepted we will, obtain and arrange;
  - 1. Insurance.
  - 2. Labour Licences.
  - 3. Any other statutory obligation, if any, prior to commencement of work as stated in (d) above.
- (f) We agree to your right to forfeit our EMD without prejudice to any other right or remedy for the following failures on our part.
  - 1. EMD is less than as specified tender.
  - 2. Changes to tender are made within Validity Period as specified.
  - 3. Work is not commenced within specified period as mentioned.
  - 4. Obligations under (e) above are not fulfilled.



- (g) Unless and until a formal Agreement is prepared and executed, this tender together with your written acceptance thereof, shall constitute a binding contract between us.
- (h) We understand that you are not bound to accept the lowest or any tender you may receive.

Authorised signatory to tender

Signature dated Designation/Capacity  
Name

Address

WITNESS 1

Signature  
Name

ADDRESS

DATE

WITNESS 2

Signature  
Name

ADDRESS

DATE

## 1. Definitions and Interpretations:

In the contract (as herein after defined) the following words and expressions shall have the meaning hereby assigned to them except where the context otherwise requires

- 1.1 **“Developer”** shall mean M/s. Asmeeta Infratech Ltd and shall include its legal representative/s, assign/s, and successor/s.
- 1.2 **“Contractor”** means the person; firm or company who’s Tender has been accepted by the Developer and includes the Contractor’s personal representatives, successors and permitted assigns.
- 1.3 **“Engineer-in-Charge”** means the person, company or firm appointed from time to time by the Developer and notified in writing to the Contractor to act as the Engineer-in-Charge for the purposes of the Contract.
- 1.4 **“Engineer-in-Charge’s Representative”** means any person or persons appointed from time to time by the Engineer-in-Charge and notified in writing to the Contractor to perform the duties.
- 1.5 **“Authority”** means any government authority, statutory authority, regulatory authority, government department, agency, commission, board, tribunal or court or other Law, rule or regulation making entity having or purporting to have jurisdiction on behalf of the Republic of India or any State or other subdivision thereof or any municipality, district or other subdivision thereof.
- 1.6 **“Architect”** shall mean the person or persons designated as such in the Contract or in case of termination of services of such architect, person(s) appointed by the Developer in its place, The term Architect shall also include the Architect’s authorized representative(s).
- 1.7 **‘Consultant/Specialist Consultant’** shall mean the person or persons, firm or company appointed/ designated as such by the Developer for giving expert advice in respect of special services works in the Project.
- 1.8 **“Other Contractors”**: The Developer reserves the right to award other contracts in connection with other portions of the Project under these or similar Conditions of the Contract.
- 1.9 **“Nominated Sub-contractor”** means and includes all specialists, merchants, tradesmen and the like executing any part of the Works or supplying any materials or services for the Works nominated by the Developer and employed by the Contractor.

- 1.10 **“Specialist Contractor”** means any contractor employed by the Developer to execute Specialist Works.
- 1.11 **“Person”** means any individual, sole proprietorship, unincorporated association, body corporate, corporation, company, partnership, limited liability company, joint venture, Governmental Authority or trust or any other entity or organization.
- 1.12 **“Contract”** means the Contract Documents which form the Contract. The Contract represents the entire and integrated agreement between the parties hereto and supersedes all prior negotiations, representations, or agreements, either written or oral.
- 1.13 **“Contract Documents”** means and consists of
- a) The Articles of Agreement ( if completed)
  - b) Bid Documents
  - c) Letter of Acceptance and / or Work Order
  - d) Special Conditions of Contract
  - e) The General Conditions of Contract
  - f) The Specifications
  - g) The Drawings
  - h) The Priced Bill of Quantities
  - i) Other documents, as furnished by the tenderer
  - j) All modifications agreed by the parties to the tender documents and to contractor’s offer, prior to acceptance of tender.
  - k) Any other documents forming part of the Contract.
- 1.14 **“Contract price”** means sum named in the Letter of Acceptance or Work Order for the Contract. In the absence of mention of a sum in the Letter of Acceptance or Work Order, Contract price shall mean the total of the priced Bills of quantities forming part of the contract.
- 1.15 **“Final Contract Price”** means the sum to be ascertained and paid in accordance with the provisions hereinafter contained for the execution of the Works in accordance with the Contract.
- 1.16 **“Bill of Quantities”** means the priced and completed bill of quantities forming part of the Contract.
- 1.17 **“Certificate of Substantial Completion”** means the certificate issued by the Engineer-in-Charge.
- 1.18 **“Constructional Plant”** means all appliances or things of whatsoever nature required for the execution of the Works but does not include materials or other things intended to form or forming part of the permanent work or vehicles engaged in transporting any personnel, Constructional Plant, materials or other things to or from the Site.

- 1.19 **“Contingency Sum”** means the sum provided for work or expenditure which cannot be foreseen at the time the tender documents are issued which sum may include provision for work to be executed or for materials or services to be supplied by a Nominated Sub-Contractor.
- 1.20 **“Drawings”** means the drawings referred to in the Contract Specifications or Bills of Quantities and any modification of such drawings approved in writing by the Engineer-in-Charge and such other drawings as may from time to time be furnished in writing or approved in writing by the Engineer-in-Charge.
- 1.21 **“Force Majeure”** shall mean any event or combination of events or circumstances beyond the control of a party and which could not have been reasonably anticipated by a prudent person, and which cannot; (i) by the exercise of reasonable diligence; or (ii) despite the adoption of reasonable precaution and/or alternative measures be prevented, or caused to be prevented, and which materially and adversely affects a party's ability to perform obligations under this Contract including but not limited to:
- (a) Acts of God. i.e. fire, flood, earthquake, epidemics, natural disasters, Abnormally bad weather,
  - (b) Serious loss or damage by fire, explosions or accidents, air crashes and shipwrecks,
  - (c) War, hostilities (whether war be declared or not), invasion, act of foreign enemies, rebellion, terrorism, revolution, insurrection, military or usurped power, or civil war,
  - (d) Riots, commotions or disorders in India affecting the execution of the work, otherwise than amongst the employees of the Contractor, any sub-contractor or Nominated Sub-contractor or Specialist Contractor currently or formerly engaged on the Works or Specialist Works,
  - (e) Any event or circumstances analogous to the foregoing.
- Any variation in prices or availability of materials, labour, or machinery, unless caused by any event or circumstance analogous to the foregoing, shall not constitute Force Majeure.
- 1.22 **“General Holiday”** means every Sunday and any other day which is a mandatory labour holiday in accordance with the law applicable to the Site.
- 1.23 **“INR/Rs.”** means Indian Rupees.
- 1.24 **“Letter of Acceptance”** means the formal acceptance by the Developer of the Tender.
- 1.26 **“Maintenance Period”** or **“Defects Liability period”** means the maintenance period named in the (Appendix to the) Form of Tender commencing on the day following the date of completion of the Works or any Section or part thereof certified by the Engineer-in-Charge.

- 1.27 **“Portion”** means a part of the Site separately identified in the Contract.
- 1.28 **“Prime Cost Sum”** means the sum provided for work to be executed or for materials or services to be supplied by a Nominated Sub-contractor; such sum shall be the estimated net price to be paid for such work executed or for materials or services supplied by a Nominated Sub-contractor, after deducting any trade or other discount.
- 1.29 **“Project”** is the total construction designed by the Architect or Developer, of which the Work performed under the Contract Documents, may be the whole or a part.
- 1.30 **“Provisional Sum”** means a sum provided for work or expenditure which has not been quantified or detailed at the time the tender documents are issued which sum may include provision for work to be executed or for materials or services to be supplied by a Nominated Sub-contractor.
- 1.31 **“Retention Money”** means the sum retained by the Developer as retention money in accordance with the Contract.
- 1.32 **“Section”** means a part of the Works for which a separate time for completion is identified in the Contract.
- 1.33 **“Site”** means the lands and other places under, over, on, or in which the Works are to be constructed and any other lands or places provided by the Developer for the purpose of the execution of the Works together with such other places as may be subsequently agreed in writing by the Engineer-in-Charge as forming part of the Site. Ready-Mix Concrete Plant, manufacturing, fabrication and other services, which are outside the Project boundary shall not be a part of the Site.
- 1.34 **“Specialist Works”** means any work separately identified in the Contract and connected with or ancillary to the Works which may from time to time be carried out on the Site by a Specialist Contractor e.g. electrical work, HVAC work, Elevator work plumbing and fire fighting work, water-proofing, anti-termite treatment etc.
- 1.35 **“Specification”** means the specifications referred to in the Contract and any modification thereof or addition thereto as may from time to time furnish in writing or approved in writing by the Engineer-in-Charge.
- 1.36 **“Temporary Works”** means all temporary work of every kind required for the construction, completion and maintenance of the Works.
- 1.37 **“Tender”** means the Contractor’s tender for the Contract.
- 1.38 **“Work/Works”** means the works or services including work or services to be carried out by Nominated Sub-contractors to be constructed, completed,



maintained and/or supplied in accordance with the Contract and includes Temporary Works and shall also mean to include all labour necessary to produce the construction required by the Contract Documents, and all materials and equipment incorporated or to be incorporated in such construction.

## 2. General:-

- 2.1 Any piece of Work shown upon the Drawings but not mentioned in the Technical Specifications, or described in the Technical Specifications without being shown on the Drawings shall nevertheless have to be included in the same manner as if it had been specifically shown upon the Drawings and described in the Technical Specifications. If Drawings are at variance with the Technical Specifications, the Contractor, if he is aware of such discrepancies, shall seek the advice from Engineer in Charge or the Developer whose interpretation shall be conclusive and final.
- 2.2 Wherever it is mentioned in the Contract/Technical Specifications/Bill of Quantities that the Contractor shall perform certain work or provide certain facilities, it is understood that the Contractor shall do so at his own cost unless a different intention is specifically and expressly stated or otherwise explicit from the context.
- 2.3 Wherever in the Contract provision is made for the giving or issue of any notice, consent, approval, certificate or determination by any person, unless otherwise specified, such notice, consent, approval, certificate or determination shall be communicated in writing. Any such consent, approval, certificate or determination shall not unreasonably be withheld or delayed.
- 2.4 The Contractor shall, with due care and diligence, execute and complete the Work under the Contract and remedy any defects therein, in accordance with the provisions of the Contract. The Contractor shall take full responsibility for the adequacy, stability and safety of all Site operations and method of construction for the Work under the Contract. The Contractor shall submit at the time of award of the Work a detailed method and techniques statement for execution of the Work under the Contract. No significant alteration to these method and techniques shall be made by the Contractor without the written consent of the Engineer in Charge.
- 2.5 The Developer reserves the right to change the Engineer in Charge, the Architect or any other Specialist Consultant at any stage without any reference to or consultation with the Contractor. However, the Developer shall give prior notice to the Contractor about such change.
- 2.6 The Contractor shall give rates of different items of work for all heights, depths, widths and floors unless otherwise specified against any specific item.

- 2.7 Words importing the singular only also include the plural and vice versa where the context requires. Unless otherwise stated specifically, the words indicating one gender include all genders.
  - 2.8 The headings and marginal notes in these conditions of contract shall not be deemed to be part thereof or be taken into consideration in the interpretation or construction thereof or of the contract.
  - 2.9 (a) Unless otherwise provided, all payments shall be made in Indian Rupees.
  - 2.9 (b) No adjustment shall be made to the Final Contract Price on account of any variation in the exchange rate between the Indian Rupee and any other currency.
  - 2.10 All documentation and correspondence in respect of this Contract shall be in English Language.
  - 2.11 The Contract shall be governed by and construed in all respects according to the laws for the time being in force in India. All references to standards, specifications, requirements and statutory schedules herein, shall, unless any intention to the contrary is stated or construed, refer to those prescribed under the relevant statutes of Indian Law, or under this Contract.
  - 2.12 If the tender is submitted by a Joint Venture Consortium formed by a group of firms, the sponsoring firm shall submit complete information pertaining to each firm in the group and state along with the bid as to which one of the firms shall have the responsibility for tendering and for completion of the contract document and furnish evidence admissible in law in respect of the authority assigned to such firm on behalf of the group of firms for tendering and for completion of the contract document. The full information and satisfactory evidence pertaining to the participation of each member of the group of firms in the tender shall be furnished along with the tender.
- 3. Scope of work :-**
- 3.1 The accepted rates include cost of materials, equipments, appliances, labour, and any other resources required for execution of the work. The rates also cover any temporary or incidental work not specifically mentioned in the documents, but which are necessary to complete the work.
  - 3.2 The Contractor shall be responsible for getting all staff / workmen - supervisory, skilled and unskilled, materials, plant, equipment, tools, appliances, transportation and insurance etc. necessary and required for the satisfactory completion of the Works in every respect.

**4. Engineer and Engineer's Representative:-**

- 4.1 The Engineer-in-Charge shall carry out such duties in issuing decisions, certificates, and orders, and exercise the powers specified in the contract or necessarily to be implied from the Contract.
- 4.2 Before carrying out any such duty or exercising any such power, the Engineer-in-Charge may be required under the terms of his appointment by the Developer to obtain confirmation that the Developer has no objection to the Engineer-in-Charge's proposed course of action and, in the event of an objection, to act in accordance with the Developer's direction.
- 4.3 The Engineer-In-Charge shall have the powers to determine the defects and deficiencies in the work of the Contractor and shall condemn work which fails to conform to the contract document. He shall have the authority to stop the work whenever such stoppage may be necessary in his reasonable opinion to ensure the proper execution of the work.
- 4.4 The Developer or his representatives or the Engineer-In-Charge shall within a reasonable time make decisions on all matters relation to the execution and progress of work or the interpretation of the Contract Documents. The Developers or the Engineer-In-Charge may in their absolute discretion and form time to time issue further drawings, details and/or written instructions, written directions and written explanations in regard to:
  - a. Variation and modifications of the design.
  - b. The quality or quantity of works or the additions or modifications or Substitution of any work.
  - c. Any discrepancy in or divergence between the drawings and / or specifications.
  - d. The removal and / or re-execution of any works executed by the Contractor.
  - e. The dismissal from the works of any persons employed thereon.
  - f. The opening up for inspection of any work covered up.
  - g. The amending and making good of any defects under Defects Liability period.
  - h. The removal from the site of any materials brought thereon by the Contractor and the substitution of any other material thereof.
  - i. Assignment and sub-letting.
  - j. Delay and extension time.
  - k. The postponement of any work to be executed under the provision of this Contract.

- 4.5 Except as expressly stated in the contract, the Engineer-In-Charge shall have no power to amend the terms and conditions of the contract nor to relieve the Contractor of any of his obligations under the contract.
- 4.6 The duties of the Engineer-in-Charge's Representative are to supervise and inspect the Works, to test and examine any material to be used and workmanship employed by the Contractor in connection with the Works and to carry out such duties and exercise such powers vested in the Engineer-in-Charge as may be delegated in writing to him by the Engineer-in-Charge.
- 4.7 Failure of the Engineer-in-Charge's Representative to disapprove any work or material shall not prejudice the power of the Engineer-in-Charge thereafter to disapprove such work or materials and to order the pulling down removal or breaking up thereof.
- If the Contractor shall be dissatisfied by reason of any decision of the Engineer in-Charge's Representative he shall be entitled to refer the matter to the Engineer-in-Charge who shall confirm, reverse or vary such decision.
- 4.8 No act or omission by the Engineer-in-Charge or the Engineer-in-Charge's Representative in the performance of any of his duties or the exercise of any of his powers under the Contract shall in any way operate to relieve the Contractor of any of the duties, responsibilities, obligations or liabilities imposed upon him by any of the provisions of the Contract.

## 5. Assignment

The Contractor shall not assign the Contract or any part thereof or any benefit or interest therein or there under without the written consent of the Developer and any assignment shall be in a form approved by the Developer.

## 6. Sub-contracting

- 6.1 The Contractor shall not sub-let any part of the Works, except where otherwise provided by the Contract, without the prior written consent of the Developer or the Engineer-In-Charge and such consent if given shall not relieve the Contractor from any liability or obligation under the Contract, and he shall be responsible for the acts, defaults and neglects of any sub-contractor, his agents, servants or workmen as fully as if they were the acts, defaults or neglects of the Contractor, his agents, servants or workmen. Provided always that the provision of labour on a piecework basis shall not be deemed to be a sub-letting under this clause.
- 6.2 If the Contractor intends to sub-contract any part of the work, he should give sufficient prior intimation of his intention along with details of the sub-contractor to be employed, his expertise, financial status, technical manpower, equipment resources and list of works executed and in hand. The Engineer-In-Charge shall have the authority to deny permission for employment of sub-contractor, which authority shall not be exercised unreasonably.

In case the Contractor intends to change any of the afore-said sub-contractors during the operation of the Contract, he shall obtain prior approval of the Engineer-in-Charge. In the event the Engineer-in-Charge is not satisfied with the performance of any of the aforesaid sub-contractors he shall have the right to direct the Contractor to change such sub-contractor. The changed sub-contractors shall also have to satisfy the laid down eligible criteria.

- 6.3 The Contractor shall be required to entrust specialist work to agencies specialized in the specific Trade like Anti-termite treatment, Waterproofing treatment etc. He shall give the names and details of such firms who he intends to employ for this work along with the tender. The Contractor shall be required to provide necessary guarantee through these sub-contractors for due performance of the work executed by them, valid for number of years specified in the Tender Document. The Conditions of the Guarantees shall be strictly as per the Developer's format.
- 6.4 If the sub-contractor's obligation extends beyond the expiry date of the Maintenance Period the Contractor shall assign the benefit of such obligations in favour of the Developer.
- 6.5 Notwithstanding that the Contract has not prohibited sub-contracting under sub-clause 6.1 and the Engineer-in-Charge has not prohibited sub-contracting under sub-clause 6.2, the Engineer-in Charge, if in his opinion he considers it necessary, shall have full power to order the removal of any sub-contractor from the Site and/or the Works, which power shall not be exercised unreasonably.
- 6.6 The sub-contracting of any part of the Works shall not relieve the Contractor from any liability or obligation under the Contract particularly in respect of the provision of superintendence and he shall be responsible for the acts, defaults and neglects of any sub-contractor or the agents, employees or workers of any sub-contractor as fully as if they were the acts, defaults or neglects of the Contractor, his agents, employees or workers.

## CONTRACT DOCUMENTS

### 7. Documents Mutually Explanatory

- 7.1 The precedence of the various documents forming part of the Contract shall be as follows:-
  - a) The Articles Agreement (if completed)
  - b) Letter of Acceptance or Work Order
  - c) All modifications agreed by the parties to tender documents and to Contractor's offer prior to acceptance of tender.
  - d) Special Conditions of contract

- e) The General conditions of contract
- f) The Specifications
- g) The Drawings
- h) The Priced Bill of Quantities
- i) All other documents forming part of the Contract documents.

7.2 Subject to the foregoing the several documents forming the Contract are to be taken as mutually explanatory of one another but in case of ambiguities or discrepancies the same shall be explained by the Engineer-in-Charge who shall issue to the Contractor instructions clarifying such ambiguities or discrepancies. Where the Contractor makes a request in writing to the Engineer-in-Charge for instructions under this sub-clause the Engineer-in-Charge shall respond, within reasonable time of receipt of such request, with his interpretations / instructions, and the Contractor shall be bound by the same. Provided always that if in the opinion of the Developer, compliance with any such instructions shall involve the contractor in any additional cost, which by reason of any such ambiguity or discrepancy could not reasonably have been foreseen by the Contractor, the Engineer- In-Charge shall certify such additional sum as may be reasonable to cover such cost.

7.3 The Contract and everything contained therein or arising there from shall be treated as strictly confidential. In particular the contract shall not publish any information, drawings or photographs concerning the works and shall not use the Site for the purpose of advertising except with the written consent of the Developer.

## **8. Provision of Drawings & Specification**

8.1 One copy of the Signed Contract and two copies of the GFC Drawings shall be furnished to the Contractor free of charge.

8.2 The Engineer-in-Charge shall have full power and authority to supply to the contractor from time to time during the progress of work such further drawings and instructions as may be necessary for the purpose of proper and adequate execution and maintenance of the work and the Contractor shall be bound by the same and shall carry out the works and instructions so given.

8.3 The Contractor shall give adequate notice in writing to the Engineer-in-Charge of other Drawings, Specification, or clarifications that may be required for the execution of the Works.

8.4 One copy of the Drawings furnished to the Contractor as aforesaid shall be kept by the Contractor on the Site and the same shall at all reasonable times be available for inspection and use by the Engineer-in-Charge and the

Engineer-in-Charge's Representative and by any other person authorized by the Engineer-in-Charge in writing.

- 8.5 At the completion of the Works, the Contractor shall return to the Engineer-in-Charge all Drawings provided under the Contract.

## **9. Drawings provided by the Contractor for the Works**

- 9.1 When the Contractor is required to provide Drawings or other documents in connection with the Works, unless the Contract provides to the contrary, all such Drawings and documents shall be submitted in duplicate to the Engineer-in-Charge at a reasonable time before the work shown or described thereon is to be carried out so as to permit the Engineer-in-Charge sufficient time to examine the Contractor's proposals properly. The Engineer-in-Charge shall give or refuse his approval in writing to such proposals within a reasonable time.
- 9.2 If the Engineer-in-Charge has reasonable cause for being dissatisfied with the proposals set out in the Contractor's Drawings or documents the Engineer-in-Charge shall require the Contractor to make such amendments thereto as the Engineer-in-Charge may consider reasonably necessary. The Contractor shall make and be bound by such amendments at no additional expense to the Developer.
- 9.3 Should it be found at any time after approval has been given by the Engineer-in-Charge that the details do not comply with the terms and conditions of the Contract or that the details do not agree with the Drawings or documents previously submitted and approved by the Engineer-in-Charge, the Contractor shall make such alterations or additions as in the opinion of the Engineer-in-Charge are necessary to remedy such non-compliance or non-agreement at the Contractor's own expense.
- 9.4 No examination by the Engineer-in-Charge of the Drawings or documents submitted by the Contractor under the provisions of this Clause nor any approval given by the Engineer-in-Charge of the same, with or without amendment, shall absolve the Contractor from any liability for the same.
- 9.5 Within One month of receiving a certificate of completion for the Works or any Section or part thereof, the Contractor shall submit to the Engineer's Representative three complete sets of as-built versions of all drawings of such permanent works which were executed by the Contractor or his sub-contractors, together with the quality assurance documentation for such permanent works, in such forms and such quantities as are specified in the Specification.
- 9.6 The copyright and other intellectual property rights in the Contractor's Documents and other design documents, including 'As Built Drawings', shall vest exclusively in the Developer.

## **10. Information not to be divulged**

The Contractor shall not use or divulge, except for the purpose of the Contract, any information provided by the Developer or the Engineer-in-Charge in the Contract or in any subsequent correspondence or documentation.

## **11. Inspection of the Site**

11.1 The Contractor shall be deemed to have examined and inspected the Site and its surroundings and to have satisfied himself, before submitting his Tender, as regards existing roads or other means of communication with and access to the Site, the nature of the ground and sub-soil, the form and nature of the Site, the risk of injury or damage to property, the nature of materials (whether natural or otherwise) to be excavated, the nature of the work and materials necessary for the execution of the Works, the accommodation it may require and generally to have obtained his own information on all matters affecting his Tender and the execution of the Works.

11.2 No claim by the Contractor for additional payment shall be allowed on the ground of any misunderstanding in respect of the matters referred to in Sub-clause 11.1 or otherwise or on the ground of any allegation or fact that incorrect or insufficient information was given to him by any person whether in the employment of the Developer or not or of the failure of the Contractor to obtain correct and sufficient information, nor shall the Contractor be relieved from any risk or obligation imposed on or undertaken by him under the Contract on any such ground or on the ground that it did not or could not foresee any matter which may in fact affect or have affected the execution of the Works.

## **12. Sufficiency of Tender**

12.1 The Contractor shall be deemed to have satisfied himself before submitting his Tender as to the correctness and sufficiency of his Tender for the Works and of the rates stated in the priced Bills of Quantities which rates shall, except in so far as it is otherwise provided in the Contract, cover all his risks, liabilities and obligations set out or implied in the Contract and all matters and things necessary for the proper execution of the Works.

12.2 Except as otherwise specifically provided in the Contract, the Contractor shall not be entitled to any extra payment nor to resile from the Contractor nor to be relieved from any of his obligation for reasons of his misunderstanding, or his failure to obtain correct information or his inability to foresee any matter which may affect the execution or maintenance of the works.

12.3 The rates stated in the priced Bills of Quantities allow for the following in force under the laws and regulations of all applicable statutory jurisdictions and Authorities:



- (a) All applicable taxes and surcharges including without limitation value added tax, sales tax, work contract tax, service tax, octroi and excise;.
- (b) Importation of plant, equipment and materials into the Republic of India, and all statutory compliance, charges, taxes and duties for same.
- (c) Royalty deposited and for obtaining necessary permit for excavation or for supply of the sand, stone, etc. from local authorities, or for any other activity related to the execution of the work.
- (d) any royalty, cess or the like payable to the State Government or local authorities, in respect of any material used by the Contractor in the Works. However, in the event any such charges are paid by the Developer on behalf of the Contractor, the Contractor shall reimburse the amount so paid by the Developer.
- (e) Any expenses in connection with the transfer of plant, equipment and materials between subordinate jurisdictions within the Republic of India, and all statutory compliance, charges, taxes and duties for same.
- (f) The Contract being treated as a Work Contract for Indian taxation purposes.
- (g) deduction by the Developer and payment to the applicable statutory authority of all taxes deductible at source, with the Developer providing proof of same to the Contractor in statutorily-compliant form.

#### 12.4 Conditions for reimbursement of levy/taxes if levied after receipt of tenders

- a. All tendered rates shall be inclusive of all taxes and levies payable under respective statutes. However, if any further tax or levy is imposed by Statute, after the last stipulated date for the receipt of tender including extensions if any and the Contractor thereupon necessarily and properly pays such taxes/levies, the Contractor shall be reimbursed the amount so paid, provided such payments, if any, is not, in the opinion of the Engineer in Charge (whose decision shall be final and binding on the Contractor) attributable to delay in execution of Work within the control of the Contractor.

- b. The contractor shall keep necessary books of accounts and other documents for the purpose of this condition as may be necessary and shall allow inspection of the same by a duly authorized representative of the Developer and/or the Engineer-in-Charge and further shall furnish such other information/document as the Engineer-in-Charge may require from time to time.
- c. The Contractor shall, within a period of 30 days of the imposition of any such further tax or levy, give a written notice thereof to the Engineer-in-Charge that the same is given pursuant to this condition, together with all necessary information relating thereto.

**13. Works to be to the satisfaction of the Engineer-in-Charge**

The Contractor shall execute and maintain the Works in strict accordance with the Contract to the satisfaction of the Engineer-in-Charge and the Developer and shall comply with and adhere strictly to the Engineer-in-Charge's instructions on any matter related to the Contract whether mentioned in the Contract or not.

**14. Program to be furnished**

**14.1 Program of Work and Progress Reports**

Within a reasonable time after the acceptance of his Tender, the Contractor shall submit to the Engineer-In-Charge for his approval and / or information a program showing the order of the procurement and method in which he proposes to carry out the works, a general description of the arrangement and methods which he proposes to adopt for the execution of the Works, the Constructional Plant and Temporary Works which he Intends to supply, use or construct as the case may be, the scheduling of samples, shop drawings and approvals from concerned authorities as required under the contract.

14.2 If the actual progress of the work does not confirm to the approved program, the Contractor shall be required to submit a revised program and implement the same for the completion of the works within the stipulated time for completion.

14.3 The submission to and approval by the Engineer-In-Charge of such program shall not relieve the Contractor for any of his duties or responsibilities under the Contract.

14.4 The Contractor shall submit every week, a detailed report of the following:-

- (a). Materials procured, consumed and balance at Site and expected deliveries during next fortnight.

- (b). List of plant and equipment working at site, standby and those under repair and equipment arrive during next fortnight.
- (c). Skilled / unskilled labour, foremen, supervisors and engineers working at site and expected increase in the next fortnight, steps proposed for speeding up progress of work.

## **15. Contractor's Superintendence**

- 15.1 The Contractor shall give or provide all necessary superintendence during the execution of the Works and as long thereafter as the Engineer-in-Charge may consider necessary for the proper fulfillment of the Contractor's obligations under the Contract.
- 15.2 The Contractor shall ensure that he is at all times represented on the Site by a competent and authorized English-speaking agent who shall be approved by the Engineer-in-Charge. Such agent shall be constantly on the Site and shall give his whole time to the superintendence of the Works.
- 15.3 The Engineer-in-Charge shall have the power to withdraw his approval of the authorized agent at any time. If such approval shall be withdrawn the Contractor shall, after receiving notice in writing of such withdrawal, remove the agent from the Site forthwith and shall not thereafter employ him again on the Site in any capacity and shall replace him by another competent English-speaking agent approved by the Engineer-in-Charge.
- 15.4 Such authorized agent shall receive on behalf of the Contractor directions and instructions from the Engineer-in-Charge and the Engineer-in-Charge's Representative.

## **16. Contractor's Employees**

- 16.1 The Contractor shall provide and employ and shall ensure that any of his sub-contractors shall provide and employ on the Site in connection with the execution of the Works:
  - (a) only such technical personnel as are skilled and experienced in their respective trades and callings and such sub-agents, foremen and leading hands as are competent to give proper supervision to the work they are required to supervise , and
  - (b) Such skilled, semi-skilled and unskilled labour as is necessary for the proper and timely execution of the Works.
- 16.2 The Contractor shall be required to remove forthwith from the works any person employed by the Contractor in or about the execution or

maintenance of the works who in the opinion of the Engineer- In-charge misconducts himself or is Incompetent or negligent and thus considered to be undesirable and shall be replaced as soon as possible by a competent substitute approved by the Engineer- In-charge.

16.3 The Contractor should strictly abide by the rules and regulations related to the Employees and workers, and make the required contribution towards provident Fund, ESIC, or any other contributions required to be made.

16.4 The Contractor shall employ on the work the minimum technical and supervisory staff as detailed below:

(a) Contract Price of upto Rs. 5 Crores.

One Senior Engineer - B.E. (Civil) with 10-12 years /D.C. with 15 to 17 years experience

One Junior Engineer - B.E./D.C.E. with 3-5 years experience.

Two Supervisors / Foremen with 10 years experience.

If the Contractor is found not employing the minimum required Technical staff. Rs. 50,000/- per month (Rupees Fifty Thousand only/ month) will be debited as agreed compensation for the default of the Contractor.

## SPECIAL CONDITIONS OF CONTRACT :

### SCOPE OF WORK :

Proposed tender is for Construction of Approach Road, Internal Concrete Road, Storm Water Drain, Land Development Works And Other Allied Services at project M/s. Asmeeta Infratech Ltd at Saravali- Kon M.I.D.C., Bhiwandi.

In brief scope of work in tender is as follow:

- All Excavation, backfilling works
- All Soling, PCC & RCC works
- All type of Masonry works
- All type of Plaster works
- Metalling & Flexible (Bitumen) pavement works
- Concrete roads
- All Miscellaneous works

1. **Mobilization Advance:** You shall be paid interest free Mobilization advance against the Bank Guarantee from Nationalized bank of same value. Mobilization advance value will be equal to 10% of the contract value excluding service tax and same shall be deducted from 2nd RA bill and shall be recovered before 80% of the work completion on pro rata basis.
2. **Secured Advance:** You shall be paid secured advance @ 75% of cost of cement & reinforcement steel received at site. Before purchasing the materials, contractor has to take approval on materials procurement schedule from EIC. Contractor has to submit materials received challans, invoices form the suppliers. For this purpose, the material lying in stock at site shall be certified at the time of bill certification.
3. **Basic Rates for Cement & Reinforcement Steel:** The following basic rates shall be considered while working out the above cost.

- a. Basic rate of Cement = Rs. 300.00 per Bag
- b. Basic rate of Reinforcement Steel = Rs. 46.00 per Kg

Above mentioned basic rates are landed rates at concerned site which includes transportation, octroi, freight, loading & unloading, VAT or any other government taxes, etc. Developer will publish basic rates of Cement and Steel on 5th and 20th of each month. The reimbursement/recovery for the difference in rate based on this published rates shall only be reimbursed/recovered. Apart from above no variation in price shall be payable on any account for the entire period of contract.

4. **Validity:** The rates shall be valid for the entire period of contract and no escalation other than the + or - reimbursement for Cement and Reinforcement Steel basic rate variation shall be applicable in this contract as per the items mentioned in schedule "A" of Bill of quantity.

5. Rates are inclusive of all materials, labour, dewatering, tools, transportation, VAT on materials, Octroi, loading & unloading, debris (waste likely to be generated during the construction phase), as may be applicable for this work etc. all inclusive. Developer shall reimburse only service tax as applicable. Contractor should register under the service category 'Works Contract Services under Service Tax Law.

#### 6. TAXES & DUTIES :

- The rates are inclusive of all taxes, excise duty and other duties, octroi, LBT and other levies, and all other local taxes, duties. No escalation or any variation on the rate is payable to you on account of any increase or modification in the tax structure or introduction / modification of existing levy/ structure. But Service Tax as per WCS structure shall be payable as per prevailing rates.
- Each & every bill should have BST/CST, VAT No., Service Tax No., PAN No., Tax Invoice No., Tax Declaration No., P.F. No., ESIC No., Labour License No., and Workmen Compensation Policy, 3rd Party Insurance etc. duly printed or stamped on the bill. The contractor shall submit Registration copy for Work Contract Service.
- Income Tax: TDS as applicable of the gross value of the monthly bills will be deducted from the bills towards Income Tax as per the statutory requirements. Our Accounts department will issue necessary Tax Deduction Certificate to you.

#### 7. EXTRA ITEMS :

All additional items and variance from those given in BOQ and accepted by the Consultant shall be treated as extra items. These shall be expressly ordered by the EIC in writing with approval of the rates by the Employer prior to start of work by the Contractor. The work shall start only after written approval with rates is received by the contractor. The Contractor shall be paid as per similar item of BOQ. In absence, actual rate analysis shall be prepared considering market rates of labour and materials with the Contractor's profit as 20% added to such cost thus arrived. Service tax & VAT will be separately paid. The Contractor shall have to produce vouchers to support the rate analysis. The Consultant reserves the right to call additional quotations for material, labour/workmanship if felt necessary and rates approved by the Consultant shall be final. The Consultant's decision shall not be subjected to arbitration.

#### 8. CEMENT & STEEL :

Grey Cement, fly ash & steel are in the Contractor Scope. The quantity of cement, fly ash, micro silica and steel required to be used as per theoretical consumptions shall be worked out. For working out theoretical cement consumption, approved coefficients attached herewith as Appendix-II should be followed. If it is noticed that the quantity actually consumed is less than the quantity to be originally used as per theoretical consumptions, wastage / variation as follows will be permitted. On the theoretical consumption of steel as calculated wastage/ variation upto +/- 3% will be permitted. Rolling margin shall be worked out based on actual sectional weight of the bars. Also for cement wastage/ variation of +/- 2% will be permitted. For any less use of cement and steel beyond this quantity, recovery will be made to the following agreed amount.

- i) For each bag of cement consumed in less - Rs.400/- per bag or 1.5 times the market rate whichever is higher.

ii) Steel reinforcement: For determining the actual consumption, the reinforcement bars placed in position according to approved Bar Bending Schedule will be measured jointly before concreting of each item limited to the actual consumption. For any less use of reinforcement beyond this quantity, recovery will be made at Rs. 75/- per Kg.

#### **9. RECONCILIATION :**

The reconciliation for the material supplied by the developer to the contractor or for the material on which secured advance is taken by contractor, shall be done after every 4th bills and finally in final bill.

#### **10. AWARDAL OF CONTRACT :**

The Contract of Individual Gala Buildings shall be awarded depending upon the capability of the contractor. The final decision of the same shall be taken by the developer. Work Order for Individual Gala Building shall be issued to contractor separately.

#### **11. ACCOMMODATION AND CONVEYANCE :**

You shall arrange necessary accommodation and conveyance for your workmen and staff at your own cost. You may accommodate labour at site till completion of the scope subject to space available & management decision. All water & sanitary facility required for labor & staff will be in contractor's scope.

#### **12. WATER & ELECTRICITY :**

Water: The Contractor shall make his own arrangement for the water required for construction and drinking purposes.

Electricity: The Contractor shall make his own arrangement for the electric supply required for construction purpose, labor & staff accommodation.

As Temporary Construction power is available at site, the Client can give the Electric power at one point, but on chargeable basis, but the necessary arrangement & further distribution to work place will be Contractor's Scope

#### **13. TIME FOR COMPLETION :**

The time is the essence of this contract. The period allowed to complete this contract is -12 (Twelve months) after handing over the site to contractor for execution. Brief schedule of completion will be as per below :

- a) Date of Start - To be reckoned as the 5th day from date of issue of WO/LOI.
- b) Period of completion - 9 Months & not more than 12 (Twelve) Months of extended.

The whole work including extra/additional works as may be required are to be

completed in the time stated in contract and Contractor will work overtime if necessary for the same at no extra cost. Contractor will make all necessary lighting and safety arrangement to carryout work at night. Rate shall be inclusive of such arrangements.

Idle time: Idle time will not be paid under any circumstances. Contractor must plan his resources carefully in case of stoppage of works beyond Developers control. Similarly, no liquidated damages will be levied due to extension of work caused by circumstances beyond Contractors control. However, it is expected that Contractor will do his best effort to recover lost time, once reason for delay is over.

#### **14. SCHEDULE OF WORK :**

Contractor should submit bar chart showing duration of each activity to achieve completion of work in stipulated time. The schedule shall be framed based on the payment milestones and dates of each milestone shall be freeze. The milestones dates and timeline shall be getting approved from Project-in-charge before start of work.

#### **15. BONUS**

Not Applicable.

#### **16. BILL PROCEDURE & PAYMENT TERMS :**

Bills should be raised in standard format (copy to be collected from Site-in-charge). It should have all necessary attachments mentioned in standard format of bills.

Bill shall be in approved format clearly indicating previous quantity, current quantity, & total quantity as per the rates mentioned in Contract Agreement. Bill shall be accompanied with measurement book having all measurements recorded mentioned in the bill with joint signature of Engineer-in-charge and Contractor.

Certified Bar bending schedule shall be submitted along with bill with abstract sheet where applicable. All items like reinforcement and work below plinth shall be jointly pre-recorded in measurement book along with the Developer's Engineer.

Whenever & wherever necessary the supporting document as a detail sketch, part drawings with plan, section etc to be submitted along with bill especially in case of infrastructure works. Challans and bills shall have to be produced for costly materials, if demanded by Engineer-in-charge.

Bill for payment will be processed against submission of work done bill and duly certified by the Site-in-Charge.

Taxes/Retention money/mobilization advance recovery as applicable shall be deducted from your bill.

All the invoices in respect of this contract work shall be quoted with the Service Tax Registration certificate number.

#### **17. WORKMAN'S COMPENSATION INSURANCE CHARGES :**

One percent (1%) of the value of each running bill will be deducted towards covering



your Workman's compensation insurance under our block policy. In case you are producing the documentary evidence of your having valid policy covering your workmen, this deduction will not be made from the bills. The deduction of 1% towards compliance shall not absolve the responsibility of the contractor.

#### **18. SECURITY AT SITE :**

You shall be responsible for adequate security at site, for all the materials issued to you, as well as those brought by you. However, you shall keep Developer informed about the materials, including the quantities that are brought by you.

You shall deploy the security personnel for the general security & maintenance of harmony at site. Developer however shall not be responsible for material / P&M brought by / given to you. Your security should not allow any outsider to enter this worksite.

#### **19. BENCH MARK :**

The contractor shall construct and maintain proper bench marks as per the Site Engineer's Instruction, such that lines and levels can be accurately checked at all times.

#### **20. DE-WATERING :**

If required shall be done by you during excavation with necessary backup arrangement and required fuel / power, for which nothing extra shall be payable. Necessary pipes will be provided by you so that water will be disposed off to nearest drain / nallah without obstructing vehicular movement within or outside the plot.

All de-watering must be arranged by you. No pump will be provided by the Developer. Periodical cleaning of drains will be arranged by you for smooth flow of pumped out watering. You should take necessary permission for the disposal of the water to the nearest drain from the local authorities if required at your cost.

#### **21. RETENTION :**

Retention @ 5% shall be deducted from each running bill. 50% of retention shall be released along with final bill & balance 50% on completion of 12 months from date of final certificate or against the BG of 12 months validity.

Subsequently, all the invoices in respect of this contract work shall be quoted with the Service Tax Registration certificate number.

#### **22. LABOUR LICENCE :**

You will obtain labour license from appropriate authority to carry out the job. You will also obtain Workmen Compensation Insurance, CAR Policy (Contractor All Risk Policy) & 3rd Party Insurance for your workmen staff & other visitors. Any damage inside and /or outside the project caused by you shall be reinstated at your cost. The copy of CAR policy including due renewals should be submitted to us latest with first R.A. bill. If contractor fails to do it, the developer may take the CAR policy and debit the cost to the contractor.

### **23. EXECUTION OF CONTRACT AGREEMENT :**

The parties herein shall separately enter into an Contract agreement with Asmeeta Infratech Ltd, for execution of the work containing interalia the terms and conditions in respect of rights, obligations, and liabilities etc. of each party.

### **24. HOUSEKEEPING WORK :**

You have to maintain the site/bldgs all floors/open areas etc. neat & clean. The entire site should be always neat & tidy. Well stacking of materials, timely disposal of debris/rubbish. Removal of unwanted materials and once in a week cleaning of all floors is to be done compulsorily. If contractor fails to maintain housekeeping, Rs.7,000/- per week shall be deducted from the R.A. Bills

### **25. SAFETY OF WORKERS:**

Contractor shall provide safety measures required to workmen, staff, visitors and passerby. Wearing helmets, safety belts are compulsory for workmen. Contractor will be responsible for any endanger to the extent of death caused to his workmen, staff and others due to falling of materials from higher level and also fall of workmen & staff from a height due to negligence or by accident. Also he has to follow all standard safety rules and regulations for the various activities of work.

### **26. LIQUIDATED DAMAGES :**

In case of delays, liquidated damages will be applicable at the rate of half percent (1/2%) of contract price per week delay beyond the date of completion stipulated in contract or beyond the date of extension of granted in writing by the company subject to maximum of ten percent (10%) of contract value. For interim delay in achieving the respective milestone payment of ½% of value of that milestone per week shall be kept on hold, but shall be released if the delay is covered in subsequent milestone. If delay is not covered then the hold amount shall be adjusted in liquidated damages.

The Contractor shall take full responsibility for the care there of and for taking precautions to prevent any losses to the Works / Property including the common areas of the building or any part there of or to any materials, articles at site, and shall be liable for any such losses or damages that may happen for any causes, due to improper execution of work from his side.

### **27. INDEMNITY :**

The contractors shall indemnify and keep the developers indemnified from any action by any statutory authority, local bodies, or any third party in respect of any matter arising out of the construction activity.

### **28. DEFECT LIABILITY :**

Defect liability period shall be 12 months from the virtual completion of individual building. In the event of contractor failing to rectify any defects notified by the Developers, within the reasonable period, then the same shall be got rectified by the Developer at the cost of the Contractor. The cost shall be adjusted against the retention money of the contractor with the Developer.

### **29. TERMINATION OF CONTRACT :**

If your progress is consistently found to be below the accepted programme and if the work being executed by you falls below the expected standard laid down by us, in such cases, in the interest of timely completion of the project and to maintain the high quality of work, Developer reserve the right to delete any part of the scope of work or the entire balance to be taken away from you and get such works executed by other agencies at your risk and cost. In such a case we shall make no compensation or damages or any other extra payment to you. You shall forthwith vacate the site and peacefully exit from site immediately. Your bills should be settled within 60 days & if it is delayed by your side for any reason, then Developer will settle the same as per his discretion & you will have to accept the same & you will have no right of arbitrations in this regards & you will peacefully accept the same.

### **30. RESPONSIBILITY OF THE CONTRACTOR AT HIS OWN COST:**

The rate quoted by the Developers shall include removal of all of the debris by the contractors to the dumping yard approved by the local authorities

Any internal temporary roads or any other facility required for construction purposes shall be constructed and maintained by the contractors at their own cost.

### **31. APPROVALS AND SANCTION:**

Approvals of project related issues such as development permission, statutory clearances, environmental sanction etc shall be the responsibility of the developers, and execution related approvals such as excavation permission from revenue authorities, pollution control Authorities, or use of explosives etc. shall be the responsibility of the contractors.

### **32. FINAL QUANTITY CERTIFICATION :**

If any item gets 100% executed & certified. The final quantity of that item has to be submitted along with bill for the reconciliation of cement & to compile the data of that building. Unless & until the quantity is submitted, that particular item will not be considered for 100% payment.

### **33. ENGAGEMENT OF LABOUR**

**Engagement of Labour:** The Contractor shall make his own arrangements for the engagement of labour, local or otherwise, and for their transport, housing and payment. All labour engaged by the Contractor shall be and remain the employees of the Contractor and no claim shall lie against the developer by them or Contractor or the Sub-Contractor or any person claiming on their behalf against the developer in respect of any right or benefit due to them in their employment.

- **Labour License:** The Contractor shall obtain a valid license under the Contract Labour (Regulation and Abolition) Act, 1970 before the commencement of the work and continue to have a valid license until the completion of work or expiry

of maintenance period, if applicable.

- **Labour Welfare Fund:** You shall deposit labour welfare fund as per periodicity & produce the deposit receipt as proof of compliance.
- **Labour Payment:** The Contractor shall pay the labour employed by him directly or through Sub-Contractors wages not less than the minimum wages notified under the Minimum Wages Act.
- **Labour Laws :** The Contractor shall in respect of labour employed by him either directly or through Sub-Contractor comply with or cause to be complied with the provisions of the payment of Wages Act, 1936, Minimum Wages Act, 1948, Owners Liability Act 1938, Workmen's Compensation Act, 1923, Maternity Benefit Act, 1961, and Contract Labour (Regulation and Abolition) Act, 1970, Employees Provident Fund Act and any act, rules or regulations for labour as may be enacted by the Government or any modification thereof or any other law relating thereto and rules made there under from time to time. Copies of monthly challans and periodical returns filed by the contractor should be attached with the bills submitted. Labour Laws as applicable exclusively to the factory / shop establishment do not apply to construction labour.
- **Regulation Dues:** The developer shall, on a report from Inspecting Officer, defined under Contract Labour (Regulation and Abolition) Act, 1970, have the power to deduct from the monies due to the Contractor any sum notified under the provisions of the relevant Act.
- **Indemnification:** The Contractor shall indemnify the developer against all or any payments to be made under and for observance of any Act, rules and regulations aforesaid without prejudice to his right to claim indemnify from his Sub-Contractors.
- The Contractor shall not give, barter or otherwise dispose off to any person any arms or ammunition of any kind, or permit such actions at Site by his agents, employees or Sub-Contractor.
- **Medical Facilities:** In the event of any outbreak of illness of an epidemic nature, the Contractor shall comply with and carryout such instructions, orders and requirements of Medical or Sanitary authorities for the purpose of dealing with and overcoming the same. The Contractor shall also, at his expense conform to all anti-malarial instruction given to him by the Engineer or by any local authority including filling up of burrow pits. Contractor shall provide first aid box at site.
- **Wages:** That the Contractor undertakes to pay wages to its workers / employees not less than minimum wages as prescribed by the government and revised from time to time. The Contractor shall also ensure full compliance with regard to the provisions of Employees Provident Fund and Miscellaneous Provisions Act and the Scheme framed there under and shall deposit the requisite contributions (both employers and employee's share) with the concerned Authorities within the stipulated dates as laid down under law and also submit the Statutory Returns as required. If the Contractor is already a covered unit under the EPF and MP Act,

it would cover the workers / employees under the Code Number already allotted by the concerned RPFC and in case no such Code Number has been allotted, the Contractor shall ensure that it obtains the coverage before the commencement of the Project and PF contributions in respect of the worker / employees engaged in or in connection with the Project are enrolled as member of the Fund including those employed through a Sub-Contractor.

- **Statutory Enactment:** That the Contractor shall be liable to comply with all the statutory enactments which shall be applicable to it as a result of the Contract undertaken by it. The Contractor in compliance with the provisions of law undertakes to submit all the statutory returns wherever required. In case of breach of any statutory enactment or rule framed there-under the Contractor alone shall be liable for the consequence while no proceeding or penal action for such breach shall be maintainable against the developer.
- **ESI:** In the event of the applicability of the ESI Act, the Contractor shall comply with the provisions of the said Act and deposit ESI Contributions. If for any reason, the developer is required to pay any ESI contribution in respect of the labour engaged by the Contractor / sub-Contractor, by operation of law or otherwise, the same shall be immediately reimbursed by the Contractor to the developer, failing which the amount so paid shall be recovered from the bills payable to the Contractor.
- The Contractor having been covered under the provisions of Contract Labour (Regulation and Abolition) Act, 1970 shall obtain the requisite license from the concerned Authorities clearly setting out the number of persons to be engaged by it for the construction of the Project assigned under this agreement. The Contractor shall maintain the requisites Registration of muster Roll and issue wages slips to each of its workers / employees including those employed through a Sub-Contractor.
- **Provident Fund :** It is clearly understood and agreed to by the Contractor that it is the statutory obligation on the part of the Contract to faithfully comply with the provisions of all the statutory enactments that are applicable to its including the EPF and MP Act and the scheme framed there under. The Contractor shall with effect from the date of the appointment of each worker / employee including those employed through a Sub-Contractor shall be covered by the provisions of the EPF and MP Act and their PF Contribution both employer and employee shall be deposited with the Regional Provident fund Commissioner. In the event if it is found either by the office of the RPFC or otherwise that the PF contributions are not being paid or deposited in respect of all the workers / employees including those employed through a Sub-Contractor and a liability on this account is created and is required to be paid to the RPFC by the developer, such amount shall be recovered from the bills that would be payable to the Contractor by the developer and the Contractor shall not be entitled to raise any dispute in this regard.
- Provision should be made for the supply of kerosene or cooking gas and pressure cooker to the labourers during construction phase.
- **Medical check for Labor:** All the labourers to be engaged for construction works should be screened for health and adequately treated before the issue of work

permits.

- Mandatory Compliances as per labour laws to be maintained / obtained by Contractors.

Sr. No.	Details of Documents required
1	The contractor must obtain his labour and building registration licenses. (Developer shall reimburse official charges towards building registration paid to the Government after production of receipts).
2	Details of progress of contract and other details (Monthly).
3	Register of deductions for damage or loss (Monthly).
4	Register of fines, if any (Monthly).
5	Register of advance, if any paid to workers (Monthly).
6	Register of overtime, if any paid to workers (Monthly).
7	Muster roll cum wages register (Monthly).
8	Copy of EPF paid receipt to Government treasury. *
9	Bombay Labour Welfare Fund Act, 1953. **
10	Professional Tax paid receipt (Monthly).
11	Monthly medical report of workers given by approved medical practitioner.
12	Group insurance policy of workers (Yearly).

\* **Note** : If any payment / deposit (concerning any compliance) delayed by the contractor, the liability of fine shall be borne by the contractor himself and no reimbursement of the amount of fine / additional charges shall be made by the principal employer even if it is part of the contract.

\*\* **Note**: The amount is required to be deposited on the basis of the nominal role of the employees (labour) as on 30th June and 31st December each year.

#### 34. POLLUTION UNDER CHECK (PUC):

Vehicles hired for bringing construction material at site should be in good condition and should have valid 'Pollution Under Check' (PUC) certificate and to conform to applicable air & noise emission standards.

#### 35. SPECIAL CONDITIONS FOR CONSTRUCTION & DEMOLITION & DE-SILTING WASTE MANAGEMENT PLAN :

The Contractor will be responsible to ensure compliance with the relevant provisions of the Rules on Waste Management as laid down by MIDC/Government bodies from time to time. He will ensure the following:

That Contractor complies with the relevant provisions of these Rules in a timely manner, including but not limited to that of providing any Deposit that it may be

required to.

The C & D Waste generated from its C & D Waste Generation Activity are aggregated, at a location in a container within the place where it is generated for collection by the Authorised Agency.

The C & D Waste so generated are disposed from the relevant premises only in accordance with these Rules.

The Contractor will be responsible for preparation and submission of the "Debris Management Plan" and for obtaining all the relevant permissions from authorities concerned. He will further be responsible for periodical processing and permissions as laid down in the relevant Rules and as updated from time to time. No extra payments will be made by the Developer for this. However, charges if any on account of "Waste Clearance Deposit" will be reimbursed to the Contractor on production of relevant Receipts.

### **36. TESTING OF MATERIALS :**

All materials brought at site by you are also required to be tested, the cost of testing shall be borne by you. Any material failing in test shall be removed from site immediately.

### **37. SITE TESTING :**

You shall establish a site laboratory, for conducting day to day tests which can be easily and conveniently done at site. In case you don't establish site lab, you shall get all tests done from an outside lab. Untested materials shall not be allowed to be used in the work.

### **38. OTHER TERMS AND CONDITIONS :**

Site conditions has been made clear to you & you have understood the scope of work, hence, no claims of whatsoever nature shall be entertained by Developer on account of any reason cited by you at later date.

**Traffic Rules:** The compliance to local traffic rules, regulations and laws is your responsibility and any incidental expenses arising out of it will be borne by you.

Inferior quality of formwork/workmanship will not be permitted under any circumstance, on pretext of "Prevailing Practice".

The work shall be executed as per the drawings issued from time to time and as per directions of the Architect, RCC Consultant, Service consultants and the Developer.

All the works shall be finished like a workmanship manner as per the standard specifications and as per the direction of Engineer-in-charge / Architect / Developer.

The rates are derived as per the quantity calculated as per GFC drawings attached with this agreement. No claim whatsoever shall be made for deviation in quantity unless there are changes in drawings or specifications.

## SCHEDULE - 'A'

**Basic Rates for Cement & Reinforcement Steel:** The following basic rates shall be considered while working out the above cost.

Basic rate of Cement = Rs. 300.00 per Bag  
Basic rate of Reinforcement Steel = Rs. 46.00 per Kg



**SCHEDULE 'B'**

**(ISSUE OF MATERIALS TO THE CONTRACTOR)**

(Not Applicable as all Materials are in Contractor's Scope)

Sl. No.	Particulars	Rate at which materials shall be issued to the contractor		Place of Delivery	Remarks	
		Unit	Rate			
			Rs.			Ps.
1	2	3	4		5	6
a	NIL					

SIGNATURE OF CONTRACTOR

DATE :

FOR ACCEPTING OFFICER

**SCHEDULE 'C'**

**(LIST OF TOOLS AND PLANTS OTHER THAN TRANSPORT WHICH  
WILL BE HIRED TO THE CONTRACTOR)**

(Not Applicable as all Tools & Plants are in Contractor's Scope)

Sl. No.	Quantity	Particulars	Details of crew supplied	Hire Charges per unit of working day	Stand by charges per unit per off day	Place of issue (by name)
1	2	3	4	5	6	7
		NIL				

**SIGNATURE OF CONTRACTOR**

**DATE :**

**FOR ACCEPTING OFFICER**

**SCHEDULE 'D'**

**(TRANSPORT TO BE HIRED TO THE CONTRACTOR)**

Not Applicable as all Transports are in Contractor's Scope)

Sl. No.	Quantity	Particulars	Rate per unit per working day	Place of issue by name	Remarks
1	2	3	4	5	6
		NIL			

SIGNATURE OF CONTRACTOR

DATE :

FOR ACCEPTING OFFICER

## Appendix I

(Details and Technical Specifications of the Work)

### TECHNICAL SPECIFICATIONS OF MATERIALS - Part I

#### INDEX

Sr. No.	Particulars	Page No.
1	Concrete work	
2	Formwork	
3	Reinforcement work	
4	Waterproofing	
5	Damp-proof course	
6	Masonry work	
7	Plastering & Pointing	
8	Wood work (Door frame)	

## CONCRETE WORK

- 1.0 GENERAL  
Concrete used on site shall comply to relevant parts of standards, codes of practices, technical specification given in particular or approved, designed mixes as prepared, approved & adopted for works to give designed strength, serviceability, & long term durability.
- 1.1 Contractor shall prepare & submit methods made for casting different items of building for approval.
- 1.2 Contractor shall maintain the register of following in standard format approved by EIC.
- a) Mix design details with laboratory test report.
  - b) Actual site trial mix test report.
  - c) Test report for material like steel, cement, Aggregate.
  - d) Pour cards with approvals of EIC.
- 2.0 MATERIALS
- 2.1 Water
- 2.1.1 Water used for mixing and curing shall be clean and free from injurious amounts of oils, acids, alkalis, salts, sugar, organic materials or other substances that may be deleterious to concrete or steel.
  - 2.1.2 The PH value of water shall generally be not less than 6. Water found satisfactory for mixing is also suitable for curing concrete. However, water used for curing should not produce any objectionable stain or unsightly deposit on the concrete surface. The presence of tannic acid or iron compounds is objectionable.
  - 2.1.3 Quality of water to be used for mixing and curing of concrete work shall conform to IS- 456-2000. Project Manager will ensure that testing of water is carried out fifteen days interval to comply with the requirement. Cost of setting will be borne by the contractor.
- 2.2 Cement
- 2.2.1 The cement used shall be of Ordinary Portland cement 53 grade & 43 grade confirming to IS -12269 & IS -8112 (Except cement for flooring / tiling work) . If developer supply cement free of cost as per schedule 'B' i.e. material supplied by developer. ,it is contractors responsibility to demand for the cement timely as required in accordance with CPM net work agreed between Project Engineer and the contractor.
  - 2.2.2 Cement shall be received on site in bags of 50 kg or loose in tankers with test certificate. Also it shall be tested before use to ascertain its strength & setting time from approved laboratory & cost of these borne by contractor.
  - 2.2.3 Cement in bags shall be stored in dry waterproof sheds to protect the cement from dampness and to minimize ware-ho deteriorations. Where cement has been stored for over 6 months or for any reason the stored cement shows signs deterioration or contamination, it may be tested before use for its strength, setting time, etc. a Cement which has fully or partially set shall not be used.

2.2.4 Storage of cement at the site of work shall be at the contractor's expense and risk. In the event of any damage occur to cement due to faulty storage in Contractor's sheds or on account of negligence on his part, such damage shall the liability of the Contractor.

## 2.3 Sources of Cement Procurement

If cement is in contractors scope, Cement shall be procured by the contractor direct from the factories of any of the manufacturer listed here-in-below:-

ACC

Binani

Gujarat sidhi

Ambuja Cement

Madras cement

India cement

Orient Cement

Century Cement

Vasavdatta

UltraTech Cement or any other approved by EIC.

The contractor shall furnish the particulars of the manufacturer of cement and obtain written approval from the Project Manager for every lot of cement separately before placing the order. The cement so brought shall be fresh and in no case older than 60 days from the date of manufacturing. The documents in support of the purchase of the cement may be verified, scrutinized and corroborated to satisfy himself about the quality, quantity, source and testing by the Project Manager. Cement shall be procured for minimum requirement of one month and not exceeding the requirement of the same for more than two months at a time. The cement so procured shall be consumed in the work within two months extendable by another month by the Project Manager after proper check. Each bag of cement shall bear relevant ISI mark and the date of packing. The weight of each consignment shall be verified by the Engineer-in-Charge and recorded. The content of cement shall be checked at random by the Project Manager to verify the actual weight of cement per bag. The content of cement per bag shall not be less than 50 kg subject to tolerance given Annexure 'B' of IS 8112.

## 2.4 Testing of Cement

2.4.1 The contractor shall submit the manufacturer's test certificate in original along with test sheets giving the results of each physical test as applicable in accordance with relevant IS provision and the chemical composition of cement or authenticated copy thereof duly signed by the manufacturer with each consignment as per the following IS provisions-

Method of sampling hydraulic cement as per IS -3535.

Methods of physical test for hydraulic cement as per IS -4031.

Method of chemical analysis of hydraulic cement as per IS -4032.

2.4.2 The test certificate and test sheet shall be furnished with each batch of manufacture. The Engineer-in-Charge shall record these details in cement acceptance register to be maintained by him which will be signed by JE (Civil), Engineer-in-Charge, Project Manager & the contractor or his authorized representative.

2.4.3 The contractor shall, however, organize

- a) Initial and final setting time,
- b) Soundness
- c) Compressive strength test
- d) Fineness test

Test of cement on samples collected from the lot brought at site before incorporation in work from any recognized institution/laboratory as approved by Project Manager. Compressive strength test shall be conducted at 3 days, 7 days and 28 days. The cost of sampling, transportation and testing shall be borne by the contractor. The contractor will be allowed to use the cement only after satisfactory compressive strength of 7 days. To meet this requirement contractor is required to keep minimum 15 days stock before any new lot is brought at site which can be used in the work. The contractor shall be required to remove the cement not meeting the requirement from site within 24 hours. 7 days strength test will be relied upon to accept the lot of cement to commence the work. 28 days compressive strength test will be the final criteria to accept/reject the lot. Cement shall test for every batch/lot.

2.5 Field Test on cement

When cement received on site it is contractor's responsibility to undertake physical field test to assess quality of cement in presence of developers representative as given under.

- a) Check for grade of cement
- b) Freshness test- Printed week, month & year.
- c) Lump Test- No lumps should be present.
- d) Fineness Test-It should feel silky, after rubbing in the fingers.
- e) When hand immersed in bag, it should feel cool.
- f) Float Test-Should float on water before sinking.
- g) Paste test- should gain some strength after 24 hours curing.

2.6 The contractor shall submit original purchase vouchers for the total quantity of cement supplied under each consignment to be incorporated in the work. All consignment received at the work site shall be inspected by

the Project Manager along with the relevant documents to ensure the requirements as mentioned hereinbefore, before acceptance. The original purchase vouchers and the test certificates shall be verified for subject contract and defaced by the Engineer-in-Charge and kept on record in the office of the Project Manager duly authenticated and with cross reference to the consignment /control number recorded in the cement acceptance register.

## 2.7 Storage of cement

- 2.7.1 Cement bags shall not be piled against the wall. A space of 60 cm all round shall be left between the walls and the piles, bags shall be piled off the floor on wooden planks. Bags shall be kept close together in the pile to reduce circulation of air as much as possible and shall not be piled more than 12 bags high to avoid lumping under pressure. The width of pile should not be more than two bags placed lengthwise. For extra safety during the monsoon, the pile shall be completely enclosed by water proof membranes such as polyethylene, tarpaulin etc as directed by Project Manager. Each consignment of cement shall be stacked separately to permit easy access for inspection and facilitate removal. Cement shall be used in the order in which it is received i.e. on the principle of FIFO.
- 2.7.2 Cement godown shall be provided with two locks on each door. The key of one lock at each door shall remain with the Engineer-in-Charge or his representative and that of the other lock with the contractor's authorised agent at site of works so that cement is removed from the godown only according to daily requirement with the knowledge of both the parties. During the period of storage, if any cement bags found to be in damaged condition due to whatsoever reason, the same shall be removed from the cement godown on written orders of the Project Manager and suitable replacement for the cement bags so removed shall be made and no claim whatsoever shall be admissible on this account.
- 2.7.3 Cement shall be removed from the store only according to daily requirement with the knowledge of both the parties and daily consumption of cement shall be recorded in cement consumption register which shall be signed by the Engineer-in-Charge and the contractor.
- 2.7.4 In case the consumption of cement as per cement consumption register is found to be more than the estimated quantity of cement due to whatsoever reason, the contractor shall not have any claim whatsoever for such excess consumption of cement.
- 2.7.5 The contractor shall not remove empty cement bags without prior inspection by the Engineer-in-Charge. At the end of each day, the empty bags shall be piled up at the place as decided within the site of works. The Engineer-in-Charge/JE (Civil) will cut the corner of each bag to the extent



of 150 mm, marked, numbered the bags so consumed and recorded in the register before being allowed for their removal.

## 2.8 Schedule of Supply

2.8.1 The contractor shall procure the cement timely as required in accordance with CPM net work agreed between Project Manager and the contractor. The contractor will forfeit his right to demand extension of time if the supply of cement got delayed due to his failure in placing order in time on to the manufacturer.

## 2.9 Measurements and payment of cement

2.9.1 The entire quantity of cement as brought at site, from time to time shall also be suitably recorded in the Measurement book for record purposes as 'Not to be abstracted' before incorporation in the work and shall be signed by the Engineer-in-Charge and the contractor.

2.9.2 The payment shall only be allowed after production of original purchase vouchers, certified copies of test certificates from manufacturer for each consignment and if results of testing carried out on receipt of cement (7 days compressive test) are found satisfactory after testing as specified hereinbefore. Cement shall be paid as "material at site". For this purpose, rate of cement adopted for rate analysis or current market rate (whichever is lesser) shall be applicable irrespective of grade of cement specified for use in the work.

For the purpose of pricing deviations for the items involving cement the rates adopted for rate analysis shall be applicable.

## 3 AGGREGATE

3.1 Aggregate shall conform to IS 383 and shall be of type basalt/trap/ sand stone.

3.2 Aggregate shall be non porous, hard, strong, durable, clean and free from various impurities and adherent coating and shall not contain any deleterious materials exceeding the limits specified in the above referred IS. When required by the Engineer-in-Charge, the contractor shall at his own expenses carry out any test laid down in IS-383 and IS-2386 to verify that the aggregate complies with the requirements of the IS. The test will be carried out in any laboratory approved by the Project Manager.

3.4 Coarse aggregate shall consist of crushed graded stone aggregates & most of which is retained on 4.75 mm IS sieve. Coarse aggregate shall have minimum specific gravity of 2.6, below this shall not be used.

3.5 One specific source of supply of coarse aggregate is approved; the source shall not be changed without prior approval of EIC.

3.6 Fine aggregate shall consist of naturally occurring coarse sand & pass through 4.75mm IS sieve. Fine aggregate shall conform to Zone II of table IV of IS-383.

Samples of the aggregate proposed to be used shall be approved by EIC, prior to bulk delivery of the same at site of work. Field tests for

determining the contents of silt, clay etc for fine aggregate shall be carried out by the contractor from time to time to ensure that material brought to site are in conformity with the samples approved by the EIC.

3.7 Grading of Aggregates:

The grading of coarse and fine aggregate shall be as per IS-383-1970 table 2 & as per IS - 383-1970 table 4 respectively. Fine aggregate shall have grading as per grading zone II. The grading of coarse and fine aggregate shall be checked as frequently as possible. The frequency for the aggregate testing shall be determined by Engineer-in-Charge to ensure that the specified grading is being maintained.

4.0 Admixtures

4.1 These are substances other than cement, aggregate & water & shall be used if specified in mix design to modify the properties of concrete. This shall be used in specified proportion with written approval of EIC.

4.2 Admixtures generally used are classified

- a) Accelerators
- b) Retarders
- c) Workability agent
- d) Water repelling agent
- e) Air entering agent

Contractor proposing to use any one of them shall submit to the EIC technical literature with its chemical composition, purpose of use & method recommended by the manufacturer.

4.3 The contractor's proposal shall accompany the following with his request to use admixture.

- a) The trade name of the admixture & manufacturer's recommended method of use.
- b) Typical doses rates & possible detrimental effect of under & over doses.

5.0 **CONCRETE**

5.1 All plain and reinforced cement concrete shall be as per IS-456-2000.

5.2 Type of cement concrete required for works in various situations, unless otherwise specified in these particular specifications or indicated in drawings, shall be as following -

LOCATION	TYPE OF MIX
Foundation concrete below masonry walls.	PCC 1:4:8/1:3:6, (As per Drawing or BOQ Specifications)
Lean concrete below RCC wall/column footing	PCC 1:4:8/1:3:6, (As per Drawing or BOQ Specifications)
Sub base to floor	PCC 1:4:8/1:3:6, (As per Drawing or BOQ Specifications)
Irrespective of what is shown on drawings, all reinforced cement concrete works shall be as follows	
RCC works, Footing, Raft, RCC retaining wall plinth beam and any locations below GL.	As per Mix design given or as per IS-456
All RCC works, Column, Beam, Slab above GL at any location	As per Mix design given or as per IS-456.
RCC water tanks	As per Mix design given or as per IS-456.
RCC in floors and other plain cement concrete work unless otherwise indicated in drgs or specified in the tender documents as follows :	
40 mm thick and above	PCC 1:2:4, PCC 1:1.5:3, 1:3:6, (As per Drawing or BOQ Specifications)
Thickness less than 40 mm	PCC 1:2:4, PCC 1:1.5:3, 1:3:6, (As per Drawing or BOQ Specifications)
PCC bed blocks	PCC 1:2:4, PCC 1:1.5:3, 1:3:6, (As per Drawing or BOQ Specifications),
PCC coping and benching	PCC 1:2:4, PCC 1:1.5:3, 1:3:6, (As per Drawing or BOQ Specifications)
Surrounding to surface of gully traps, bedding under nahani traps/floor traps/deep seal traps/ and surrounding of Indian type WC seats	Lean concrete PCC 1:5:10,

5.3

**BATCHING:**

This shall be done as per IS -4925 clause No. 5. Weigh batching shall be carried out for all design mix concrete. Volumetric mixing of concrete can be permitted by EIC to the extent that all items shall be converted to volumes except cement which shall be added by weighing only.

5.4

**MIXING:**

All cement concrete shall be mixed in approved mechanical mixer. The mixers shall be free fall tilting type, fitted with water measuring devices ,abrasion resistant replicable liners and blades conforming to the performance requirements of IS : 1791 & 12119. The minimum mixing periods specified are based on standard speed of rotation of the mixer and of the introduction of the materials, including water into the mixer. Mixing time shall be increased if and when the charging and mixing operations fail to produce a concrete batch which conforms throughout with the fore going

requirements with respect to adequacy of mixing. The concrete as discharged from the mixer shall be uniform in composition and consistency throughout the mixed batch and from batch to batch, except where changes in composition or consistency required.  
 Mixing time shall be as follows,

Capacity of mixer (In M3)	Time of mixing (in Min)
Up to 2	1 1/2
Up to 3	2
Up to 4	2 1/2

## 5.6 TRANSPORTATION

Concrete shall be transported to a place of pour as far as possible in most efficiently, conveniently & without loss of concrete characteristics. Method of transportation depends upon location, size & nature of work & shall be approved by EIC. Concrete should be placed within ½ hour of production i.e. prior to initial setting time.

If characteristic of concrete changed due time elapsed between production of concrete & place of pour, shall be rejected.

## 5.7 PLACING

5.7.1 The concrete shall be deposited as nearly as practicable in its final position to avoid remanding. The concrete shall be placed and compacted before initial setting of concrete commences and should not be subsequently disturbed.

5.7.2 Methods of placing should be such as to preclude segregation. Care should be taken to avoid displacement of reinforcement or movement of formwork. As a general guidance, the maximum permissible free fall of concrete may be taken as 1.5m

5.7.3 Concreting shall commence only after form work is approved, reinforcement is checked & RCC consultant give written permission to proceed for concreting.

5.7.4 Form work should be clean, free from dust, pieces of wood. It should be treated by form releasing agent prior to laying of reinforcement & concrete.

5.7.5 Concrete on to the sloping surface shall be discharged by providing chute.

5.7.6 Columns & walls shall be casted in operation to their required level to avoid any horizontal constructional joint.

## 5.8 COMPACTION:

5.8.1 Concrete should be thoroughly compacted and fully worked around the reinforcement, around embedded fixtures and into corners of the formwork. Concrete shall be compacted using mechanical vibrators complying with IS 2505, IS 2506, IS 2514 and IS 4656. Over vibration and under vibration of

concrete are harmful and should be avoided. Vibration of very wet mixes should also be avoided.

5.8.2 Whenever vibration has to be applied externally, the design of formwork and the disposition of vibrators should receive special consideration to ensure efficient compaction and to avoid surface blemishes. For footing, beam, column, shear wall, parti use needle/pin vibrator & for slab use plate or surface vibrator.

5.8.3 When electric vibrators are in use, the stand by petrol vibrator must always be available at the concreting point.

## 6.0 CONSTRUCTION JOINT:

6.1 Joints are a common source of weakness and, therefore, it is desirable to avoid them. If this is not possible, their number shall be minimized. Concreting shall be carried out continuously up to construction joints, the position and arrangement of which shall be indicated by the designer. Construction joints should comply with IS 11817.

6.2 Construction joints shall be placed at accessible locations to permit cleaning out of laitance, cement slurry and unsound concrete, in order to create rough/ uneven surface. It is recommended to clean out laitance and cement slurry by using wire brush on the surface of joint immediately after initial setting of concrete and to clean out the same immediately thereafter.

6.3 The prepared surface should be in a clean saturated surface dry condition when fresh concrete is placed, against it. In the case of construction joints at locations where the previous pour has been cast against shuttering the recommended method of obtaining a rough surface for the previously poured concrete is to expose the aggregate with a high pressure water jet or any other appropriate means. Fresh concrete should be thoroughly vibrated near construction joints so that mortar from the new concrete flows between large aggregates and develop proper bond with old concrete. Where high shear resistance is required at the construction joints, shear keys may be-provided. Sprayed curing membranes and release agents should be thoroughly removed from joint surfaces.

### 6.4 Expansion joints

Expansion joint shall be formed & located as detailed in the drawing. Insert sealant to completely fill the joint & finish neat & smooth approved by EIC

## 7.0 PROTECTION & CURING:

Freshly laid concrete shall be protected from rain by suitable covering. The work should also be protected from damage & rain during construction. After concrete has begun to harden i.e. 1 to 2 hours after its laying, it shall be protected with moist gunny bags, sand or any other material approved by the EIC to protect drying shrinkage.

After 24 hours of laying of concrete the surface shall be cured by flooding with water of about 25mm depth. The period of curing shall not be less than 10 days for concrete exposed to dry & hot weather & conforming to IS-456.

## 8.0 COVER BLOCKS

Spacers, cover blocks should be of concrete of same strength or PVC. Contractor may use at his discretion plastic cover blocks in lieu of cement mortar for concrete cover blocks to ensure proper cover for the reinforcement. Concrete cover block shall be specified size & well cured before use.

**9.0 Mix Design**

Mix design shall be prepared based on SP-23, hand book on concrete mixes and IS-10262. Recommendations, guide lines for concrete mix design.

for Soon after commencement of work, contractor shall arrange the design mix required grade concrete.

Design Mix of concrete shall be got carried out from National test house, CME, Regional Research Laboratories. Design Mix of concrete from any other laboratories such as reputed Engineering colleges shall be got approved from Project Manager before implementation in the work. In case contractor fails to submit the samples of design mix soon after commencement of work, the delay shall solely be attributable to the contractor and no claim of what so ever nature shall be admissible on this account.

**MIX PROPORTION AND STRENGTH**

Strength to be achieved	As per IS-456
Type of cement	As per clause 5 here-in-before.
Target mean strength of cement	To be taken as per mix designed as per IS-10262.
Aggregate/cement ratio by weight	As per mix design based on IS-10262 and IS -456.
Workability	As per IS-456 Slump shall be 25 mm to 75 mm compaction factor 0.85 to 0.92.
Water cement ratio	As per mix design based on IS-10262 and IS -456.
Degree of quality control	Good
Durability	Exposure: Moderate for entire work as per IS-456.
Minimum cement content	300 Kg/cum

**10.0 TRIAL MIX**

10.1 At the time of tendering, the contractor after taking into account the type of aggregate, plant/method of laying concrete he intends to use/adopt and all other variable/factors given in IS-10262 shall allow in his tender for aggregate/cement and water cement ratio, which he consider will achieve the strength requirements specified.

- 10.2 As soon as possible after receiving the order to commence the work, the contractor shall make trial mixes to satisfy the Engineer-in-Charge to get the specified strength.
  - 10.3 From each trial mix twelve numbers of preliminary test cubes of size 15 x 15 x 15 cm shall be made as per IS-516. The concrete cube shall be tested as per IS-516. Out of twelve cubes three will be tested after seven days from the date of casting, six cubes after 28 days from the date of casting, remaining three cubes shall be preserved by the Project Manager for one year after certified date of completion of the work for any subsequent check.
  - 10.5 The test after seven days (ie on 8<sup>th</sup> days) is intended only to give an early indication of the strength likely to be achieved. The strength achieved should be as per IS-456. Frequently of sampling shall be as per IS-456.
  - 10.6 The concrete shall be deemed to comply with the strength requirement as per IS-456 is met with.
  - 10.7 Whenever, there is any change in the type of grading of material, the mix should be rechecked and modified suitably to the desired compressive strength.
  - 10.8 On the result of the above test the mix actually to be used shall be agreed to and approved by the EIC. The approval of the EIC shall not relieve the contractor of his responsibility for obtaining the required minimum strength of quality concrete in the works test cubes.
- 11.0 FINISHING TO CONCRETE SURFACES:**
- 11.1 In case of roof slab the top surface shall be finished even & smooth with wooden trowel, before the concrete begins to set.
  - 11.2 Immediately on removal of forms, the R.C.C work shall be examined by the EIC, before any defects made good. The work that has sagged or contains honeycombing to an extent detrimental to structural safety or architectural concept shall be rejected. Surface defects of minor nature may be accepted and shall be made good as per direction of EIC.
  - 11.3 Unless otherwise specified, exposed surfaces of concrete (other than in contact with casing and of pre-cast concrete) shall be finished to a fair and even surface without using extra cement.
  - 11.4 Exposed faces of RCC/Concrete surfaces which are ultimately required to be finished by application of white/colour washing/distempering/painting shall be plastered with a thin layer of cement mortar (1:3), 5 mm thick and finished even and smooth after removal of formwork.
  - 11.5 Exposed surfaces of RCC lintels, beams, columns etc. which are continuous with plastered surfaces of walls shall be finished as for adjoining walls.
  - 11.6 Exposed surfaces of concrete other than those referred to in paras above, shall be finished even and fair without application of any plaster after removing irregularities and protruding, form work marks and stopping air holes with cement and sand mortar 1:3

- 11.7 Use of mortar/plaster shall neither be permissible for correcting levels, unevenness, or elevation etc, nor shall such plaster be used to increase the thickness.
- 11.8 The surface which is to receive plaster or where it is to be joined with brick masonry wall shall be properly roughed immediately after the shuttering is removed. The roughening shall be done by hacking. Hacking is done according to the direction of the EIC.

**12.0 READY MIXED CONCRETE:**

- 12.1 Ready mix concrete as approved only shall be used. It shall comply all requirements of concrete. Batching plant, mixture, truck mixture, pump etc shall confirm to relevant IS standards.
- 12.2 Stationary or mobile pumps as per requirements shall be deployed. Supply of concrete shall be continuous to avoid any blockage of pump. Concrete mix shall be with slump as desired by pump.
- 12.3 mix design adopted shall be approved be EIC & confirm all test detailed in specification.

**13.0 TESTING**

The minimum frequency of cube casting shall be as follows. Each sample shall consist of 6 cubes

Concrete Quantity	No of sample
Up to 5 cum in a day	1.0
5 cum to 15 cum	2.0
15cum to 30 cum	3.0
30 cum to 50 cum	4.0
More than 50 cum	4.0+ 1 additional /each 50cum

**14.0 FIELD TEST**

- 14.1 It is the responsibility of the contractor to prepare & get the cube tested & to provide all the material, labour, moulds, equipment, casting & curing facility charges for testing etc.
- 14.2 Contractor shall have to provide & maintain all the equipment & the staff at the site throughout to carry out the following test in site laboratory or from approved laboratories.
  - a) Grading of coarse & fine aggregates.
  - b) Silt content of sand



c) Moisture content of coarse & fine aggregate

d) Slump test of concrete

a) GRADING OF COARSE & FINE AGGREGATE

Coarsed aggregate shall be supplied in nominal size given in table. For any of the nominal sizes, the proportion of the other sizes as determined by method described in I.S 2386 (Part-I) shall also be accordance with table 2 of I.S

IS Sieve	Percentage passing for single sized aggregate of nominal size					
	63mm	40mm	20mm	16mm	12.5mm	
10mm						
(1)	(2)	(3)	(4)	(5)	(6)	(7)
80mm	100	—	—	—	—	—
63mm	85 to 100	100	—	—	—	—
40mm	0 to 30	85 to 100	100			
20mm	0 to 5	0 to 20	5 to 100	100	—	—
16mm	—	—	—	85 to 100	100	—
12.5mm	—	—	—	—	85 to 100	100
10mm	0 to 5	0 to 5	0 to 20	0 to 30	0 to 45	
85to100						
4.75mm	—	—	0 to 5	0 to 5	0 to 10	0 to 20
2.36mm	—	—	—	—	—	0 to 5

IS Sieve	Percentage passing for graded aggregate of nominal size			
	40mm	20mm	16mm	12.5mm
(1)	(8)	(9)	(10)	(11)
80mm	100	—	—	—
63mm	—	—	—	—
40mm	95 to 100	100	—	—
20mm	30 to 70	95 to 100	100	100
16mm	—	—	90 to 100	—

12.5mm	—	—	—	90 to 100
10mm	10 to 35	25 to 55	30 to 70	40 to 85
4.75mm	0 to 5	0 to 10	0 to 10	0 to 10
2.36mm	—	—	—	—

The grading of fine aggregate when determined as described in IS 2386 shall be within the limits given in table 4 of IS 383 . For fine aggregate grading follow following table,

IS Sieve	Percentage passing			
	Grading zone	Grading zone	Grading zone	Grading zone
	I	II	III	IV
10mm	100	100	100	100
4.75mm	90-100	90-100	90-100	95-100
2.36mm	60-95	75-100	85-100	95-100
1.18mm	30-70	55-90	75-100	90-100
600micron	15-34	35-59	60-79	80-100
300 micron	5-20	8-30	12-40	15-50
150 micron	0-10	0-10	0-10	0-15

#### Fineness Modulus:

This is a ready index of the coarseness/Fineness of the material. F.M is an imperial factor ,obtained by adding cumulative percentage of aggregate retained on each of the standard sieves ranging from 80mm to 150 micron & dividing this sum by an arbitrary number 100.The larger the figure, the coarser the material.

Type of Sand	Fineness Modulus
Fine sand	2.2-2.6
Medium Sand	2.6-2.9
Coarse Sand	2.9-3.2

Sand with F.M. more than 3.2 is unsuitable for making satisfactory concrete.

#### b) SILT CONTENT OF SAND

Silt content shall be within limit given in IS code. To calculate silt content use following procedure

- 1) Take a clean 200 ml measuring cylinder.
- 2) Fill with sand up to certain mark say reading is X.
- 3) Add water above it & shake well. Allow a period of 2 hours for settlement.
- 4) Clean sand will settle down at the bottom with silt & clay impurities on top of the sand layer.
- 5) Now observe the top level reading for sand. Assume that it is Y. Then the silt contain in % is given by

$$\% \text{ silt content} = \frac{X-Y}{X} \times 100$$

- 6) Total silt content should not be more than 7% for good quality sand.

#### c) BULKING OF SAND

The bulking of sand should be known for proper correction to be applied when calculating dry sand requirement.

- 1) Take 250 ml glass cylinder.
- 2) Fill up with damp sand up to 200 ml mark.
- 3) Slowly pour some water .The sand settles to its actual volume which is less than 200 ml . Mark this level, say X ml.
- 4) Then bulkage is calculated by

$$\% \text{ bulkage} = \frac{200-X}{200} \times 100.$$

#### d) SLUMP TEST

This test is performed to determine the workability of fresh concrete & to check the uniformity of concrete from batch to batch . the test is conducted where the nominal size of aggregate does not exceed 40mm. The apparatus used for this confirming to IS.

Procedure of measuring slump

- 1) Clean the internal surface of the mould & fill the mould with concrete in four layers.
- 2) Tamp each layer with 25 stroke of the rod & distribute the strokes uniformly over the entire cross section of the mould.
- 3) The rod should penetrate every underlying layer.
- 4) Strike off excess concrete after top layer with trowel.

- 5) Remove the mould vertically & slowly, the concrete will slump or slide.
- 6) Measure the height of slump in mm.

If slump is not specified use following values for given workability as guidelines.

Placing condition (1)	Degree of workability (2)	slump in mm (3)
1) Blinding concrete, shallow sections, Pavements using pavers.	Very low	As per IS 456
2) Mass concrete, lightly reinforced Section in slab, beams, walls, columns, Floors, hand placed pavements, strip footing	Low	25-75
3) Heavily reinforced section in slab, beams, walls, Columns, slipform work, pumped concrete	Medium	50-75 75-100
4) Trench fill	High	100-150
5) In- situ pilling, Tremie concrete	Very high	As per IS 456

#### e) LABORATORY TEST FOR HARDNED CONCRETE

This test is carried out for

- 1) To check that the mix proportions are adequate for the strength prescribed as a basis for acceptance/for quality control.
- 2) To determine the time of removal of forms / when a structure may be put into service.
- 3) To asses the 7days, 28 days compressive strength of the concrete.

Procedure for casting of Cubes.

- 1) Clean the standard cube moulds, 6 nos. thoroughly & tighten all the nut- bolts properly.
- 2) Apply oil to all contact surfaces of the mould.
- 3) Size of the mould is normally 150mmX150mmX150mm.
- 4) Take random samples from the mix in a ghamela, while concreting. Pour concrete in cubes in 3 layers. Compact each layer with 35 no of

strokes with the tamping rod. Finish the top surface by trowel after compaction of last layer.

- 5) Cover the mould by a damp hessian cloth immediately to prevent loss of water. After 24 hours remove specimen from the mould. Code the cubes with paint or marker. Submerge the specimen in clean, fresh water until the time of casting.
- 6) Test 3 cubes for 7 days & 3 cubes for 28 days compressive strength.

## 15.0 FAILURE OF FIELD TEST CUBES

15.1 If test of field cubes i.e. from the final points of placing indicate likelihood of low strength concrete in the structure thereby implying that the load carrying capacity of the structure may have been significantly reduced, then as per direction of developer the contractor shall conduct non destructive tests of the structure as given below.

15.2 When 28 days crushing strength values on field specimen or specimen made for guide line test fall short of specified values, the developer shall call for non destructive test on the structure. Such test may be any one or combination of the following.

- a) Rebound hammer test
- b) Pulse velocity test
- c) Core Test
- d) Load Test

15.3 Interpretation of rebound hammer, pulse velocity test result shall rest with the Developer.

If felt necessary , the developer may instruct load testing for any part of the structure based on doubtful concrete strengths. Such tests shall be carried out as per details to be provided by the developer in consultation with the structural consultants.

Core test, if ordered by the developer shall be done in accordance with I.S. samples for such test shall be taken from location to be identified by the developer & such samples shall be collected in compliance with I.S

Concrete in the area represented by the core test shall be considered structurally adequate if the average of three core test result is equal to at least 85% of the specified strength & if no single core test result is less than 75% of specified strength. If these strength acceptance criteria are not met by the core test, the developer will decide upon

- a) Rejection of the affected work & total replacement to acceptable standards or
- b) Measures to strengthen the affected work. The decision, either way, shall be solely that of the owner & all expenses relating to replacement of

defective work or strengthening measures shall be borne by the contractor along with responsibility for the consequences of delay.

16.0 MEASUREMENT:

Unless otherwise stated all concrete work shall be measured in cubic meters. Cement concrete measurement conforms to IS-1200 (part-2).

- 16.1 Dimensions shall be measured to nearest 0.01m except for the thickness of shall be measured to nearest 0.005m.
- 15.2 Areas shall be worked out to nearest 0.01 Sqm.
- 15.3 Cubic content shall be worked out to nearest 0.01 cubic metre
- 15.3 Fair finishes of exposed surfaces of concrete including hacking or roughening surfaces of concrete shall be included in the description. Special finishes other than those obtained through formwork shall be so described & measured separately in square metres.
- 15.4 Columns shall be measured from top of column base to underside of first floor slab & subsequently from top of floor slab to underside of floor slab above.
- 15.5 In case of column for flat slabs, flare of column shall be included with column for measurement.
- 15.6 Beams shall be measured from face to face of columns & shall be included haunches, if any, between column & beams. The depth of beam shall be measured from bottom of slab to bottom of beam except in case of inverted beam where it shall be measured from top of slab to top of beam.
- 15.7 Slab shall be measured in between the beams.
- 15.8 The Chajja shall be measured inclusive of bearing. When chajja is combined with lintel, beam or slab, it shall be measured as clear projection.
- 15.9 No deduction shall be made for the following.
  - a) Ends of dissimilar materials for example beams, posts, girders, rafters, purlins, trusses, corbels, & steps up to 500 cm<sup>2</sup> in cross section.
  - b) Opening up to 0.1 m<sup>2</sup> or specified.
  - c) Volume occupied by reinforcement.
  - d) Volume occupied by pipes , conduits ,sheathing, etc not exceeding 100 cm<sup>2</sup> each in cross sectional area or as specified.
  - e) Moulds , drip moulding, champers, splays rounded or coved angles , bed grooves & rebates up to 10cm in width & 15cm in girth.

16.0 Standards

Above work shall be carried out as per IS standards & code of practices. These shall be latest issue. Any discrepancies, conflict noticed shall be informed in writing to EIC for his direction & approval.

- a) IS-456 Code of practice for plain & reinforced cement concrete
- b) IS-269 Specification for ordinary & low heat Portland cement.
- c) IS-8112 Specification for 43 grade ordinary Portland cement.
- d) IS -12269 Specification for 53 grade ordinary Portland cement.
- e) IS- 383 Specification for coarse & fine aggregate from natural sources.
- f) IS-460 Specification for test sieves( Part I,II,III)
- g) IS- 515 Specification for natural & manufactured aggregates from natural sources.
- h) IS-516 Method of test for strength of concrete.
- i) IS-1199 Method of sampling & analysis of concrete.
- j) IS-1791 Batch type concrete mixers
- k) IS- 2386 Method of test for aggregate for concrete( Part I,II,III)
- l) IS-2505 General requirements for concrete vibrators immersion type.
- m) IS-4926 Specification for ready mix concrete.
- n) IS- 2645 Specification for integral cement waterproofing compound.
- o) IS-9103 Specification for admixture for concrete.
- p) IS-1200 Method of measurement of building & civil work (Concrete)
- q) IS-4031 setting time, soundness & compressive strength
- r) SP-16 Handbook.
- s) SP- 23 Handbook on concrete mix
- t) SP -24 Explanatory handbook on Indian standards code for plain & reinforced concrete.

FORM WORK:

1.0 General

1.1 Form work shall include all forms or moulds required for forming the concrete which is cast-in-situ, together with all temporary construction required for their support. Form work shall be of rigid construction true to shape and as per dimension shown on drawing. It shall be strong enough to with stand dead & live load & forces caused by ramming & vibration of concrete incidental loads imposed upon it during & after casting of concrete. All form work confirms IS-14687 for material, erection & design.

1.2 All form work shall be so constructed as to be removable in sections in the desired sequence, without damaging the surface of concrete or disturbing other section. Forms should be easy to strip after connecting & no piece should be keyed into the concrete.

1.3 Form work shall provide safety & shall have adequate access for concreting.

- 1.4 Contractors ensure that workers shall work with required safety measures such as safety belts, helmets etc.
- 1.5 Contractor shall provide qualified site supervisors & foramen.
- 1.6 Before starting the form work contractor shall examine, ensure himself that strata is firm, rigid & safe to erect scaffold. In absence same shall be prepared by him & then work shall be proceed. In any case responsibility of formwork shall be that of the contractor.
- 2.0 MATERIAL:
- The form work may consist of timber, plywood, steel, adjustable props, steel plates, aluminum, PVC, plastics, Ferro-cement or any engineering material. Use of timber shall be limited to beam bottoms, runners but not for soffit of slab, wall faces etc.
- 2.1 Timber
- Timber should be softwood of partially seasoned stock to avoid swelling or warping. Any species of timber used for manufacture of concrete plywood & it conforms to IS-4990-1993 Timber which may be used for making strong scaffolding, beams, columns, props and bracings shall conform to IS 883.
- 2.2 Plywood
- Plywood conforming to IS 4990 may be used for form lining, sheathing and panel.
- 2.3 Steel
- Steel sheet plates conforming to IS 2062 or IS 8500 or IS 1977 may be used for form and form lining and rolled sections and tubes conforming to IS 2062 or IS 8500 or IS 116 1 may be used for steel forming and bracings. Whenever proprietary systems are intended to be used, technical information as per Annex B should be obtained from the manufacturer beforehand -IS 14687. Steel clamps and couplers shall conform to IS 2750.
- 3.0 Propping & Centering:
- 3.1 Props used for centering shall be of steel, timber, posts, ballies or any other material approved by EIC. In case when ballies are used none shall be less than 100mm measured at mid length & 80mm at thin end. Ballies shall rest on wooden sole plate of not less than 40 mm thickness having a minimum bearing area of .1 Sqm laid on ground. All props shall further be provided with double wedges between the sole plate and the props so as to facilitate tightening & easing of shuttering without causing shock to the concrete.
- 3.2 In case a span exceeds 4.5m & height exceeds 3.5m suitable horizontal as well as diagonal bracing shall be provided after accounting for all forces including action of wind which may produce lateral forces. In case height of centering exceeds 3.5m, the props may be provided in multistage. The detail of splicing the props at each stage shall be as per approved drawing.



4.0 Shuttering:

- 4.1 The shuttering shall be of approved dressed timber of well seasoned boards to give a smooth & even surface & the joint shall not permit leakage of cement grout. The timber shall free from loose knots, projected nails, splits, adhering grout or other defects
- 4.2 The surface of timber shuttering that would come in contact with concrete shall be thoroughly cleaned and well wetted & coated with soap solution, raw linseed oil, or form oil of approved manufacture.

Contractor shall submit design of shuttering as per IS code well in advance for approval. It is contractor's responsibility to inspect & take approval from EIC, RCC Consultant for its strength, alignment and general fitness before placing the concrete in the forms. But such inspection & approval shall not relive the contractor of his responsibility for safety of man, machinery, materials & for results obtained.

Use of material shall depend upon its location, type of finish specified & subject to acceptability by the EIC. Use material as specified otherwise use following prior approval of EIC.

- a) Steel Props -Heavy duty, drop head & adjustable type.
- b) Steel plates -MS angle 45x45x4 mm thick frame work. With minimum 16 gauge thick sheet.
- c) Ply wood -Marine Ply-Plastic coated preferred.
  - 12 mm thick with timber framing for sides of beam.
  - 18 mm thick with timber framing for beam bottom & wall panels.
  - 12/18 mm thick for slab depending upon thickness & supporting system.
- d) Bracing - 40 mm dia MS steel tubes with clamps.

4.3 Removal of form work:

The form work shall be removed avoiding shok or vibration that may cause any damage to concrete. In a slab & beam construction, sides of beam shall be stripped first, then the under sides of slab & lastly the underside of the beam. The period that shall elapse after the concrete has been laid before undertaking the work of easing & removal of centering & shuttering shall be as per given in drawing by RCC consultant, otherwise as per IS 456-1978 table given below.

Parts of structure	Where ordinary Portland cement is used forms May
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be removed after expiry of the following periods.

- |  |                |
|--|----------------|
| 1) Wall, Column & vertical faces of all structural Members | 24 to 48 Hours |
| 2) Slabs (Props left under)                                | 3 Days         |
| 3) Beams soffits (Props left under)                        | 7 Days         |
| 4) Removals of props under slab                            |                |
| a) Spanning up to 4.5m                                     | 7 Days         |
| b) Spanning over 4.5m                                      | 14 Days        |
| 5) Removal of props under beam & arches                    |                |
| a) Spanning up to 6 m                                      | 14 Days        |
| b) Spanning over 6 m                                       | 21 Days        |

#### 5.0 Measurement:

- 5.1 Form work shall be measured in Square meters as the actual surfaces in contact with the concrete or any other material requiring form work.
- 5.2 Dimension shall be measured to the nearest 0.01m.
- 5.3 Area shall be worked out to the nearest 0.01 Sqm
- 5.4 No deduction shall be made for opening upto 0.4 Sqm.
- 5.5 Form work to secondary beams shall be measured up to the sides of main beams, but no deduction shall be made from the form work of main beam where the secondary beam intersects it.
- 5.6 Form work to beam shall be measured up to the sided of column, but no deduction shall be made from the formwork to stanchion or column casing at intersection of beam.

Measurement of form work confirms to IS- 1200 (Revision-5).

#### 6.0 Standards

Above work shall be carried out as per IS standards & code of practices. These shall be latest issue. Any discrepancies, conflict noticed shall be informed in writing to EIC for his direction & approval.

- a) IS-303 Specification for plywood for general purpose
- b) IS-456 Plain & reinforced concrete- code of practice.
- c) IS-3696 Safety code of scaffolds & ladders.

- d) IS-4014 Code of practice for tubular scaffolding.
- e) IS- 8989 Safety code of erection of concrete formed structure.
- f) IS- 2751 Code of practice for welding of M.S bars used for RCC.

REINFORCEMENT:

- 1.0 General
- 1.1 The contractor will submit the schedule of procurement of steel in consultation with EIC as specified & confirming to specification detailed in drawing & schedule of items.
- 1.2 If steel is free supplied by developer to be delivered to the site as per approved indent of the contractor to agreed schedule.
- 1.3 It is contractors responsibility to collect samples of each type for every batch received & test as per IS for
  - a) Unit weight per running meter
  - b) Cross section area
  - c) Ultimate tensile strength
  - d) Yield strength
  - e) Elongation
- 1.4 Prepare bar bending, cutting schedule detailing schedule covering as under & approved by EIC.
  - Cutting Length
  - Laps
  - Ring for various location & item
  - Chairs
- 1.5 Transport, cut, bend & shift to site reinforcing bars.
- 1.6 Place in position at any height, depth, & tie as per detail drawing with specified cover.
- 1.7 Provide attendance to keep reinforcement in position during concreting.
- 1.8 Unit weight payable per meter shall be as follows.
 

1.	6mm	0.22 Kg/Rmt
2.	8mm	0.40 Kg/Rmt
3.	10mm	0.62 Kg/Rmt

4.	12mm	0.89 Kg/Rmt
5.	16mm	1.58 Kg/Rmt
6.	18mm	2.00 Kg/Rmt
7.	20mm	2.47 Kg/Rmt
8.	22mm	2.98 Kg/Rmt
9.	25mm	3.85 Kg/Rmt
10.	28mm	4.83 kg/Rmt
11.	32mm	6.31 Kg/Rmt
12.	36mm	7.99Kg/Rmt
13	40mm	9.85Kg/Rmt

2.0 Material:

- 2.1 Reinforcement should free from loose rust, dust, loose mill scales, coats of paints, oil or other coating which may destroy or reduce bond.
- 2.2 Reinforcement bars used in construction shall be mild steel or medium tensile steel round bar & high strength deformed bars.
- 2.3 Steel should be from the original ore producers like Rashtriya Ispat Nigam/ Gurunanak/Bhuwalka/MITC/Parwati steel/Shri vaishnavi alloys/Vishnu steel or approved by EIC
- 2.4 Rolled mild steel & medium tensile steel plain round bars used in concrete (Grade Fe 410) shall confirm to IS 432(Part I).
- 2.5 Tor Steel- High strength deformed bars for use as reinforcement in concrete shall be grade Fe415, Fe 500 & Fe 5550 confirming to IS 1786.

The reinforcement shall be any of the following

- a) Mild steel & medium tensile steel bars confirming to IS- 432
- b) High strength deformed steel bars confirming to IS - 1786
- c) Hard drawn steel wire fabric confirming to IS-1566
- d) Structural steel confirming to grade A of IS -2062

2.6 Binding Wire

Binding wire shall be 16 or 18 gauge annealed wire confirming to IS 280. It shall be free from rust, oil, grease or any other deleterious material etc.

3.0 Transportation:

Reinforcement shall be transported to the site of work or to the place of storage by such means and in such a manner that the reinforcement is neither damaged nor deformed. The unloading of the reinforcement shall be done at the nearest convenient place where it is to be processed further. Particularly in cases where unloading is required to be done by hand, it is important that the vehicle should be brought as close as possible to the stacking or bending place in order to avoid carrying over long distances. As far as possible, at the time of unloading the bars should be separated by sizes and lengths.

#### 4.0 Storage of Reinforcement:

The actual location of the stacking place of reinforcement depends upon the site conditions & it is a contractor's responsibility to store it at convenient place, but it should be such that the reinforcement could be conveniently received and supplied to the operational centers in the site. On works covering large area, it might be an advantage to stack the reinforcement at different places close to areas where they are likely to be used most.

In order to ensure that the reinforcement bars are kept in good condition, they should not be left in direct contact with the ground but they should be stacked on top of an arrangement of timber sleepers or the like. Suitable racks may also be used for stacking reinforcement in tiers. Storage of reinforcement should conform IS-2502.

#### 5.0 Bending & Cutting of reinforcement:

Bars shall be bent & cut in accordance with appropriate dimension shown in schedule. The permissible tolerance for cutting & bending the bar is as per IS-2502- table-XI. Bar shall be bent cold & follows IS-2502. Any type of equipment may be used for bending of bars with the prior approval of EIC. For all measurement of bending dimension of bars for reinforced concrete follow IS-2502 - table no III,IV,V,VI,VII,VIII,IX,X.

#### 6.0 Spacing of Bar

Bars shall be placed in position as shown in drawing .Following points are followed if spacing is not shown any where directed by EIC.

- 6.1 The horizontal distance between two parallel reinforcing bar shall usually shall not be less than the greatest of the following
  - a) The dia. of bar if dia. is equal.
  - b) The diameter of bar if diameter is unequal and
  - c) 5mm more than the nominal size of coarse aggregate.
- 6.2 Greater horizontal distance than the minimum specified in (a) should be provided whenever possible. However when needle vibrator are used the horizontal distance between bars of a group may be reduced to two- third nominal maximum size of coarse aggregate, provided that sufficient space is left between groups of bars to enable the vibrator to be immersed.

- 6.3 Where two or more rows of bars, they shall be vertically in line & minimum vertical distance between the bars shall be 15mm, two third the nominal size of aggregate or maximum size of bar which is greater.

## 7.0 Lapping of bar

Lapping of bars shall be strictly followed as per the drawing, if not shown on drawing as per directed by EIC or given following as guidelines.

- 7.1 Where splices are provided in the following reinforcing bars, they shall be as far as possible away from the section of maximum stress & shall be staggered
- 7.2 Not more than half of the total bars shall be spliced at section.
- 7.3 Where more than one half of the bars are spliced at a section or where splices are made at points of maximum stress, special precaution shall be taken, such as increasing the length of lap or using the spirals or closely stirrups around the length of bar.

## 8.0 Cover to reinforcement

Nominal cover is the design depth of concrete cover to all steel reinforcement, including links. It is the dimension used in design & indicated in drawing. It shall not be less than diameter of bar.

- 8.1 For longitudinal reinforcing bar in a column nominal cover in any case shall not be less than 40 mm or less than diameter of such bar.
- 8.2 In case of columns of minimum dimension of 200 mm or under whose reinforcing bar do not exceed 12mm a nominal cover of 25mm may be used.
- 8.3 For longitudinal reinforcing bar in beam not less than 25mm, nor less than the diameter of such bar.
- 8.4 For footing minimum cover shall be 50mm.

## 9.0 Placing of Reinforcement:

The economy of reinforced concrete design will be fully realized only when reinforcement are maintained at their designed position at all times. So reinforcement fixed with great precision & convenience. It shall be placed in a position as given on the detailed design drawing & secured in position. Lapping of bars shall be done accordance with the relevant requirement specified in IS-456-1964 (Second Revision). Laps shall be staggered. Bars crossing each other, where required shall be secured by binding wire (annealed) of size 0.90 mm & conforming to IS- 280-1962 specification for mild steel wire ( Revised) in such a manner that they will not sleep each other at the time of fixing & concreting. Tying of bars conform to IS -2502.

## 10.0 Measurement:

Reinforcement bars shall be measured in running meters and their mass calculated as per IS-1200 (Part-8).

- 10.1 The item of work shall include removal of surface rust, straightening, cutting to lengths, hooked ends, cranking or bending (straight or spiral).
- 10.2 Authorized overlaps, chairs/separators shall be measured. Binding wire for reinforcement shall not be measured but shall be included in description of item. Measurement of reinforcement work conforms to IS 1200 (revision-8).

#### 11.0 Standards

Above work shall be carried out as per IS standards & code of practices. These shall be latest issue. Any discrepancies, conflict noticed shall be informed in writing to EIC for his direction & approval.

- a) IS- 456 - Plain & Reinforced concrete-Code of practice.
- b) IS- 226 - structural steel
- c) IS -961 - Specification for structural steel - High tensile steel bars.
- d) IS-2502 - Code of practice for bending & fixing of bars for concrete reinforcement.
- e) IS 2751 - Code of practice for welding of MS bars.
- f) IS-1599 - Method of Bend test.
- g) IS-1566 - Hard drawn steel wire fabric for concrete reinforcement.
- h) IS-5525 - Recommendation for detailing of reinforcement in RCC work.
- i) IS- 9417 - Recommendation for welding cold worked steel bars for reinforced concrete construction.
- j) IS-1200 - Method of measurement of building & civil work

### **WATERPROOFING**

#### 1.0 General

Various methods of waterproofing are in practice. The recommended specifications are described hereinafter. The contractor shall satisfy himself about adequacy, effectiveness, and effective service life of these methods. The Contractor shall give a specific bond on Rs. 100/- stamp paper for water tightness of the structure or building for a period of 7 years reckoned from date of handing over the building. The system to be adopted shall be got approved from EIC.

- 1.1 Manufacturers experience should not be less than five years manufacturing of membrane roofing.

- 1.2 Applicator shall be approved by manufacturer & having at least five projects experience.
- 1.3 Manufacture shall certify
- a) System design, penetration, transition & system specification are appropriate & satisfactory for this project.
  - b) Certify products proposed for use comply with standards.
  - c) Certify material ordered is compatible with each other suited for local & purpose intended.
  - d) Certify materials have express warranty of merchantability & fitness for particular purpose of this project.
- 1.4 Waterproofing Compound  
Waterproofing compound shall be cementious, non shrinking, self curing mixers.
- 2.0 Materials
- 2.1 Cement:  
Ordinary Portland cement grade 53/43 is used for waterproofing.
  - 2.2 Sand:  
  
Clean river sand should be used for waterproofing work .If silt is present sand should be washed before use. It confirms to IS 2386- 1963. (Part I) sea sand should not be used. Sand shall be stored in such away that it does not get mixed with mud, grass, vegetable & other foreign matter.
  - 2.3 Metal:  
  
Hard angular metal of size varying from 12mm to 20mm size is used for water proofing work & confirms to IS - 386- 1963 (Part I)
  - 2.4 Brick Bats:  
  
Brick bats should be well burent pieces of bricks having proper thickness. Underburent & overburent brick bats should not be used for waterproofing work. Brick bats shape like half brick or more should only be used. Very small pieces of brick should be rejected.
  - 2.5 Water  
  
Water used for mixing & curing shall be clean , clear, & free from objectionable quantities of silt, oils, alkalies, acid ,salts so as not to weaken mortar or concrete or cause efflorescence or attack the steel in RCC while curing.  
Water shall be tested in accordance with IS 3025. Maximum permissible limit of deleterious materials in water should be as given in IS 456.



- 2.6 Waterproofing Chemical:  
Waterproofing chemical or powder should be as per IS- 2645 & approved by EIC.
- 2.7 Shahabad Tile:  
25 mm to 40 mm thick rough Shahabad tiles of size 60 cm x 90 cm are used for box type waterproofing for basement & underground structure.
- 3.0 Preparation of surfaces
  - 3.1 The surface to receive the treatment shall be thoroughly cleaned of laitances, scales, loose material on surface.
  - 3.2 Surfaces shall be examined & well defined cracks grouted by making V groove, notches with cement slurry, shall be cured & dried well before treatment.
  - 3.3 Any honeycombs shall be carefully cut & plugged & cured well before treatment.
- 4.0 Waterproofing Methods
  - 4.1 Box Type Waterproofing Method Waterproofing for Basements and other underground structures
    - 4.1.1 The treatment shall start over the leveling course of 100 to 150mm thick plane cement concrete in the proportion 1:3:6 laid even with smooth surface finished with wooden float on well compacted rubble packing.
    - 4.1.2 Finishing the top by spreading 10 to 12 mm nominal size aggregate @ 8 cum/sqm thoroughly embedded in CM 1:5
    - 4.1.3 Next provide 20-25 mm thick approved rough Shahabad stone over 25 mm thick base of cement mortar (1:4) mixed with waterproofing compound confirming to IS 2645.
    - 4.1.4 Second layer of 12 to 18 mm thick cement mortar 1:3 mixed with waterproofing compound in recommended proportion.
    - 4.1.5 This surface shall be superimposed by RCC raft slab as per drawing. After completing waterproofing treatment on the floor, sockets & pipes shall be provided to release sub soil pressure. This pipe hole shall be grouted & plugged % after bottom raft slab is cast.
    - 4.1.6 After completion of the raft slab & sides of wall, the waterproofing layer is continued along the outer face of the wall up to 300 mm above ground.
    - 4.1.7 These vertical treatment shall consist of integral cement based treatment for waterproofing on vertical surface by fixing Shahabad stone with cement slurry mixed with waterproofing compound with gap of 20mm between stone slab & receiving surface & filling the gaps with neat cement slurry mixed with waterproofing compound & finishing the exterior of stone slab

with cement mortar (1:4) 20 mm thick with net cement punning at all levels as directed by EIC.

The average thickness of this treatment shall be about 75mm on the floor & 40mm on the walls.

4.1.9 After laying each layer surface shall be cured well.

#### 4.2 Brickbat Coba Waterproofing for sunken portion

4.2.1 Before waterproofing work is started, all cutting or chasing in the floor and/or walls and all the plumbing work shall be completed and the normal plaster to the ceiling and upper part of walls shall be provided.

4.2.2 First course of applying cement slurry @ 4.4 kg/sqm (@ ¾" thick) mixed with water proofing compound conforming to IS 2645 in recommended proportions, and embed aggregate of 15 mm to 20 mm nominal size by hand at random. Cure the treatment for 24 hours. .

4.2.3 Second course of 20 mm cement plaster 1:4 (1 cement: 4 coarse sand) mixed with water proofing compound in recommended proportion. The treatment shall be carried on the side of the sunken slab & side walls upto 600 mm above floor level. Thickness will be @ ½" above stone aggregate & ¾" on the side walls. Cure the treatment for 24 hrs.

4.2.4 Now the plumber shall finish all his plumbing work i.e. laying and fixing of pipes, Nahani traps, pans etc. without any further breaking or disturbing our treatment.

4.2.5 After plumbing work, fill in the depression (sunken portion) with brick-bat coba method (Brick-bat fixed in cement mortar) unto required level. (The treatment shall then be cured for at least 24hours).

4.2.6 Now provide waterproof plaster (C:M 1:4 mixed with water proof compound confirming to IS-2645 in recommended proportions) of about ½" above the brick bat layer, which shall be finished rough suitable to receive tiles to be laid by the owners.

#### 4.3 Brickbat Coba Waterproofing for Terraces, Chajjas, Canopies, Staircases, Gutters, etc.

4.3.1 This method is recommended for terraces and gutters. Water proofing treatment shall start directly over the RCC slab setting brickbats on a grout consisting of chemical and cement mortar to provide necessary gradient of 1 in 120 (1 inch in 10 feet) for the easy flow away of rainwater. The treatment shall consist of laying integral cement based water proofing treatment including preparation of surface as required for treatment of roofs, balconies, terraces, etc.

4.3.2 Applying and grouting a slurry coat of neat cement using 2.75 kg/sq.m of cement admixed with proprietary water proofing compound conforming to IS 2645 over the RCC slab including cleaning the surface before treatment.

4.3.3 Laying broken bricks / brick bats 25 mm to 100 mm size with 50% of cement mortar 1:5 (1 cement : 5 coarse sand) admixed with proprietary water

proofing compound conforming to IS : 2645 to required slope and treating similarly the adjoining walls up to 300 mm height including rounding of junctions of walls and slabs.

- 4.3.4 After two days of proper curing applying a top coat of cement slurry admixed with proprietary water proofing compound conforming to IS : 2645 with 20 mm thick jointless cement mortar of mix 1:4 (1 cement : 4 coarse sand) finished rough to receive china mosaic.
- 4.3.5 The whole terrace so finished shall be flooded with water for a minimum period of two weeks for curing and for final test. All above operations to be done in order and as directed and specified by the Engineer.
- 4.3.6 The average thickness of the above treatment shall be 120 mm and minimum thickness at water outlet shall be 65 mm
- 4.3.7. Due to the location of rainwater pipes being far apart and/ or due to the span being wider than 6 meters and if the water is required to travel on one side only, then the thickness of the treatment shall increase proportionately to maintain the minimum gradient for the easy flow away of rainwater.

#### 4.4 Crystalline Waterproofing System

- 4.4.1 Crystalline waterproofing compound one or more coats shall be applied to water retaining structure.
- 4.4.2 Before start Applying clean the surface removing dust, loose particles & laitance.
- 4.4.3 Apply crystalline waterproofing compound one or two coat at specified intervals as recommended by the manufacture on concrete or plastered surface.
- 4.4.4 Protect horizontal surface with 30 mm thick IPS 1:2:4 laid to gradient, with waterproofing compound 2% by weight of cement & vertical surface shall be plastered with cement sand mortar in the ratio 1:4 with using 2% waterproofing compound by weight of cement.
- 4.4.5 Curing shall be done at least 7 days.
- 4.4.6 Treatment shall be tested by ponding water about 250mm high for 72 hours. Surface shall be examined for leakage, seepage, dampness etc.

#### 4.5 Membrane Waterproofing

This type of waterproofing carries out by various experienced waterproofing specialists.

- 4.5.1 Terrace & roof slab shall be treated with integral cement based waterproofing consisting of light weight perlite concrete laid to slope. The treatment shall be taken over vertical surfaces as required, specified. Final finished surfaces may be laid with paving tiles, stones or finished smooth in cement & marked with false chequered marking.
- 4.5.2 3.2 mm thick APP polymer modified polyester reinforced torch on membrane of Texsa Ltd or equivalent approved is laid over light weight concrete.

- 4.5.3 Workmanship & process treatment shall be followed by manufacturers direction & instruction given in manual.
- 5.0 Testing
- 5.1 The work shall be tested for a period for minimum 72 hours and diligently rectified if leakages are detected.
  - 5.2 Terraces: Impound 10 - 15 cm of water for 72 hours and check underside.
  - 5.3 Under ground water tanks: No back filling is to be done outside perimeter. Tank to be completely filled with water and check water levels and physical inspection on the exterior side.
  - 5.4 Basements: No back filling is to be done along the outside perimeter till the treatment is completed. After the treatment is completed carryout the filling in 30 cm layers. Each layer shall be saturated with water. After completion of filing the peripheral portion shall be maintained in saturated condition for 72 hours and the inside inspected for water tightness.
  - 5.5 Contractor may note that above testing and acceptance thereof by the Engineer does not relieve the contractors from his responsibility to ensure water tightness for the said period of 10 years.
  - 5.6 All arrangement of material, labour etc. required including preserving & maintaining areas flooded shall be carried out by the contractor at his cost under the item of waterproofing.
- 6.0 Security Deposit towards Water Proofing
- 6.1 Should the Project Engineer at any time during/constructions or reconstruction's or prior to the expiration of a period of ten years after the certified date of completion of buildings or group of buildings find that the building shown leakage dampness or any sign of defective water proofing treatment the contractor shall on demand in writing from the Project Engineer specifying the building complained of not withstanding the fact that the same may have been inadvertently passed certified and paid for forthwith under take to carry out such treatment as may be necessary to render the said buildings water proof at his own expense for a period of ten years from the certified date of completion of said buildings and in the event of his failing to do so within a period to be specified by the Project Engineer, in his demand as aforesaid the Project Engineer may undertake such treatment at his risk and expense in all respects of the contractor, the liability of the contractor under the condition shall not extend beyond the period of 10 years from the certified date of completion unless the Project Engineer had previously given the notice to the contractor.
  - 6.2 A sum equal to 0.10 % (zero point one percent) of quoted lump sum against Schedule. 'A' shall be retained from the contractor's final bill amount as security deposit for the water proofing treatment and the same shall be released after satisfactory completion of guarantee period as stated above. The contractor may alternatively submit fixed deposit receipt for the said

sum from a scheduled Bank in lieu of the sum to be returned out of the final bill.

- 6.3 The security deposit referred here-in-before may be refunded to the contractor after expiry of the period of 10 years from the certified date of completion by the Project Engineer provided always that the contractor shall first have been paid the final bill and have rendered no demand certificate.
- 6.4 Materials required for waterproofing shall be purchased by the contractor from the manufacturer's or their authorized agent only and brought to site. Name of authorized agent shall be verified from the manufacturer by the Project Engineer before approval only ISI approved material shall be approved for use.

7.0 Measurement

Waterproofing work shall be measured in square meter otherwise specified other.

8.0 Standards

Above work shall be carried out as per IS standards & code of practices. These shall be latest issue. Any discrepancies, conflict noticed shall be informed in writing to EIC for his direction & approval.

- a) IS-8112 Specification for 43 grade ordinary Portland cement.
- b) IS-12269 Specification for 53 grade ordinary Portland cement.
- c) IS-383- Specification for coarse & fine aggregate from natural sources.
- d) IS-2645 Specification for integral cement waterproofing compound.
- e) IS-6494 Code of practice for water proofing of underground reservoirs & swimming pool.
- f) IS-702 Specification for industrial bitumen.
- g) IS-3384 Specification for bitumen primer for use in waterproofing & damp-proofing.
- h) IS-13826 Method of test.
- i) IS-3495 Method of test for Burnt clay building bricks.
- j) IS-456 Plane & reinforced concrete-Code of practice.

DAMP PROOF COURSE:

1.0 General

Damp proof course shall consist of a layer of cement concrete or cement mortar of the proportions and thickness as indicated. In the case of solid walls, piers etc. the DPC shall run the full width of walls just below it. Damp proof course shall run without a break throughout the length of wall. even under door or other opening.

1.1 Material

DPC of cement concrete should have a mix of 1:2:4 or 1:11/2:3 & thickness is 25mm to 40mm. Cement ,sand & metal used for this is as per

1.2 Surface preparation & laying

The surface of masonry on which the damp proof course is to be laid shall be leveled flushed up with mortar and properly prepared. Cement concrete and cement mortar shall be. Where indicated, admixed with integral water proofing compound in the specified proportion as per the manufacturers' instructions. Cement concrete or cement mortar on laying, shall be thoroughly compacted to dense impervious mass and cured for at least seven days. The upper surface and sides which are not exposed shall be finished fair and even and exposed surfaces finished fair and smooth and flush with the masonry surface unless otherwise indicated.

A sandwich layer of polythene film in the damp proof course shall be provided, where indicated. Bitumen primer shall be applied to the prepared surface at 0.3 to 0.5 Kg per sq.m by brushing till the surface is properly impregnated and allowed to dry for 6 to 12 hours or till the solvent oil in the primer evaporates completely. The polythene film shall then be carefully laid on the primed surface and firmly but carefully pressed down with the help of gunny cloth so as to prevent any damage to the film. The next length shall be similarly laid down with proper end overlap and firmly pressed. The overlaps shall be carefully sealed with hot bitumen applied over the upper surface of lower layer of polythene film. Over stretching of the film at the time of laying shall be avoided.

The laying of the film shall be immediately followed by subsequent treatment. If the film is left exposed it may cause wrinkles in the film which may possibly lead to damage. Where polythene film is to be carried over from horizontal to vertical surface it shall be over a fillet and properly protected:

Bitumen coat on DPC, where indicated, shall be of blown type bitumen of the required grade complying with IS 702-1988, Specification for industrial bitumen. The bitumen shall be a temperature slightly higher than the softening point to make it workable. The concrete/mortar surface shall be thoroughly cleaned and mopped dry before applying bitumen. The bitumen shall be applied at the rate of 1.50 Kg per square meter, to a uniform thickness and the surface shall be blinded with clean dry sand at the rate of 0.05 cubic meter per square meter.

D.P.C shall be kept wetted for at least 7 days.

1.3 Measurement:

D.P.C in concrete shall be described & measured in Sqm stating thickness. Form work, fair finish to edges, leveling, preparation of bed to receive damp proof course shall be included in the item.

1.2 Standards

- a) IS- 456                      Plane & reinforced concrete -code of practice
- b) IS-515                      Specification for natural & manufactured aggregate from natural source.
- c) IS-8112                      Specification for 43 grade ordinary Portland cement

- |             |   |
|-------------|---|
| d) IS-12269 | Specification for 53 grade ordinary Portland cement |
| e) IS-1791  | Batch type concrete concrete mix                    |
| f) IS-702   | Specification of industrial bitumen.                |
| g) IS-9103  | Specification of admixture for concrete.            |

#### MASONARY WORK:

##### Brick Masonry:

- 1.0 General
- 1.1 Bricks used for brick masonry shall be sound, hard, well burnt, uniform in size, shape & colour, homogenous in texture, giving metallic ringing sound ,free from flaws, crack, holes, lumps or girt, straight & sharply defined.
- 1.2 Samples shall be tested for its strength, moisture content, dimensional tolerance, prior to approval.
- 1.3 Bricks of approved quality & quantity shall have to be procured by the contractor at the desired time. No delay or extra cost due to non availability shall be accepted. It shall be contractor's responsibility to procure sufficient quantity of brick & stack them at site or elsewhere to avoid delays.
- 1.4 At the time of brickwork layout or first course of brickwork should be laid in rich cement concrete.
- 1.5 At the joint of masonry & concrete insert 20mm coarse aggregate to minimize cracks due to different properties.
- 1.6 Brick work should be in plumb, line, level & room sizes shall be as given in drawing & rooms in diagonal.
- 2.0 Material
- 2.1 Brick:
  - 2.1.1 Brick shall be first class & confirms to standard specification, regular in shape & size with sharp edges & corners. Frog of the brick should not be less than 1cm & greater than 2cm. Bricks should give clear metallic ringing sound & water absorption should not be more than 20 % by weight. Bricks shall have an average com. Strength of not less than 35 Kg/cm<sup>2</sup>. brick for size & shape confirms to IS-1077-1986 & for all physical requirement confirms to IS- 3495 ( Part-2) 1992.
  - 2.1.2 Cement:  
Cement for brick work shall be fresh ordinary Portland cement & as per
- 2.2 Sand:
 

Sand for masonry mortar shall be natural sand, crushed stone sand or crushed gravel sand or combination of any of these confirming to IS 2116-1980 Sand shall be hard durable medium coarse sand, clean sharp & free from clay.

For screening of sand use screen (Jali), for 230 mm brick - 6 hole per square centimeter, for 150mm & 115mm thick brick work -8 hole per square centimeter.

### 2.3 Water:

Water used for brick work clean & free from injurious amount of deleterious material. Potable water are generally considered satisfactory for use in masonry mortar.

### 2.4 Mortar:

2.4.1 The brick work shall be done with specified mortar (cement or lime) mixing the ingredients in the specified proportion. For 230mm thick brick work use 1:6 & for 150mm & 115mm thick brick work use 1:4.

2.4.2 Mixing shall be done preferably in a mechanical mixer. If done by hand mixing operation shall be carried out clean water tight platform. Cement and sand shall be mixed dry in the required proportion to obtain a uniform Consistency. The required quantity of water shall then be added and the mortar hold back and forth for 5 to 10 minutes with addition' of water to a workable consistency. In the case of mechanical mixing, the mortar shall be mixed for at least 3 Mni. After addition of water. Cement mortar shall be freshly mixed for immediate use. Any mortar which has commenced to set shall be discarded and removed from the site.

2.4.3 Mortar with cement shall be used as early as possible after mixing, preferably from half an hour from the time water is added to mix or at the latest within one hour of its mixing.

### 2.5 Scaffolding:

2.5.1 Scaffolding shall be strong to withstand all dead, live and impact loads which are likely to come on them. Scaffolding shall be provided to allow easy approach to every part of the work, overhand work shall not be allowed.

2.5.2 It is not advisable to use bamboos for internal scaffolding. M.S scaffolding chair (M.S Ghodi) should be used for internal scaffolding.

2.5.3 Timber or bamboo scaffolds shall be erected in accordance with the provisions contained in IS 3696 (Part 1)-1987. Safety code for scaffolds and ladders, Part I-Scaffolds, to ensure safety of workmen and others. Steel scaffolding shall be erected in accordance with the provisions contained in IS 2750-1964, Specifications for steel scaffolding and relevant provisions of IS 3696 (Part 1)-1987.

2.5.4 For exposed brick facing double scaffolding having two sets of vertical supports shall be provided.

### 3.0 Soaking of Bricks:

3.1 Bricks shall be soaked in water before use for a period for the water to just penetrate the whole depth of the bricks. Alternatively bricks may be



adequately soaked in stacks by profusely spraying with clean water at regular intervals for a period not less than six hours.

- 3.2 The bricks required for masonry work using mud mortar shall not be soaked. When bricks are soaked, they shall be removed from the tank sufficiently early so that the time of laying they are skin-dry. Such soaked bricks shall be stacked on a clean place, where they are not again spoiled by dirt, earth, etc.

#### 6.0 Laying Of Brick:

- 4.1 All loose materials, dirt and set lumps of mortar which may be lying over the surface on which brickwork is to be freshly started, shall be removed with a wire brush and surface weeded slightly. Bricks shall be laid on a full bed of mortar.

- 4.2 When laying, the bricks shall be properly bedded and slightly pressed with handle of trowel so that the mortar can get into all the pores of the brick surface to ensure proper adhesion.

- 4.3 All the joints shall be properly flushed and packed with mortar so that no hollow spaces are left. Care shall be taken to see that the required quantity of water is added to the mortar at the mixing platform to obtain required consistency. Addition of water during laying of the course shall not be permitted. In the case of walls two brick thick and over, the joints shall be grouted at every course in addition to bedding and flushing with mortar.

- 4.4 Bricks shall be laid with frog up. However, when the top course is exposed, bricks shall be laid with frog down, and care shall be taken to fill the frogs with mortar before embedding the bricks in position.

- 4.5 For half brick work cement concrete band (m25, 8mm dia 2-bottom, 2 top, Stirrups 8 mm dia @300mm c/c.) provided at every 3' ht.

#### 5.0 Bond:

All brickwork shall be built in English Bond, unless otherwise indicated. Half brick walls shall be built in stretcher bond. Header bond shall be used for walls curved on plan for better alignment. Header bond shall also be used in foundation footings, stretchers may be used when the thickness of wall renders use of headers impracticable. Where the thickness of footings is uniform for a number of courses, the top course of the footings shall be of headers.

#### 6.0 Striking of Joint:

Where no pointing, plastering or other finish is indicated, the green mortar shall be neatly struck flush. Where pointing, plastering or other finish is indicated, the joints shall be squarely raked out to a depth not less than 10 mm for plastering and 15 mm for pointing.

#### 7.0 Cleaning:

Face of brickwork shall be cleaned on the same day it is laid and all mortar droppings removed.

8.0 Curing:

The brickwork shall be constantly kept wet for at least seven days, except in the case of brickwork with mud mortar for which no such curing shall be done. In the case of the lime mortar, curing shall commence two days after the laying of masonry and shall continue for seven days.

9.0 Measurement:

9.1 Brick work shall generally measure in cubic meters, unless other wise stated.

Walls one brick thick & less shall be measured in square meter stating thickness.

9.2 Dimension shall be measured to the nearest 0.01m.  
Areas shall be worked out to the nearest 0.01m<sup>2</sup>  
Cubic content shall be worked out to the nearest 0.0m<sup>3</sup>

9.3 Measurement shall confirm to IS- 1200 (Part III) 1976.  
The item of brick work shall be deemed to include the following

- 1) Raking out joints for plastering or for pointing
- 2) Preparing tops of existing wall & the like for raising.
- 3) Rough cutting & waste for forming gables, cores of arches, splays at eaves & the like & all rough cutting in the body of brickwork, unless otherwise specified.
- 4) Plumbing to angles.
- 5) Forming reveals to jambs where fair cutting on exposed face is not involved.
- 6) Leaving holes for pipes etc.
- 7) Building in holdfast, air bricks, fixing bricks etc.
- 8) Forming opening & flues for which no deduction is made.
- 9) Leaving chases of section not exceeding 50 cm in girth.

No deduction or addition shall be made on any account for the following.

- a. Ends of dissimilar materials up to 0.1 m<sup>2</sup> in section.
- b. Opening up to 0.1 m<sup>2</sup> in area.
- c. wall plates ,bed plates,& bearing of slab, chajjas & the like where thickness does not exceed 10 cm & bearing does not extend over full thickness of wall.
- d. Iron fixtures such as wall ties, pipes up to 300mm dia & hold fast for door & windows.

10.0 Standards

Above work shall be carried out as per IS standards & code of practices. These shall be latest issue. Any discrepancies, conflict noticed shall be informed in writing to EIC for his direction & approval.

- a) IS-8112 Specification for 43 grade ordinary Portland cement
- b) IS-12269 Specification for 53 grade ordinary Portland cement
- c) IS-269 Specification for 33 grade opc
- d) IS-1077 Specification for common burnt clay building brick.
- e) IS-2116 Specification for sand for masonry mortar
- f) IS- 2212 Code of practice for brick work

- g) IS-2250 Code of practice for preparation & use of masonry mortar  
 h) IS- 3495 Method of test for burnt clay building brick.

### UNCOARSE RUBBLE MASONRY:

#### 1.0 General

This type of masonry is constructed of stones as they come from approved quarries. Uncoarsed rubble masonry conforms to IS-1597(Part-I)

#### 2.0 Mortar:

Mortar used for UCR masonry shall be of cement mortar & in the Proportion 1:6 or specified other. Cement, Fine aggregate, water as per

#### 3.0 Dressing

Stones shall be hammer dressed on the face, the sides and the beds to enable to come in proximity with the neighboring stones. The bushes on the face i.e. maximum depression from a straight edge held against the dressed surface shall be more than 40 mm on an exposed face and 20 mm on faces to be rendered.

#### 4.0 Lying:-

Every stone shall be carefully fitted to the adjacent stone so as to form neat and close joint. Face stone shall extend bond well in the back. These shall be arranged to break joints, as much as possible and to avoid long vertical lines of joints. Thickness of joints shall not exceed 25 mm. Walls shall be levelled up at top of plinths, cill and lintel level openings, floor and roof levels and at top with minimum amount of chips and spalls.

#### 5.0 Hearting Stones:-

The hearting or interior filling of a wall face shall consist of rubble stones not less than 15 cm in any direction, carefully laid, hammered down with a wooden mallet into position and solidly bedded in mortar. The hearting shall be laid n level with facing and backing.

#### 6.0 Insertion of Chips:-

Chips and spalls of stone shall be used wherever necessary to avoid thick mortar beds or joints and it shall be ensured that no hollow spaces arc left anywhere in the masonry. Chips shall not be used below hearting stones to bring upto the level of face stones. The use of chips and spalls shall be restricted to the filling of interstices between adjacent stones in hearting and these shall not exceed 20 percent of the quantity of stone masonry. Spalls and pinnings may show on face.

#### 7.0 Bond Stones:-

Through bond stones shall be provided in walls up to 60 cm thick. In the case of walls above 60 cm thickness. Stones of the full thickness of wall or a set of two or more bond stones overlapping each other by at least 15 cm be provided in a line from face to back. Bond stones shall not be less than 2 per sq.m. of face and staggered. No stone shall tail into a point. The bond stone shall be marked by a distinguishing letter for subsequent verification.

#### 8.0 Quoin & Jamb Stones:-

The quoin and jamb stones shall be selected stones, hammer dressed. Quoin stone shall not be less than 0.01 cu. volume. Height of quoins and jamb stones shall not be less than 15 cm. Quoin shall be laid header and stretcher alternately. Face beds and joints, where indicated shall be chisel dressed on beds and joints 5 cm and 2.5 cm respectively in case of granite or trap stone and 8 cm and 4 cm respectively in case of other stones, so that no portion of the dr surface shall have a depression more than 6 mm from a straight edge held against the dressed surface.

Plum Stones: Vertical plums projecting about 15 to 20 cm in the courses above shall be provided at about 90 cm intervals in I beds. They shall be firmly embedded.

#### 9.0 Random Rubble Masonry Brought to Course:

All requirements are the same as for random rubble masonry uncoursed, except that work in addition, shall be level to courses at intervals varying from 30 to 60 cm in height.

#### 10.0 Measurement:

Except where otherwise stated, stone masonry generally shall be measured in cubic meter & face work in square meters. Measurement of this should conform to IS-1200 (Part V)-1976.

#### PLASTERING WORK:

##### 1.0 General:

Plastering work scope shall include preparing surfaces, applying plaster, providing reinforcements such as beds, chicken mesh, scaffolding, curing, to correct line, level & plumb with acceptable tolerance.

Work shall include required material & at all locations with required leads, lift & height. Work may be in single coat or multiple coat as specified in schedule 'B'. Finishing of grooves, jams, ills, pattas, drip mould etc. shall be part of work.

##### 2.0 Material

###### 2.1 Cement:

Cement shall be ordinary Portland cement 53 or 43 grade confirming to IS-12269 & IS- 8112.

###### 2.2 Water

Water used for mixing & curing shall be clean, free from objectionable qualities of silts, oils, alkalis, acids so as not weaken mortar & confirms to IS-456.

2.3 Sand:

Unless otherwise indicated, sand for plastering and pointing shall conform to IS 1542-1977, Specification for sand for plaster. The sand shall consist of natural sand, except where crushed stone sand or crushed gravel sand or a combination of any of these are indicated. The sand shall be hard, durable, clean and free from adherent coating and organic matter and shall not contain any appreciable amount of clay balls. Sand shall be obtained from approved sources.

2.4 Aggregate:

All aggregates other than sand shall conform to IS 383-1970, Specification for coarse and fine aggregates from sources for concrete.

2.5 Integral Waterproofing compound:

Integral waterproofing compound shall confirm to IS- 2645.

2.6 Fibrous Material:

Certain natural fibers such as flax, sisal, manila, jute hemp, & coconut fibers may be used for incorporation in the mortar & shall be approved by EIC.

2.7 Lime Putty (Neeru):

Lime putty shall be obtained by slaking fat lime with fresh water & sifting it. Putty shall be kept moist until used & quantity at a time shall not be more than that can be consumed in 7 days.

2.8 Gypsum:

It is a ready made proprietary dry gypsum plaster mix available. No. of brand available in market, but choice of brand shall be approved by EIC. Gypsum used for given work shall confirm to IS-2547 (Part I & II) regarding its properties & strength.

2.9 GI Chicken mesh:

Chicken mesh of 20 gauges with opening of 25x25 mm hot dipped galvanized shall be provided over junction of two dissimilar material about 150 mm wide as directed by EIC.

2.10 Scaffolding:

Independent scaffolding shall be used to obviate the subsequent restoration of masonry in put log & other breaks in the work. Stage scaffolding shall be provided for ceiling plaster. Scaffolding should be rigid, allowing free & safe movement on the platform & it should be at sufficient distance or height from working areas. Before start the work scaffolding shall be approved by

EIC. In no case contractor allow to make hole in brick masonry for fixing bamboo.

Timber or bamboo scaffolds shall be erected in accordance with the provisions contained in IS 3696 (Part 1)-1987. Safety code for scaffolds and ladders, Part I-Scaffolds, to ensure safety of workmen and others. Steel scaffolding shall be erected in accordance with the provisions contained in IS 2750-1964, Specifications for steel scaffolding and relevant provisions of IS 3696 (Part 1)-1987.

3.0 Workmanship:

3.1 Mortar:

Mortar shall be specified by proportion only & not by strength. Volumetric mixing shall be based on dry volume of each ingredient. For convenience, measurement shall correspond to volume of one cement bag i.e.0.035 cum. Boxes shall be of sizes 40x35x25 cm. These shall be marked as mortar mixing boxes by red paint & shall be used through out the contract. Mechanical mixing proportion shall be done with the use of the boxes.

3.2 Cement Mortar:

Cement mortar shall be prepared by mixing cement & sand in specified proportion given in schedule 'A'. Sand shall be added suitably to allow for bulkage if required. Bulkage shall be determined as specified in IS-2386 (Part III). Cement & sand added to mixer shall be thoroughly mixed & water shall be added to it gradually. The mortar mixed shall be consumed within 30 minutes of mixing.

3.3 Preparation of surfaces:

3.3.1 All dirt, dust and other foreign matter on masonry and laitance on the concrete surfaces shall removed by watering and brushing as required. If the background contains soluble salts, particularly sulphates, the application of plaster shall be done only after the efflorescence of the salts is complete and the efflorescence is completely removed from the surface. In case of old work crumbled and damaged parts shall be cut out and patched. Any trace of algae or moss formation shall be removed.

3.3.2 Joints in brickwork, stone masonry and hollow block masonry shall be raked out to a depth of not less than 10 mm as the work proceeds. Local projections in brickwork and masonry beyond the general wall face shall be trimmed off where necessary.

3.3.3 Smooth surfaces of in-situ concrete walls and ceilings etc. shall be roughened by wire brushing, if it is not hard; and by hacking or bush hammering if it is hard, to provide for proper adhesion. Projecting burrs of mortar because of gaps at joints in shuttering shall be removed. The surface shall be scrubbed clean with wire brushes. In addition concrete surface shall be pock marked with a pointed tool at spacing of about 50 mm, the pocks made to be not less than 3 mm deep.

- 3.3.4 Fix the chicken mesh on joint of RCC & masonry wall, by plumbing nail on RCC wall & wire nails on masonry wall.
- 3.4 Commencement of plaster:
- Plastering work shall not be started until all necessary fixtures such as door & windows frame, mantel pieces are completed and all pipes & conduits embedded have been installed & surfaces to be plastered have been passed by EIC.
- 4.0 Protection:
- All existing work & fitting that are likely to be damaged in the application of plastering work shall be protected. Care shall be taken to avoid as far as possible, the splashing of mortar on to the finished surfaces such as joinery, painting & glazing, all such splashes shall be cleaned immediately by the contractor.
- 5.0 Application of plaster:
- 5.1 At the time of plastering work, plaster mason should have Mortar pans, Spade, Trowel, Water level tube, wooden float, Batten for making grooves, Aluminum hollow box section 6" length, right angle, measuring tape, nylon string, plumb bob, etc.
- 5.2 Walls should be sufficiently damp prior to plastering. Water from plastering mortar must not be absorbed by masonry under any condition.
- 5.3 Plastering shall be done from top to bottom & care shall be taken to avoid joints in continuous surface.
- 5.4 Screeds 15cmx15cm shall be done horizontally & vertically not more than 2m apart to serve as guides in bringing the work to an even surface.
- 5.5 Corners, external or internal shall be finished along with final coat. It is advisable to have rounded corners.
- 5.6 Plaster shall be cut to correct horizontal or vertical line at the end of the day or if work requires to be suspended for any reason.
- 5.7 Cement Plaster shall be cured for 14 days.
- 6.0 12mm thick internal plaster:
- Single coat cement-sand plaster with cement-sand mix in proportion of 1:4 shall be carried out over the entire area specified by EIC. This shall be finished just with the wooden float to give the best smooth surface possible. This may be for internal or external areas. Thickness may vary from 10 to 15mm or specified in Schedule 'A'.
- 7.0 Cement finished plaster:
- This shall be carried out in the same manner as 12 mm thick internal plaster for specified thickness in a single or double coat. Then it shall be finished uniformly over the entire area with a paste of neat cement when plaster has just hardened and finished smooth with a steel trowel. Quantity of cement applied shall be about 1kg/sqm.
- 8.0 12 mm thick single coat plaster to Ducts/Boxes:

This is the same as but using approved integrated waterproofing compound by 2% weight of cement or specified by manufacturer.

4.0 20 mm thick sand faced plaster:

This is same as for 12 mm thick single coat plaster except that this shall be carried out in two coats. First coat as a under coat in 1:4 proportion not less than 10mm thickness has been applied & finished, the final coat of cement & sand mortar in the proportion 1:3 shall be applied to the thickness not less than 5mm & brought to an even surface with a wooden float. The surface then shall be tapped gently with wooden float lined with cork to retain course surface texture, care being taken that tapping is even & uniform.

10.0 Rough Cast Finish Plaster:

After applying the under coat of cement and sand mortar 1:3 not less than 10 mm thick and while it is still in plastic state the roughcast mixture consisting of crushed stone or fine gravel aggregate (which is generally of size between 6 to 12 mm depending on the texture required) mixed with coarse sand and cement in the ratio of 1: 1: 1 shall be applied and finished even. The mix of cement and sand shall be made slightly wetter than normal for rendering to ensure that larger aggregates are thoroughly covered.

11.0 Neeru Finish:

After applying & finishing the under coats & before they set the finishing coat of specially prepared lime putty about 1.5 mm thick shall be applied. It shall be polished with a trowel.

12.0 Gypsum Plaster:

Average 12mm thick gypsum plaster shall be applied directly to masonry, concrete surface.

If it used for finishing coat, apply 6 to 8 mm thick on under cement sand coat. For ceiling its average thickness shall be 6 to 8 mm.

Dry mix plaster received shall be mixed with water in proportion 4:3 or specified as EIC.No other product shall be added to the mix.

Plaster application shall be normal taking spot at every 1.0 m over the walls care shall be taken that minimum thickness is 5mm. Plaster shall be applied & leveled with 3m straight edge of aluminum.

13.0 Measurement:

13.1 All plastering work shall be measured in square meter, unless otherwise specified.

Cutting to edges shall be measured separately in running meter or alternatively described & included in the item.

All plastering measurement shall confirm to IS- 1200 (part XII)-1976.

13.2 Dimension shall be measured to the nearest 0.01m & areas shall be worked out to the nearest 0.01m<sup>2</sup>

13.3 Plastering on roof, ceilings, & walls shall be measured separately.



- 13.4 Plastering in isolated width or in widths not forming part of general plastering work ( as in bands , cornices ,sunk, panel etc) and in chamfers ,rounded angles exceeding 80mm girth shall be measured as below  
a) 30 cm or below in width/girth in running metres &  
b) Width/ girth above 30 cm in Sqm.
- 13.5 Plastering at a height greater than 10m above ground/datum level shall be measured separately in stages of 5m height except interior plastering in case of building which shall be measured separately for each storey.
- 13.6 Ceiling shall be measured between walls or partition & dimension before plastering shall be taken. Width covered by cornices or coves if any shall be deducted.
- 13.7 Measurement of wall plastering shall be taken between walls or partition for length & from top of floor or skirting to ceiling for height. Depth of cornices or coves if any shall be deducted.
- 13.8 Sides of pilasters, projection etc shall be added to plaster on walls.
- 13.9 No deduction shall be made for ends of joist, beams, post etc & opening not exceeding 0.5 m2 each & no addition shall be made for reveals, jambs, soffits  
Etc of these opening nor for finish to plaster around ends of joists, posts etc.
- 13.10 Deduction for openings exceeding 0.5m2 but not exceeding 3m2 each shall be made for reveals ,jambs,soffits,sills etc of these opening :

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

b) When two faces of wall plastered with different types of plaster or if one face is plastered & other pointed, deduction shall be made from the plaster or pointing on the side on which width of reveals is less than that on the other side but no deduction shall be made on other side. Where width of reveals on both faces of wall are equal, deduction of 50% area of opening on each face shall be made from areas of plaster and /or pointing as the case may be.

c) When only one face is plastered & other face is not , full deduction shall be made from plaster if width of reveals on plastered side is less than that of un plastered side but if width of reveals on both side are equal or width of reveals on plastered side is more , no deduction shall be made.

d) When width of door frame is equal to thickness of wall or is projecting beyond thickness of wall , full deduction for opening shall be made from each plastered face of wall.

#### 14.0

##### Standards

Above work shall be carried out as per IS standards & code of practices. These shall be latest issue. Any discrepancies, conflict noticed shall be informed in writing to EIC for his direction & approval.

- a) IS-8112 Specification for 43 grade ordinary Portland cement  
b) IS-12269 Specification for 53 grade ordinary Portland cement  
c) IS- 383 Specification for coarse & fine aggregate form natural source.

- |            |  |
|------------|--|
| d) IS-1542 | Specification for sand for plaster   |
| e) IS-1661 | Code of practice for application of cement & cement lime plaster finishes. |
| f) IS-2402 | Code of practice for external rendered finishes.                           |
| g) IS-2645 | specification for integral cement waterproofing compound                   |
| h) IS-456  | Plain & reinforced cement concrete-code of practice.                       |
| i) IS-1200 | Method of measurement of building & civil work.                            |

#### POINTING:

The type and mix of mortar for pointing and the type of pointing shall be as indicated in schedule 'A' or specified by EIC.  
Mortar used for pointing shall be as per IS standard.

#### 1.0 Ranking out Joints:-

Joints of new brick work or block or stone masonry shall be raked out (without damaging the brick work or m when the mortar is green to such a depth that the minimum depth of new mortar measured from either the sunk surface finished pointing or from the edge of the brick/block shall not be less than 10 mm. The raked out joints shall well wetted before application of mortar.

#### 2.0 Application of Mortar and Finishing:

The mortar shall be pressed firmly into the raked out joints, with a pointing trowel according to the type of required. The mortar shall not spread over the corners, edges or the surface of the masonry. When pointing is air it shall be rubbed smooth with the trowel and shall then be finished with proper tool. The surface of masonry shall clean of all mortar.

#### 3.0 Pointing on Random Rubble Stone Masonry:

The pointing shall follow the natural irregularities in line and surface of stones.

#### 3.1 Flush Pointing:-

The mortar shall be pressed into the joints and shall be finished off flush and level with the edges of the bricks, blocks or stones so as to give a smooth appearance. The edges shall be neatly, timed with a trowel and straight

#### 3.2 Struck Pointing (Weather-Struck pointing

The mortar shall first be pressed into the raked out joints. The top of the horizontal joints shall be neatly pressed about 3 mm or as directed by EIC with the pointing tool so that the joint is sloping from top to bottom. The v joints shall be pressed back to form a semi-circular or V-groove of the same width as the horizontal joints.

3.3 Raised Pointing:-

Raised pointing shall project from the wall facing with its edges cut parallel so as to have a uniformly raised band about 6 mm in depth. The pointing shall be finished to a smooth but hard surface.

3.4 Recessed Pointing (Sunk Pointing) :-

The mortar shall be neatly pressed back to about 3 mm or as directed with the pointing tool. The vertical joints shall be pressed back similarly to match the horizontal joints.

4.0 Curing:-

The pointing shall be kept wet for seven days. During this period it shall be suitably protected from all damages.

5.0 Measurement:

Pointing shall be measured in square meter. Proportions of the materials, type of pointing shall be described fully & measurement confirms to IS-1200 (part-XII) -1976.

WOOD WORK (Door Frame):-

1.0 General

All members of the timber frames shall be straight without any warp or bow and shall be exactly at right angles, which shall be checked from the inside surfaces of the respective members. Frames shall have smooth, well planed surfaces except the surfaces touching the walls, lintels; cills etc. which may be left clean sawn, unless it is required for straightening up or to obtain the overall sizes. Rebates, rounding's and molding etc. shall be done before the members are jointed into frames.

1.1 Timber frames shall have dovetail joints. The jamb post shall be through tenoned into the mortices of the transom to full width and the thickness of the tenon shall be not less than 15 Mm. The tenons shall be closely fitted into the mortices without any wedging or filling and shall be pinned with hard wood or bamboo dowels not less than 10 mm dia. The depth of rebate in the frames for housing the shutters shall be 15 mm. The joints before being put together shall be glued with a synthetic adhesive conforming to IS 851-1978 or to IS 4835-1979 or animal glue conforming to IS 852-1969.

2.0 Material:

Timber shall be as per specified in schedule 'A' otherwise it shall be teak, Sal, deodar. Timber shall be well seasoned, dry, and free from soap, knots, cracks or any other defects.

All door frames shall be clamped together so as to be square and flat before being built in. Each assembled door frame shall be fitted with temporary cross battens.

The faces of frame abutting the wall. lintel, cill etc shall be given two coats of hot tar before fixing, unless otherwise indicated.

### 3.0 Fixing of Door frame:-

Frames of door shall be installed by 'built in method' unless indicated to be installed by 'prepared opening method' or as per direction of EIC. Precautions shall be taken to fix the door frames so as to take care of the final floor level and whether the shutters open inside or outside.

#### 3.1 Built In Method:-

Masonry or concrete in the wall shall be built after installation of the frames so that the holdfasts and pins, if any, at the bottom are well anchored into them. Suitable arrangement shall be made to hold the frame in rectangular shape and to prevent warping and distortion of frames during construction. Usually one cross batten at the middle, one cross batten at the bottom (where no sill is provided for door) and two cross battens diagonally will be necessary to hold the frame rectangular.

#### 3.2 Prepared Opening Method:-

The clearance between the frame and opening shall be kept depending on whether the opening is externally rendered or fair faced. The frame shall be checked before fixing in position that the same is square and in the proper position. The holdfast openings and the bottom pins shall then be grouted or frames fixed as indicated. Plastering of the sides shall be done and allowed to dry before the shutters are fixed.

#### 4.0 Measurement:

Wood work shall be measured in cubic meter as per IS-1200 (part XXI) or as per mentioned in schedule 'A'.

## FLOORING WORK

### General

1.1 Flooring work should comply with standard specified for material & workmanship.

1.2 The contractor shall submit manufacturers each product data sheet covering technical literature & test certificates of independent laboratories.

1.3 Tiles manufacturer shall confirm that material is as per specification & within acceptable tolerances. Tiles shall be of one production run, of consistent quality, appearance & physical properties.

1.4 Stone received shall be from approved quarries & of approved lot.

1.5 Contractor shall prepare shop drawings for layout based on architectural concept drawing & this includes

- a) Detail plan with material & size of each element.
- b) Details of expansion, contraction, & joint width
- c) Method of fixing & laying.

- 1.6 Before purchase the order contractor should submit sample of tiles, stones for approval.
- 1.7 Grouting material proposed with technical literature & sealants if proposed to be used shall submit for approval.
- 1.8 Material delivery, storage & handling should be proper & any damage to material supplied by developer debited to contractor.
- 1.9 Material stored on elevated platform under cover at dry location & safe from damage.

#### MATERIAL

- 2.1 **Cement**  
Cement shall be ordinary Portland cement 53 or 43 grade confirming to IS-12269 & IS-8112.
- 2.2 **White cement**  
White cement shall confirm to IS-8042-1978. Specification for white Portland cement.
- 2.3 **Lime**  
Lime shall confirm to IS 712-1984. Field slaking shall be done as per IS 1635 code of practice for field slaking of lime & preparation of putty.
- 2.4 **Sand**  
  
Unless otherwise indicated, sand shall conform to IS 1542-1977. Sand shall consist of natural sand, except where crushed stone sand or crushed gravel sand or a combination of any of these are indicated. The sand shall be hard, durable, clean and free from adherent coating and organic matter and shall not contain any appreciable amount of clay balls. Sand shall be obtained from approved sources.  
For white or coloured rendering , only quartz or silica sand shall be used.
- 2.5 **Water**  
  
Water used for mixing & curing shall be clean, free from objectionable qualities of silts, oils, alkalis, acids so as not weaken mortar & confirms to IS-456.
- 2.6 **Pigments**  
  
Coloured cement may be either ready mixed material or obtained by mixing pigments & cement at site.
- 2.7 **Grouts**  
  
Ready made approved grouts as specified or approved by EIC shall be used. Grout may be standard cement grout, polymer modified grout, Epoxy grout etc.

## 2.8 Aggregates

Coarse & fine aggregate for cement concrete shall confirm to IS 383-1970.

## 2.9 Tiles

Tiles shall be of specified size & make given in schedule. Tiles shall be free from cracks, spots, chipped edges & corners. Variation in size shall be limited to 1.5 mm. Thickness shall be as specified in schedule of items, but in no case shall be less than 6mm.

## 2.9 Stone for flooring

Stone for flooring like kota, marble, granite or any other natural stone used shall be as approved by the EIC & shall be hard, sound, free from cracks, cavities, holes, patches of injuries veins, weathered portions, flaws etc. Before purchase contractor should submit samples of stones for approvals. Material received shall confirm to said approvals & no other type shall be accepted. Colour, grain, vein etc must confirm to approved sample only. The stone shall be ordered in various sizes to suit pattern selected by the EIC.

### Scope of work

Providing & laying of various types of finishes includes

- a) Preparing shop drawing if any
- b) Preparing surfaces & gradients if any
- c) Laying of tiles/stone
- d) Providing spacers /dividers
- e) Cleaning & grouting joints
- f) Polishing with machine/Hand
- g) Mirror polishing as per EIC
- h) Curing
- i) Cleaning
- j) Protecting it till handing over

### Tools required for flooring work

- a) Trowel, mortar pan, spades etc
- b) Wooden batten of 2m length
- c) P.V.C tube level 10m long & spirit level
- d) Right angle
- e) String
- f) Wooden mallet
- g) Small chisel/Hammer
- h) Farma
- i) Tile cutting machine
- j) Polishing machine
- k) Polishing stone of appropriate numbers.

## 5.0 Mosaic Tile Flooring

Ensure that mosaic tiles & skirting are of the same lot. This can be checked by the colour strips marked on one side of the tiles & skirting. Stack the tiles lotwise. Ensure that the corners of the mosaic tiles & skirting are sharp & unbroken. The percentage of broken edge tiles should not exceed 3%. Tiles should be rejected if this percentage is more.

Generally abrasion test, absorption test & average transverse test are carried out in laboratory at contractors cost.

- 5.1 For flooring work, the surface should be clean & leveled. There should not be any cement mortar lumps on the slab & corners of rooms.
- 5.2 There should be sufficient skirting margin from surface of the slab or level.
- 5.3 Cement mortar under the floor shall be prepared in the proportion of 1:6 & it shall be spread all the rooms with reference to level dots.
- 5.4 On the main door frame of the flat, mark a fixed line from the floor & transfer this fixed marking to all other door frames of all flats on that particular floor of the building. Also transfer this level on the walls & mark lines on all the walls temporarily with the help of red colour. These lines are useful for checking the levels of tilling work.
- 5.5 After taking level marking in all rooms, proceed for mortar bed for flooring tiles.
- 5.6 Take level dots with the help of level marking all over in the rooms.
- 5.7 Now prepare a uniform layer of cement mortar throughout the flat & allow it to set for at least for 12 hours. The thickness of the mortar bedding shall be 30 mm.
- 5.8 Before start the laying of tile, first fix the right angle taking in consideration the longest span of the room, to ensure that there will be minimum wastage of tile & therefore minimum cutting work.
- 5.9 Prepare the cement slurry & spread this over mortar bed. Match all the four corners of the tile properly with the help of wooden mallet. Fix the mosaic tiles in particular sequence for better result & fine joints.
- 5.10 After completion of tilling work of the floor, check the overall level. Any unevenness can be rectified with wooden mallet.
- 5.11 Next day fill the gap filling /joint between the tiles with cement slurry.
- 5.12 Then cure this flooring for a minimum of 14 days.

#### Mosaic tile skirting

After mosaic tile joint filling start fixing the skirting work.

Wooden farma should be prepared out of wooden batten. with the help of this wooden farma, skirting tile is fixed projecting at a distance or flush to plaster approved by EIC.

Keep the skirting in one line .for this fix the skirting at two corners and fix the line dori as a guideline for line of in between skirting.

Ensure that the skirting lines are perpendicular to the mosaic tile line.

#### Polishing of Mosaic Tile

For polishing mosaic tile floor use 60 no stone or approved by EIC.

This is basic coat which takes the maximum time. During this coat, the flooring is considerably leveled. Water is used as lubricant between the flooring & revolving stones fixed to the machine.

The 2<sup>nd</sup> coat is the grouting coat which involves grouting of the cement slurry (Gray/white as per the colour of tiles) on flooring. Grouting is done to fill up the open joints & undulation, that occur during the coat. After this coat, curing of the grouting is done for at least 3 days.

The 3<sup>rd</sup> coat is done with 120 no stone. These stone are finer than 60 no stone. This coat serves the same purpose as the 1<sup>st</sup> coat.

The 4<sup>th</sup> coat is done with 320 no or 220 no stone & 5<sup>th</sup> coat is done with 600 no. stone to achieve a smooth polish.

The 6<sup>th</sup> coat is done with oxalic acid in powder form & white flat brush. After six coats, the flat should be washed with water. Polishing of the skirting tiles should be done manually, while polishing of flooring is being done with same stone. use 600 or 300 no stone for skirting.

### PLINTH BAND/PLINTH BEAM

RCC plinth band/beams shall be provided as per details shown on drawings at the location shown o drawings.

### DAMP PROOF COURSE

Irrespective of whether shown on drawings or not, the damp proof course with 40 mm thick PCC 1:2:4, type B.0, using 12.5 mm graded stone aggregate mixed with water proofing compound (ISI marked) as per manufacturer's instructions shall be provided except where the top of plinth beam/band is at the plinth level or 40 mm below the finished floor level over full width of all external and internal walls. DPC shall be provided to all openings as specified in clause No 5.42 of SSR Part I. In case of deviation, water proofing compound shall be taken as 2 % by weight of cement.

### LINTEL BAND/ROOF BAND

RCC lintel band/roof band shall be provided as per details shown on drawings at the location shown on drawings.

COPING: Irrespective of whether shown in drawing or not, 50 mm thick PCC coping as specified herein-before shall be provided on top of parapet/retaining walls (except RCC parapets).

### PRECAST PCC SOLID BLOCK WALLING

PCC solid blocks shall conform to IS-2185

Type of mix: The precast PCC solid block shall be of PCC (1:2:4), using 20mm graded stone aggregate. The concrete shall be mixed as laid down in IS-456. The solid concrete block shall be of grade D-5 as per IS -2185.

Size: The size of block shall be one of the following sizes:

Designation	Nominal size in cm			Actual Size in cm		
	Length	Breadth	Height	Length	Breadth	Height
A	40	30	20	39	30	19
B	40	20	20	39	20	19
C	40	10	20	39	10	19
D	20	20	20			
E	20	20	10			



Sizes other than those specified above may also be used with the approval of Engineer-in-Charge.

#### MATERIAL (AGGREGATE)

Coarse Aggregate: This shall be crushed aggregate 20 mm and down size of approved quality and shall conform to IS -383.

Fine Aggregate (sand): This shall be free from dust and well graded having fineness modulus 3.6 and 4 of combined aggregate conforming to IS-383.

#### **MANUFACTURING OF BLOCKS**

The blocks shall be machine made. The mixing of concrete, the manufacturing of block, curing and drying shall be in accordance with paras 6 to 10 under IS -2185.

Faces of the blocks shall be flat and rectangular.

Mixing: Concrete shall be mixed in mechanical mixer. Mixer shall be continued until there is a uniform distribution of materials and the mix is uniform in colour and consistency.

#### Placing and Compaction

In case of mechanical compaction, the mould shall be filled upto overflow, vibrated or mechanically tamped and struck off level.

After de-moulding, the blocks shall be protected until they are sufficiently hardened to permit handling.

Curing: The block hardened as mentioned herein before shall then be cured in a curing water tank or in curing yard and shall be kept continuously moist for at least 14 days. Where the blocks are cured in an immersion tank, the water of the tank shall be changed at atleast every 4 days.

Note: Curing yard is a paved yard sub divided by shallow drain 4 to 5 metre square platform which are provided with water fountain in the center. The blocks are stacked on the platform around the fountain which works continuously. The fountains are connected to an elevated water storage tank.

Drying: After curing the blocks shall be dried for a period of 4 weeks before being used in the work. They shall be stacked with horizontal voids to facilitate thorough passage for air. The dimensioned stability of concrete block is greatly affected by variation in their moisture content. Since, the shrinkage of the block is much greater at the time it dries for the first time than due to subsequent wetting and re-drying, it is necessary to ensure that the blocks are dried so that initial shrinkage is completed before they are delivered to use. Further their moisture content should not exceed 25 % of their maximum water absorption capacity. If the blocks are to be used in the situation where the relative humidity of air averages more than 60 %, the block can be dried to a moisture content of 40 % of their maximum water absorption capacity.

## PHYSICAL REQUIREMENT

**General:** All blocks shall be sound and free from cracks or any other defects which interfere with proper placing of the blocks or impair the strength or performance of the construction. Minor chipping resulting from the customary methods of handling during delivery shall not be deemed a ground for rejection.

**Tolerances:** The maximum variation in the dimensions shall not be more than  $\pm 1.5$  mm for height and  $\pm 3$  mm for length.

**Block Density:** The block density shall be as per para 4 of IS-2185. For solid PCC block it shall not be less than 1800 Kg/m.

**Compressive Strength:** The average compressive strength of eight blocks when determined in the manner described in IS-2185 shall not less than 50 kg/Sq cm of gross area. The strength of lowest individual blocks shall be not less than 75 % of the average compressive strength of eight blocks.

**Water absorption:** The water absorption shall be as per IS-2185.

**Drying:** Shrinkage and moisture movement shall be as per IS-2185.

**Tests:** Tests as described in appendices 'A' and 'F' of IS-2185 shall be conducted on samples of blocks selected according to the samples procedure given in para 1(C) of IS - 2185 to ensure conformity with the physical requirement laid down in para 8 of IS-2185. Cost of testing such as transportation, casting of blocks, testing fees and other expenses shall be borne by the contractor. The tests listed in Appx 'A' to IS-2185 shall be conducted from the laboratory as approved by Project Manager and other tests shall be carried out as listed in IV to VI.

**Sampling Criteria for Conformity:** The blocks required for carrying out the test laid down in standards shall be taken by one of the method given in para 10 of IS-2185 and shall be considered as conforming to the requirements of the specifications if the conditions mentioned in para 11.2 to 11.5 of IS-2185 are satisfied.

## PRE CAST PCC SOLID BLOCK WALLING

20 cm thick and over PCC solid block walling (foundation/superstructure) shall be built in cement mortar (1:6) and 10 cm thick PCC solid block walling shall be built in cement mortar (1:4).

**Laying:** The block shall be slightly wetted before and during laying in the wall. The blocks shall be laid with mortar joints completely filled without any void left in the masonry. The thickness of the horizontal and vertical joints shall not exceed 1 cm. The 1/2, 1/3 and 2/3 blocks shall be used for breaking the joints. The face joints shall be raked to a depth of 1 cm by raking tool during the progress of the work when the mortar is still green, so as to provide proper key for plaster or to facilitate pointing to be done later. Where plaster or pointing is not required the joints shall be struck flush and finished side by side.

**Curing of Walling:** Masonry work shall be kept constantly moist on all the faces for a minimum period of 7 days.

**Scaffolding for walling:** Only double scaffolding shall be used. The scaffolding shall be strong and sound. No holes in the masonry for supporting scaffolding shall be allowed.

20/10 cm thick walls wherever shown on drawings shall be 20/10 cm thick pre cast PCC solid block walling.

Unless otherwise specified or shown on drawings, all 10 cm thick partition walls on ground floor shall rest on sub base of the floor. 10 cm thick partition walls shall be properly

bonded at ends into adjoining walls. Irrespective of whether shown in drawings or not, partition walls shall be provided with the following:  
2 Nos 8 mm dia deformed bars at second course and shall be embedded in cols at least 150 mm both side and full width in case of PCC block walls.

RCC band at lintel level for the entire length (including over opening) shall be provided. Unless otherwise shown on drawings, the RCC band shall be 100 mm x 100 mm size reinforced with 4 nos. 8 mm dia CTD bars as longitudinal bars and 8 mm dia. CTD bars stirrups at 150 mm C/C. Lintel band shall be anchored in supporting walls/columns.

### STONE MASONRY

Stone for masonry shall be from the sources mentioned in Appendix 'A' and shall conform to the sample kept in the office of the PM/EIC.

Sand for mortar shall be from the source as mentioned in Appendix 'A' and shall conform to the sample kept in the office of PM/EIC.

Stone masonry in foundation upto plinth, steps and in super structure shall be random rubble masonry, regularly coursed, well bonded, bedded and solidly hearted all as described in clause 6.10.11 of SSR Part I built in CM 1:6 unless otherwise specified / shown on drawings.

Quoins and jambs stones where exposed shall be of stone only and may be either of stones or precast solid PCC blocks in mix 1:3:6 type C-1 at other locations at the option of contractor. Bond stone may be either of stone or precast solid PCC block in PCC 1:3:6 type C-1 at the option of contractor. No price adjustment for use of PCC block shall be made.

No facing shall be executed to surfaces covered by earth filling. Unless otherwise specified/shown on drawings and joints of stone masonry covered by earth filling shall be finished flush with the same mortar as the work proceeds.

Leave or form holes as and where required or as directed by the Engineer-in-charge shall be made good as per clause 14.14.8 of SSR Part-I.

Chases and recess in walls where required or where directed by the Engineers-in-Charge shall as far as possible be provided during construction to avoid cutting afterwards.

In the event of deviation pricing for stone masonry shall be done at the appropriate rate in schedule irrespective of the changes specified above.

The joints of stone masonry shall be raked out and cleaned as the work proceeds as specified in clause 6.9.3 and 6.9.4 of SSR Part-I.

Stone masonry in arches shall be provided with dressed stone cut to shape & size and shall be built in CM (1:3).

### STEEL AND IRON WORK

All types of steel including reinforcement steel not mentioned in Schedule 'B' and to be used in the work shall be procured by the contractor and shall be of quality/grade as indicated in the drawings and all as specified.

Procurement: Steel will be procured by the contractor from Rashtriya Ispat Nigam /SAIL/IISCO/TISCO. In case certain lower section of steel are not being produced by the aforesaid main manufactures than the same shall be procured from their authorised

conversion agents through main producers. The contractor shall submit the purchase vouchers and test certificate of billets of main manufacturer out of which lower section purchased have been produced by the authorised conversion agents. In such case two test certificates (one of the billets from main producer and other of authorised conversion agents) shall be mandatory for each lot of steel brought at site. The test certificate and purchase vouchers shall be duly inter linked with one another with particular references to lot number etc. No payment shall be allowed to the contractor till such these vouchers/test certificates are produced. Project Manager shall ensure that steel shall not be procured from authorised conversion agents directly ie without the knowledge of main producers. Contractor may at his discretion procure locally ordinary quality steel Fe-310 required for Guard bars, hold fasts, fencing posts, angle iron door frame for paneled/wire gauge shutter or for any other places as indicated in drawings. Contractor will submit documents in support of the purchase of all steel required for the job to Project Manager who will make necessary endorsement therein and retain them for record. Any variation on lower side in the sizes other than those received in coils of 6 to 8 mm diameter shall be rejected and will not be allowed to be incorporated. On receipt of materials from each consignment, contractor will inform Project Manager and the sizes of each length of steel will be got checked through EIC in the presence of contractor's representative and shall be recorded in the MB as 'Not to be Abstracted' indicating dia and length of bars, quantities, sizes and voucher number with dates.

Mild steel bars and deformed or twisted bars 6 and 8 mm diameter which are brought at site in coils shall be got checked by EIC in the presence of contractor to determine the actual weight per unit length by getting a suitable length (not less than three metre) from each coil of respective section and shall be recorded in the MB as specified here-in-below.

Testing of Steel: The manufacturers viz Rashtriya Ispat Nigam/SAIL/IISCO/TISCO, are required to carry out inspections and testing of steel in accordance with the relevant BIS provisions. The original test certificates alongwith the test sheets giving the result of each mechanical test as applicable and the chemical composition of the steel or authenticated copy thereof duly signed by the manufacture is to be sent with each consignment. This will be recorded by the Engineer-in-Charge in a steel acceptance Register as per format given at Annexure I after due verification. The Project Manager shall also organise independent testing of random samples of steel drawn from various lots from National test house, Regional Research Labs, Govt approved labs etc as per the suggested minimum frequency shown in table at Annexure-II 11.4

Storage, Accounting, Preservation and Maintenance of Steel by the Contractor Till Consumed in the Work

Each consignment of steel and every individual steel section shall be stacked separately on suitable dunnage to prevent ground moisture and mud and should be stacked at least 15 cm above ground level. For each classification of steel, separate area shall be earmarked. Steel shall be marked with distinct painting marks for easy identification. Steel sections which are not likely to be used before onset of monsoon shall be given cement slurry wash so as to ensure scale and rust free steel. Also steel sections which are procured during monsoon and are not likely to be used within a week from the date of procurement shall be given cement slurry wash immediately.

Schedule of Supply: Contractor shall within three weeks of acceptance of his tender, will intimate in writing his schedule for procurement of steel sections required for the works with copy of each order placed on the manufacture viz. Rashtriya Ispat Nigam/SAIL/TISCO/IISCO. Contractor shall make all necessary arrangement for procurement of steel to ensure that progress of work as per CPM chart agreed between

Project Manager and the contractor is not affected. Contractor will forfeit his right to demand extension of time if the supply of steel got delayed due to his failure in placing order in time to the manufacturer viz Rashtriya Ispat Nigam/SAIL/TISCO/IISCO.

Procedure for Making Payment for Steel including Measurements, Conversion of Weight etc

The requirement of steel shall be worked out section wise and will be recorded in a separate Register jointly maintained by contractor and Engineer-in-Charge. Day to day record shall also be signed by the contractor as well as Engineer-in-Charge. The register should contain different sheets for each steel sections indicating reference to drawing number, location, number of bars, sketch of each length of bar with dimensions, length of waste and off cuts and the quantity thereof by multiplying the length of bars with the conversion factors given in SSR Part II. For sections not listed in SSR, the ISI conversion table shall be followed. The contractor will not have any claim in case the actual weight of steel items works out to be more than the weight obtained by standard conversion factor. For making adjustment arising out of reinforcement bars the length of each bar for the purpose of calculation of laps shall be taken as 10 meters.

On completion of work, the Register will be in the custody of the Engineer-in-Charge and Contractor may keep a copy for his record if he so desires.

Payment for steel as materials brought at site shall be made only on production of paid vouchers for the quantity for which payment is claimed at SSR Rate Plus (to be deleted where not applicable) quoted percentage of the contractor /percentage indicated in CA for valuation of deviation order or the rate as per the paid vouchers whichever is less, subject to fulfillment of the following conditions:-

Section wise quantity brought at site is required for incorporation in the work.

Production of manufacturer's test certificates.

Recording of all steel section brought at site in MBs and steel register maintained jointly by Engineer-in-Charge and the contractor. The contractor will however be required to ensure proper stacking and storage of steel within seven days from the date of receipt of stores at site. Also, the contractor will remove the remaining steel section (s) which do not conform to specifications consequent to testing of steel by Project Manager as specified hereinbefore. Normal waste and off cuts shall be stacked neatly and shall become the property of contractor. Contractor will be allowed to remove such cut pieces after the recovery is made.

Irrespective of whether steel is procured from Rashtriya I spat Nigam/SAIL/TISCO/IISCO or their authorized conversion agent the contractor shall submit purchase voucher and test certificate from the main producer i.e. Nigam/SAIL/TISCO/IISCO only for steel brought to site for incorporation in the work.

#### Structural Steel Construction

Irrespective of whether shown on drawings or not the structural steel construction shall conform to IS-800 (code of practice for use of structural steel i.e. general building construction). The rolled beam, channels, angles and flats shall be of standard quality steel conforming to IS-226 (specifications for structural steel standard quality).

**Welding:** Welding of iron and steel work shall be metal arc welding and shall be done as approved in manner with electricity. Special attention is drawn to clause 10.15.13.2 of SSR Part-I with regard to qualification tests for welder as well as test for approval of electrodes which will be carried out as per IS-823. Welding electrodes shall be of Oxygen Ltd or Advani Orlinkon makes. Gas welding however may be allowed by Project Manager in case of structural steel without any price adjustment.

#### Hold Fast/Lugs

Flat iron hold fast/lug shall be provided by welding as and where shown on drgs except those to be provided to wooden chowkhats which shall be fixed with screws as per details shown on drawings.

Irrespective of what is shown on drgs flat iron hold fast shall be embedded in PCC 1:3:6 type C-1 block of size 15 cm (height of block) X 30cm (length of block) X width of masonry wall. Hold fasts/lugs shall be hot tarred and sanded before fixing.

Wherever door frame and windows frame side is coming in contact with RCC column, dash-tru fasteners shall be provided in lieu of hold fasts.

### Aluminium Windows and Ventilators

The term aluminium window used in the particular specification shall mean aluminium windows and ventilators

Aluminium windows shall be all as per clause 10.25 of SSR Part I and as per sample kept in the office of Project Manager.

Aluminium windows (Glazed) shall be sliding or openable all as specified and shown on drawings. Fixing and glazing of windows shall be in accordance with IS-1081 and shall be tenoned and screwed to the Frames.

Hinges for side hung shutters (glazed) shall be friction hinges projecting type and hinges for gauzed shutter shall be box type with peg stay.

Aluminium windows shall be fixed to concrete / masonry/ PCC block masonry with screws as shown on drawings.

Peg stays and handles for aluminium windows shall be of aluminium anodized same as for windows.

Central hung windows shall be mounted on antifriction brass pivots.

Aluminium windows shall be factory made or site made as specified conforming to IS-1038. The structural members for aluminium windows shall be obtained from the approved manufacturers. The finished products shall conform to the above specifications in all respect. The contractor shall submit one sample of each type of aluminium windows with all fittings for approval of the Project Manager. Project Manager shall certify that aluminium window and fittings conforms to the contract specification in all respects. The Engineer-in-Charge shall ensure that all windows provided and fixed are strictly in conformity with approved sample.

Handle to fly proof windows shall be pressed type.

Approved manufacturers of factory made aluminium windows and structural members are given in Appendix 'F1'.

#### GUARD BARS / GRILLS TO WINDOW

The term window used in the particular specifications shall mean windows/ventilators.

Irrespective of what is shown on drawings all windows shall be provided with guard bars / grills as shown on drgs. However in case of double windows in the opening guard bars shall be provided to glazed windows only.

Guard bars to windows unless otherwise shown on drgs shall be mild steel 12 mm square welded to steel frame of windows in the factory of approved manufacture's of steel

windows. In case of grills, these shall be manufactured as specified and shown on drawings.

#### FAN HOOKS

Fan hook shown in drawings shall be provided wherever ceiling fan/fan hook is indicated in drawings. The lump sum tendered by the contractor for the building under schedule 'A' Part I shall be deemed to include for the cost of the same.

#### MS ANGLE IRON FRAMES FOR DOORS (EXCEPT BATH/TOILET)

Unless otherwise shown on drawings door frames shall be of mild steel angle iron 40x40x6 mm mitred at corner and welded to form a solid fused welded joint. The process of welding adopted may be any suitable method which gives a continuous and solid joint all along the place of meeting the members.

Hinges shall be fixed to steel frame as shown on drgs/as directed by Engineer-in-Charge. Staple for barrel/tower bolts shall be as directed by Engineer-in-Charge. Suitable holes in floor/masonry /Frames shall be made for functioning of door fittings. Proper care shall be taken to avoid breakage of holes.

Irrespective of whether shown on drawings or not, 12mm dia deformed bar shall be welded horizontally at the bottom of MS angle iron frame. The 12mm dia bars shall be embedded in floors. In case of double frame ie for paneled door and guazed door, separate 12mm dia deformed bar shall be provided to each frame at bottom of frame.

#### **STEEL FOR REINFORCEMENT**

Steel for reinforcement for RCC shall be all as indicated in the drgs.

The overlaps for reinforcement given in drawings No ACL/09/TD/S-12 sheet 1/5 to 5/5 ( as applicable) shall take precedence over provisions given in para 10.19 of TAA SSR Part I.

For making adjustment arising out of deviation involving reinforcement bars, the length of each bar for the purpose of calculation of laps shall be taken as 12 metres.

**CHAIRS:** Adequate numbers of chairs shall be provided in all reinforced sections to prevent top layer of reinforcement from sagging and the cost of the same shall be deemed to be included in lump sum quoted for schedule 'A' Part I (Building works).

**WOVEN WIRE CLOTH:** Wire gauge/Fly proofing wherever indicated in drawings shall be amended to read as "WOVEN WIRE CLOTH". The wire cloth shall be conforming to IS-1568. Wire cloth shall be galvanized iron wire with not less than 0.50 mm nominal diameter of wire and 1.00 mm average width of aperture.

#### **ROOF COVERING**

##### **RCC ROOF SLAB**

Unless otherwise shown on drgs, all RCC roof slabs shall be laid to slope of 1:100.

Exposed surfaces of soffits of RCC slabs shall be plastered in CM (1:3) 5 mm thick and finished even and fair.

Irrespective of what is shown on drawings full bearing of RCC roof slab shall be provided on external wall.

RCC roof band shall be provided as per details shown in drawings. RCC roof band shall not be provided where RCC beam cast monolithically with RCC roof slab are provided over masonry wall.

Water proofing Treatment: Water proofing treatment to RCC roof slabs shall be carried out as follows:

The surface shall be painted with hot paving bitumen grade 30/40 conforming to IS-73 @ 1.20 Kg/Sqm over a coat of bituminous primer conforming to IS-3384 applied @ 0.30 Ltr/Sqm.

150 micron polyethene film (white) weighting 135 gms/sqm (approx.) having tensile strength not less than 140 Kg/Sq. cm in machine direction and 110 Kg/Sq. cm in transverse direction, conforming to IS-2508 shall be laid with overlaps & bonded with cold cutback adhesives, overlaps being not less than 150 mm. Polythene film shall be tucked in wall to a depth of 65 mm as per fig shown in IS-7290.

Factory made bituminous impregnated craft paper of weight not less than 100 gms/sqm, shall be laminated over the film with semi hot layer of paving bitumen grade 30/40 conforming to IS-73 painted on the paper, paper reversed and pasted on the film.

Hot paving bitumen grade 30/40 conforming to IS-73 applied @ 1.20 Kg/Sqm on the surface and the entire surface shall be dusted with fine sand.

Padding PCC (1:2:4) type B-0 with brick aggregate with 10mm cement mortar (1:4) screed laid while concrete is steel green and finish even and smooth, laid to a minimum consolidated thickness of 50 mm to provide a finished slope of 1:40. In case of slope of roof slab is 1:40 or more, uniform 50mm thick PCC (1:2:4) shall be provided as above.

Coved fillet in PCC (1:2:4) type B-0 of radius 75 mm shall be provided at the junction of roof and parapet wall/chimney/other vertical space and surface painted with a coat of bitumen over a coat of primer specified in para(a) here-in-before.

#### **SECURITY DEPOSIT TOWARDS WATER PROOFING TREATMENT TO ROOF**

Should the Project Manager at any time during/constructions or reconstruction or prior to the expiration of a period of ten years after the certified date of completion of buildings or group of buildings find that the building shows leakage / dampness or any sign of defective water proofing treatment, the contractor shall on demand in writing from the Project Manager specifying the building complained of, notwithstanding the fact that the same may have been inadvertently passed, certified and paid for, forthwith undertake to carry out such treatment as may be necessary to render the said buildings water proof at his own expense for a period of ten years from the certified date of completion of said buildings. And in the event of his failing to do so within a period to be specified by the Project Manager in his demand as aforesaid, the Project Manager may undertake such treatment at the risk and expense in all respects of the contractor. The liability of the contractor under this condition shall not extend beyond the period of 10 years from the certified date of completion unless the Project Manager had previously given the notice to the contractor.



A sum equal to 0.11 % (zero point one one percent) of quoted lump sum against all serial items Nos 2 to 4 of Sch. 'A' Part I or 10.00 % (Ten percent) of water proofing items shall be retained from the contractor's final bill amount as security deposit for the water proofing treatment and the same shall be released after satisfactory completion of guarantee period as stated above. The contractor may alternatively submit fixed deposit receipt for the said sum from a scheduled Bank in lieu of the sum to be returned out of the final bill.

The security deposit here-in-before may be refunded to the contractor after expiry of the period of 10 years from the certified date of completion by the Project Manager provided always that the contractor shall first have been paid the final bill and have rendered No Demand Certificate (Standard Form). The General Conditions of Contract on waterproofing guarantee if any, shall be deemed to be amended to the extent mentioned above.

Materials required for water proofing shall be purchased by the contractor from the manufacturers or their authorised agent only and brought to site. Name of authorised agent shall be verified from the manufacturer by the Project Manager before approval. Only ISI marked / approved material shall be approved for use.

**MAKE OF EQUIPMENT AND APPROVED MANUFACTURERS OR APPROVED EQUIVALENT**

1.	R.C.C. Pipe	a.	Pranali Industries Bombay or Equivalent
		b.	Prathibha Industries
2.	GI Pipes	a.	Tata
		b.	Zenith
2.	UPVC SWR Pipes	a.	Supreme
		b.	Prince
3.	ASTM UPVC Pipes	a.	Astral Aquarius
4.	ASTM-UPVC Fittings	a.	Astral Aquarius
5.	CPVC Pipes	a.	Astral
6.	Water Meters	a.	Capstan Make or Equivalent
		b.	Kaycee
7.	Ball Valves	a.	President
		b.	V. B.
8.	Paint	a.	Asian Paints
		b.	Shalimar
		c.	Equivalent
9.	S.W. Pipes	a.	Sonya
		b.	Rajura
10.	G. M. Non Return Valve	a.	Zoloto
		b.	Equivalent
11.	Strainers	a.	Varie
		b.	HAWA
		b.	Hammer
12.	Cast Iron Pipe	a.	Neco
13.	Cast Iron Manhole Cover & Gratings	a.	Neco
14.	Automatic Air Release Valve	a.	Varie / OR Equivalent

## SECTION - 'I'

### MODE OF MEASUREMENT

#### 10.1 MODE OF MEASUREMENT: (METRIC SYSTEM)

All drain pipes shall be measured in linear lengths along the centre line of the drainage line laid. Deductions shall be made for chambers (internal clear) and effective fittings lengths (joint to joint).

10.2 Inspection chambers/manholes shall be measured in numbers complete as specified in the respective items in the Schedule of Quantities.

10.3 Fitting such as gully traps, bends, junctions, traps etc., shall be measured and paid in numbers.

10.4 All cast iron spigot and socket or flanged pipes shall be measured in linear lengths along the centre line completed. Deductions shall be made for effective fittings lengths (joint to joint/s). The rate shall include lead caulking or nut and bolts for lead caulked joints/flanged joints etc., as specified in the respective items.

10.5 Cast iron fittings such as spigot and socket fittings, flanged fittings shall be measured and paid in numbers, separately unless otherwise specified.

10.6 All UPVC pipes/ Copper Pipes shall be measured in linear lengths along the centre line of the pipe including UPVC./ Copper Pipes fittings. The rate for pipes upto and including 50mm dia. shall be inclusive of all kinds of UPVC./ Copper Pipes fittings. In the case of pipes of diameter 65mm and above UPVC./ Copper Pipes fittings will be measured in numbers and paid 'extra over' the linear measurement.

10.7 All Peet valves, ball valves, non-return valves, butterfly valves, pressure reducing valves, Motorised Valve etc. shall be measured in numbers & paid 'extra over' the linear measurement.

10.8 In case of fittings of G.I.,C.I. of unequal bore, the largest bore shall be measured.

10.9 M.S.Brackets/hangers shall be paid on actual weight. M.S.Brackets/hangers upto 1 kg. net weight shall not be measured and deemed to have been included in the rate of respective item.

10.10 All sanitary fittings and fixtures shall be measured in numbers.

10.11 Plain cement concrete for supports and for bedding etc. shall be measured in Cu.M. of the completed work carried out as per instructions.

10.12 The rock cutting shall be measured in Cu.M of the stacks of the excavated rock. Only the rock which is removed by chiselling shall be measured for this item of work. The deduction for voids shall be 33% of the stack measurement. Boulders shall not be considered as rock. Excavated Rock shall become the Owner's property.

Unless otherwise specified, the Mode of Measurement shall be as per I.S. Code of practice of measurement of Plumbing Installation Work.

**APPENDIX - II**

**Item wise Theoretical Consumption of Cement (in Bags)--As per CPWD**

Sl.	Particulars	Unit	Cement bags
	<b>PLAIN CEMENT CONCRETE</b>		
1	Plain Cement Concrete (1:5:10)	Cum.	2.6
2	Plain Cement Concrete (1:4:8)	Cum.	3.4
3	Plain Cement Concrete (1:3:6)	Cum.	4.4
4	Plain Cement Concrete (1:2:4)	Cum.	6.4
	Reinforced Cement Concrete (M20)	Cum.	
	Reinforced Cement Concrete (M25)	Cum.	6.66
5	Damp proof course (25mm thick) (1:2:4)	Sqm.	0.08
6	Damp proof course (40mm thick) (1:2:4)	Sqm.	0.13
7	Damp proof course (50mm thick) (1:2:4)	Sqm.	0.16
8.a	Plum Cement Concrete (1:3:6) (60 conc: 40 boulder)	Cum.	2.64
8.b	Plum Cement Concrete (1:3:6) (50 conc: 50 boulder)	Cum.	2.20
9	Plum Cement Concrete (1:3:6) (40 conc: 60 boulder)	Cum.	1.76
10	Precast Cement concrete (1:2:4)	Cum.	7.6
11	Precast Cement concrete (1:3:6)	Cum.	5.6
12	For fixing of RCC jail (50mm/40mm/25mm thick)	Sqm.	0.0328
	<b>Guniting work---</b>		
1	7.5cm thick guniting (1:3)	Sqm.	0.95
2	5cm thick guniting (1:3)	Sqm.	0.64
3	4cm thick guniting (1:3)	Sqm.	0.40
4	R.C.C overhead / underground tank	Litre	0.005
	<b><u>BRICK MASONARY</u></b>		
1	Brick masonry in foundation and superstructure in CM (1:4)	Cum.	1.90
2	Brick masonry in foundation and superstructure in CM (1:6)	Cum.	1.25
3	(115mm) Half Brick work in CM (1:3)	Sqm.	0.285
4	(115mm) Half Brick work in CM (1:4)	Sqm.	0.212

Sl.	Particulars	Unit	Cement bags
5	Brick on edge masonry in CM (1:3)	Sqm.	0.18
6	(150mm) Brick block work in CM (1:4)	Sqm.	0.212
7	Half Brick honeycomb in CM (1:4)	Sqm.	0.13
8	Brickwork in arches in superstructure	Cum.	2.56
9	Moulding & cornices with brick masonry in CM(1:4) girth to be measured in cm & length in running metre.	100m/cm of girth	0.0706
	<b><u>STONE WORK</u></b>		
1	Random Rubble masonry with stone in foundation and superstructure in CM (1:6)	Cum.	1.65
2	Coursed Rubble Masonry with stone in foundation and superstructure in CM (1:6)	Cum.	1.5
3	stone work for wall lining over 12mm thick bed of CM(1:3) & jointed with grey cement slurry 3.3kg/sqm	Sqm.	0.275
	<b><u>MARBLE WORK</u></b>		
1	Marble stone flooring of 20mm thick marble stone over 20mm thick base coat of CM (1:4) & using cement slurry 4.4Kg/m <sup>2</sup>	Sqm.	0.27
2	Marble stone flooring of 20mm thick marble stone over 30mm thick bedding coat of CM (1:4) & using cement slurry 4.4Kg/m <sup>2</sup>	Sqm.	0.316
3	Marble Dado--pasted & grouted (over the plastered surface/RCC) with 8-10mm thick cement paste & joint filling etc.	Sqm.	<b>0.288</b>
4	150mm wide Marble sill/frame (single patti)	Rm	0.0432
5	200mm wide Marble sill/frame (single patti)	Rm	0.0576
6	Italian marble flooring-20mm thick CM(1:4) bedding; white cement paste/slurry is used for fixing	Sqm.	0.27
7	Italian marble Dado	Sqm.	<b>0.288</b>
8	Double patti---150mm wide Marble sill/frame (external patti)--total 23-25 mm thick cement paste.	Rm	<b>0.1242</b>
	Double patti---75-100mm wide Marble sill/frame (external patti)--total 23-25 mm thick cement paste.	Rm	0.0621
9	Pure cement paste		
	<b><u>FLOORING</u></b>		
1	Brick flooring in CM (1:4)	Sqm.	0.37
2	Brick flooring in CM (1:6)	Sqm.	0.257
3	IPS flooring--In PCC (1:2:4) finished with a floating coat of neat cement slurry.		
a	25mm thick		0.2444

Sl.	Particulars	Unit	Cement bags
b	40mm thick		0.340
c	50mm thick		0.404
d	75mm thick		0.564
4	Mosaic tiles flooring with 30mm CM (1:6) bedding	Sqm.	0.173
5	Mosaic tiles skirting with 20mm CM (1:6) bedding	Rm	0.015
6	Glazed tiles for flooring, Dado, skirting, treads, risers etc on 12mm bedding (1:4) & jointing with cement slurry etc	Sqm.	0.188
7	Ceramic tile/Vitrified tile flooring on 20mm thick bedding CM (1:4) & jointed with white cement slurry	Sqm.	0.248
8	Ceramic/vitrified tile work in skirting, dado, risers of steps etc over & above the plaster with 6mm thick cement paste including grouting/jointing etc.	Sqm.	<b>0.216</b>
9	Kotah stone flooring (20mm to 30mm thick ) over 20mm thick base of CM(1:4) & jointed with neat cement slurry.	Sqm.	0.298
10	Kotah stone 20mm thick in Riser or steps skirting, dado, walls and pillars laid in 13mm thick cement mortar (1:4) and jointed with neat cement slurry etc.	Sqm.	0.274
	<b>Cement Mortar---( see the comments inserted)</b>		
1.a	Cement Mortar (1:1)	M3	20.4
1.b	Cement Mortar (1:2)	M3	13.6
1.c	Cement Mortar (1:3)	M3	10.2
1.d	Cement Mortar (1:4)	M3	<b>7.6</b>
1.e	Cement Mortar (1:5)	M3	6.2
1.f	Cement Mortar (1:6)	M3	<b>5.0</b>
	<b>Cement Plastering---</b>		
1	<b>Single coat plastering--</b>		
a)	12mm -15mm internal Cement Plaster (1:4)	Sqm.	<b>0.118</b>
b)	20mm Cement Plaster (1:4)	Sqm.	0.170
c)	12mm Cement Plaster (1:6)	Sqm.	0.072
d)	15mm Cement Plaster (1:6)	Sqm.	0.086
e)	20mm Cement Plaster (1:6)	Sqm.	0.112
2	<b>With floating coat of neat cement----</b>		
a)	12mm Cement Plaster (1:4) with floating coat of neat cement.	Sqm.	0.153
b)	15mm Cement Plaster (1:4) with floating coat of neat cement.	Sqm.	0.174
c)	20mm Cement Plaster (1:4) with floating coat of neat cement.	Sqm.	0.214
3	<b>Cement plaster in 2 coats---</b>		

Sl.	Particulars	Unit	Cement bags
a)	18mm thick in 2 coats--12mm (1:5) +6mm(1:3)	Sqm	0.162
b)	20mm Cement Plaster (1:4)--(12+8mm)	Sqm	0.215
<b>4</b>	<b>6mm cement plaster--</b>		
a)	6mm Cement plaster to ceiling (1:4)	Sqm.	0.054
b)	6mm Cement plaster to ceiling (1:3)	Sqm.	0.073
c)	Neat cement punning	Sqm.	0.044
5	Rough cast plaster with a mixture of sand & gravel or crushed stone from 2.36mm-12.5mm dashed over and including the fresh CM (1:4) plaster in two coats (12+8mm)	Sqm.	0.231
6	Pebble dash plaster with a mixture of washed pebble from 6.0mm-12.5mm dashed over and including the fresh CM (1:4) plaster in two coats (12+8mm)	Sqm.	0.231
	<b><u>POINTING</u></b>		
1	Flush/ruled/cut/weather pointing on brick work with cement mortar (1:3)	Sqm.	0.03
2	Raised and cut pointing on brick work with CM (1:3)	Sqm.	0.04
3	Flush /ruled pointing on stone work with CM (1:3)	Sqm.	0.023
4	Raised and cut pointing on Stone work with CM (1:3)	Sqm.	0.047
	<b><u>Waterproofing work----</u></b>		
1	Waterproofing in sunken areas of toilet (base coat + Brick bat filling + W/P plaster etc) as per std procedure along with 2'0" ht WP plaster on side wall all along (Plan area of toilet for measurement)	Sqm.	0.788
2	Brick bat coba filling, jointing with CM(1:4) & top finishing with cement ghotai /paste	M3	2.6
3	W/P Base coat with 12-15 mm (CM-1:4) thickness with floating coat of neat cement.	M2	0.153
	<b><u>Box Type waterproofing--(shahabad ladi)</u></b>		
1	Shahabad on Vertical surface (20mm thick cement grouting with 15-20 mm thick cement plaster over shahabad finish in neat cement.)	M2	0.836
2	Horizontal surface (25mm base coat C.M. (1:4) below shahabad +25mm thick W.P. plaster coat having aggregates embedded over shahabad with joint filling, necessary grouting etc all)	M2	0.468
	<b><u>Terrace waterproofing---</u></b>		
1	Brickbat coba (115mm avg. thickness) as per std procedure with cement tile finish	M2	0.64

Sl.	Particulars	Unit	Cement bags
2	Brickbat coba (115mm avg. thickness) + China mosaic	M2	0.716
3	Only china mosaic work over the hardened surface (previous waterproofing course)	M2	0.164
f)	<b>Watertank waterproofing--</b>		
1	Cement slurry 2.5 kg/m <sup>2</sup> ; 25-30mm thick IPS at bottom; 15mm thick W/P plaster on walls with injection grouting etc .	M2	0.294

**Note :** For concrete of all grades, cement consumption will be considered as per the approved mix design.



## Appendix - III

### Tender Drawings

**Note : -**

- 1) All tender (Architectural, Structural, PHE) drawings enclosed with tender in Compact Disc (Soft Copy) Format.
- 2) Tenderer has to take print of soft copy drawings and submit in cover A with duly signed & stamped.

**PRICE BID - TENDER BOQ's**

***Project - Asmeeta Infratech Ltd. Phase II***

**A.1 BOQ for Land Development - Excavation & Site Grading Work**

<b><i>BOQ for Site Grading Work</i></b>					
<b>Sr. No.</b>	<b>Description of Items</b>	<b>Unit</b>	<b>Qty</b>	<b>Rate</b>	<b>Amount (Rs)</b>
	Cleaning, Excavation, Transportation, Filling, watering & compaction of earth which includes details scope as mentioned below. Rate is inclusive of all require machineries, tools, tackles, fuel, labor, water, etc. all complete.				
1	<p><b>Clearing</b> jungle including uprooting of rank vegetation, grass, brush wood, trees and saplings of girth up to 30 cm measured at a height of 1 m above ground level and removal of rubbish up to a distance of outside the premises <b>CLEANING &amp; GRUBBING SITE AREA</b> as instructed by Engineer-in-charge.</p> <p>Earthwork in excavation by mechanical means Hydraulic excavator over areas (exceeding 30cm in depth, 1.5m in width as well as 10sqm on plan) including getting out the excavated soil, disposal of excavated earth, within plot area in all type of soil, soft murum ,hard murum with boulder, weathered rock, soft rock. To achieve require level in low laying area, The excavated earth to be filled in layers not exceeding 200mm in depth, breaking clods, watering, compacting to achieved overall 10 CBR strength with 10/12 ton vibratory roller using water @4 liter per sqmt.</p>	Cum	61864		
	<b>Total Amount</b>				
	<b>Service Tax</b>			12.36%	
	<b>Total Amount Incl. Service Tax</b>				

Note This is purely the working for Land Development works in the Infrastructure Areas.  
The Excavation for foundation in the Area of Building units is not accounted here.

**A.2 BOQ for Project Internal Concrete Road & Paver Block Work**  
**Pathway width - 18Mtr, 16 Mtr, 14 Mtr & 12 Mtr. of Roads Work**

Sr. No.	Description	Unit	Quantity	Rate	Amount
1	Cleaning, Excavation, Transportation, leveling of earth work which include Clearing jungle including uprooting of rank vegetation, grass, brush wood, trees and saplings of girth up to 30 cm measured at a height of 1 m above ground level and removal of rubbish within the premises <b>CLEANING &amp; GRUBBING SITE AREA</b> as instructed by Engineer-in-charge, Earthwork in excavation by mechanical means Hydraulic excavator over areas (exceeding 30cm in depth, 1.5m in width as well as 10sqm on plan) in all types of soil, soft murum, hard murum with boulder, weathered rock, soft rock including dressing, leveling, surface preparation for getting grading, camber & slope, watering & compaction with 8 to 10 Ton capacity 3-wheeled steel vibratory roller for roadways including getting out the excavated soil, disposal of excavated earth, within plot area or out side the plot as instructed by EIC. Rate is inclusive of all require machineries, tools, tackles, fuel, labors & also royalty & debris management permission including all government charges, etc. all complete as per instructions by Engineer-in charge.	Cum	2,173		
2	Providing, laying, spreading and compacting stone aggregates of a specified size to <b>water bound macadam (WBM)</b> specifications, including spreading in uniform thickness, handpicking, rolling with 3-wheeled steel vibratory roller 8-10 tones in stages to proper grade and camber, applying and booming requisite type of screening and binding material to fill up the interstices of course aggregate and watering and compacting to required density, making necessary earthen bund to protect edges, lightening, gardening, goading, barricading and maintenance of diversion, etc. complete 200 to 290 MM thk in two layer By Manual means grading -II 63-45mm etc. all complete as per instructions by Engineer-in charge.	Cum	4001		

3	Providing & laying <b>125 micron Polythene sheet</b> under PQC & as per drawing & as per instructions by Engineer-in charge.	Sqm	8689		
4	Providing, Cutting, transporting, placing & binding in position M.S. / H.Y.S.D. /T.M.T. bar reinforcement for dowel bars, tie bars & any other related work at required location as per drawing. Dowel bars of dia & length as per drawing should be placed partly in PVC conduit & partly in concrete supported on Dowel chairs as directed by Engineer in charge. Rate is inclusive of all required materials, labors, tools, tackles, machineries, 18 gauge binding wire & require dia PVC conduit pipes,etc. all complete as per instructions by Engineer-in charge.	Kg	20075		
5	Providing and laying Design mix cement concrete <b>M35</b> in roads with steel channel form work, concrete shall be laid and finished with screed board vibrator , vacuum dewatering process and finally finished by floating machine, booming with wire brush .Including curing and providing and filling construction joints and dummy joints with approved joint filler and primer including rounding of edges and filling the grooves 10x25mm deep at top for construction joints and 10x50mm deep at top for dummy joint with bitumen joint sealing compound (conforming to grade B of IS : 1834) including making necessary arrangement for expansion joints etc.all complete as per instructions by Engineer-in charge.	Cum	1825		
6	Painting road surface marking with adequate no. of coats to give uniform finish with ready mixed road marking <b>thermoplastic paint</b> conforming to IS standards on concrete surface in white/yellow shade including cleaning the surface of all dirt, scales, oil, grease and foreign material etc. complete as per instructions by Engineer-in charge				
a	Yellow	Sqm	187		
b	White	Sqm	187		
7	Providing & supplying factory made, precasted, well cured M20 grade kerb stone of size 200*400*600 or approved sample available at site including transportation, loading, unloading, stacking at site, etc. all complete as per instruction by Engineer In charge.	Rmt	QRO		

8	Fixing M20 grade kerb stone over DLC bed pointed with fine mortar 1:4 including finishing the top smooth including all materials ( except kerb stone), labor, tools, tackles etc. all complete as per drawing & instruction by Engineer In charge.	Rmt	QRO		
9	Providing & Painting Kerb stone surface with adequate no. of coats to give uniform finish with Enameled paint conforming to IS standards on concrete surface in Black/yellow shade or as approved including cleaning the surface of all dirt, scales, oil, grease and foreign material, applying approved paint as per manufacturer's specification including all materials , labor, tools, tackles etc. all complete as per drawing & instruction by Engineer In charge.	Sqm	QRO		
10	Providing and fixing <b>Glow studs</b> of size 100x20 mm made of heavy duty body shall be moulded ASA (Acrylic styrene Acryloretrite ) or HIP (High impact polystyrene) or ABS having electronically welded micro- prismatic lens with abrasion resistant coating as approved by Engineer in charge. The cats eye shall support a load of 13635 kg tested in accordance with ASTM D4280. The slope of retro- reflective surface shall be 35 +/- 5 degrees to base .The reflective panels on both sides with at least 12 cm of reflective area up each side. The luminance intensity should be as per the specification and shall be tested as described in ASTM I: 809 as recommended in BS: 873 part 4 : 1973. The studs shall be fixed to the Road surface using the adhesive conforming to IS, as per procedure recommended by the manufacturer complete and as per direction of Engineer-in-charge	nos	497		
11	Providing, laying, leveling & fixing M30 grade 80mm thick factory made cement concrete interlocking <b>pavers block of Grey &amp; Red shade</b> made by block making machine with strong vibratory compaction and of approved size and design/ shape as per approved sample available at site, laid in required color and pattern over and including 40mm thick compacted bed of course sand, filling the joints with coarse sand etc. all compacted bed of course sand, filling the joints with coarse sand etc. all complete as per the instructions by Engineer-in-charge.	Sqm	7405		

12	Supplying, installing, testing and commissioning of R.C.C NP2 class ( Heavy Duty) Hume pipes laid to the required level and grade with collars joining in CM 1:3 including require trench excavation, laying, jointing & testing pipes and filling the excavated trench with approved quality saturated sand on sides, bottom and top surface of pipe with all ends and lifts, making necessary connections as required Including all materials, labors, tools, tackles, machineries, etc. complete as per the instructions by Engineer-in-charge. (Provision for road crossings)				
a	100 mm dia	Rmt	100		
b	200 mm dia	Rmt	100		
c	250 mm dia	Rmt	100		
d	300 mm dia	Rmt	100		
e	450mm dia	Rmt	100		
f	600 mm dia	Rmt	100		
	<b>Total Amount Including VAT</b>				
	<b>Service Tax</b>			<b>4.944%</b>	
	<b>Total Amount Including all taxes</b>				

**A.3 BOQ for Strom Water Drain Work in Brick Masonry**

Sr No.	Description	Unit	Quantity	Rate	Amount
1	<b>Excavation for foundation</b> in including removing the excavated materials with in site limit as specified, stacking, necessary dewatering unless provided elsewhere, preparing bed for the foundation and required back filling at extra excavation after completion of work with available earth / murum, ramming, watering etc. complete as directed excluding shoring and starting, etc. all complete as per instructions by Engineer-in charge.				
a	All kinds of soil /murum/soft rock	cum	1826		
b	Hard rock (controlled blasting)	cum	QRO		
2	Providing and laying compacted 230 mm thick or more rubble packing with 150 mm maximum size of stone & filling the voids with 40 mm aggregates & coarse sand below the base course or as directed by the EIC as per specifications ;watering, rolling ,compacting with water & power roller or Vibratory compactor, etc. all complete as per instructions by Engineer-in charge.	cum	218		
3	Providing and laying in situ cement concrete in proportion <b>1:3:6</b> of trap metal for foundation and bedding, including bailing out water manually, formwork, compacting and curing, etc. all complete as per instructions by Engineer-in charge.	cum	143		
4	Providing and constructing 230mm or more thick masonry SWD walls with locally available first quality bricks having minimum crushing strength 35 Kg/Sq. cm and water absorption maximum 20% in cement mortar CM 1:6 (1 cement : 6 Sand) in specified courses of approved bond and including raking out joints, curing, all complete as per specifications, etc. all complete as per instructions by Engineer-in charge.	cum	502		

5	Providing and applying 12mm thick plaster in cement mortar mix ratio CM 1:4 (1 cement : 4 sand) on internal surfaces of Gala Building SWD masonry work etc. all complete as per specifications and to be finish extra smooth using extra cement, cleaning of surfaces, curing, , etc. all complete as per instructions by Engineer-in charge.	Sqm	2340		
6	Providing and applying 15mm thick single coat plaster in cement mortar mix ratio CM 1:4 (1 cement : 4 sand) on Gala Building SWD masonry & FB boundary fencing foundation wall above ground surface etc. all complete as per specifications, cleaning of surfaces, curing, etc. all complete as per instructions by Engineer-in charge.	Sqm	836		
7	Providing and casting in situ cement concrete M20 of trap metal for RCC slab 150mm thick or as mention in drawing Including centering, formwork, compacting, roughing the surface if special finish is to be provided, keeping cut out for precast cover fixing at require location as per drawing and curing , etc. complete. Rate is including all require materials (except reinforcement steel), labors, tools, tackles, shuttering materials & scaffolding at all leads & lifts, etc. all complete as per instructions by Engineer-in charge.	cum	161		
8	Providing and casting in situ cement concrete M20 of trap metal for Raft, side walls & slab for RCC culverts including centering, formwork, compacting, roughing the surface if special finish is to be provided as per drawing and curing , etc. complete. Rate is including all require materials (except reinforcement steel), labors, tools, tackles, shuttering materials & scaffolding at all leads & lifts, etc. all complete as per instructions by Engineer-in charge.	cum	10		
9	Providing and fixing in position - M.S. / H.Y.S.D. /T.M.T. bar reinforcement of various diameters for R.C.C. drain, culvert or any other related work, etc. as per detailed designs, drawings and schedules, including, cutting, bending, hooking the bars, binding with 18 gauge GI binding wires, placing cement mortar or PVC cover blocks, etc. all complete as per instructions by Engineer-in charge.	kg	3006		



10	Providing, Casting, curing, transporting and fixing factory made RCC Precast covers of required size & thickness in grade of concrete M25 including making M.S./ approved farma, cutting, bending & placing reinforcement as per drawing, mixing & placing concrete, curing the casted covers in pounded water for minimum 15 days or to achieve required minimum strength, transporting the covers to required locations, fixing the covers at locations as mentioned in drawing. Rate is including embossing the required letters as mentioned in drawing. Rate is including all required materials, farmas, labors, tools, tackles, water, electricity & any other fuel, etc. all complete as per instructions by Engineer-in charge.	Sqm	269		
	<b>Total Amount including VAT</b>				
				4.9440%	
	<b>Total Amount including All</b>				

**A.3 BOQ for Project Approach Road**

Sr. No.	Description of Item	Unit	Qty	Rate	Amount
<b>A</b>	<b>Road Work (20 Mtr Wide Road Work)</b>				
1	Cleaning, Excavation, Transportation, leveling of earth work which include Clearing jungle including uprooting of rank vegetation, grass, brush wood, trees and saplings of girth up to 30 cm measured at a height of 1 m above ground level and removal of rubbish within the premises <b>CLEANING &amp; GRUBBING SITE AREA</b> as instructed by Engineer-in-charge, Earthwork in excavation by mechanical means Hydraulic excavator over areas (exceeding 30cm in depth, 1.5m in width as well as 10sqm on plan) in all types of soil, soft murum, hard murum with boulder, weathered rock, soft rock including dressing, leveling, surface preparation for getting grading, camber & slope, watering & compaction with 8 to 10 Ton capacity 3-wheeled steel vibratory roller for roadways including getting out the excavated soil, disposal of excavated earth, within plot area or out side the plot as instructed by EIC. Rate is inclusive of all require machineries, tools, tackles, fuel, labors & also royalty & debris management permission including all government charges, etc. all complete as per instructions by Engineer-in charge.	Cum	5369		
2	Excavation in existing road for damaged area/area of hume pipe & other areas identified by site in charge. Rate shall include for excavating all layers of existing road & upto the required depth including stacking, necessary dewatering, required backfilling with available earth, ramming, watering, compaction with 8 to 10 Ton capacity 3-wheeled steel vibratory roller for roadways, surface preparation for getting grading, camber & slope, dewatering & removing unwanted soil, debris out side site premises, etc. all complete as per instructions by Engineer-in charge.	Cum	500		

3	<p>Providing, laying, spreading and compacting stone aggregates of a specified size to <b>water bound macadam (WBM)</b> specifications, including spreading in uniform thickness, handpicking, rolling with 3-wheeled steel vibratory roller 8-10 tones in stages to proper grade and camber, applying and booming requisite type of screening and binding material to fill up the interstices of course aggregate and watering and compacting to required density, making necessary earthen bund to protect edges, lightening, gardening, goading, barricading and maintenance of diversion, etc. complete 200 mm thk in two layer By Manual means grading -I 60- 80 mm, etc. all complete as per instructions by Engineer-in charge.</p>	Sqm	2100		
4	<p>Providing, laying, spreading and compacting stone aggregates of a specified size to <b>water bound macadam (WBM)</b> specifications, including spreading in uniform thickness, handpicking, rolling with 3-wheeled steel vibratory roller 8-10 tones in stages to proper grade and camber, applying and booming requisite type of screening and binding material to fill up the interstices of course aggregate and watering and compacting to required density, making necessary earthen bund to protect edges, lightening, gardening, goading, barricading and maintenance of diversion, etc. complete 100 mm thk in single layer By Manual means grading -II 43- 60 mm, etc. all complete as per instructions by Engineer-in charge.</p>	Sqm	2100		
5	<p>Providing and laying bituminous tack coat at rate of 6.5 Kg/10 Sqm over WBM by using asphalt grade 80/100 as per MIDC standard road specification including all require materials, labors, machineries, tools &amp; tackles, etc. all complete as per instructions by Engineer-in charge.</p>	Sqm	3800		

6	<p>Providing, laying &amp; compacting 75 mm thick built up spray full grout layer including supplying all materials including all lifts, preparing and cleaning the base, laying the required thickness in two layers heating and spreading, bitumen spreading chips compacting both layer with power roller (excluding tack coat) etc complete as directed by Engineer in charge By using bulk asphalt 60/70 grade) Spec No.: MORTH 2001 Cl No.508. Rate shall include for spreading 12mm aggregate @ 1.8 Cum per 100 sqm as a bonding to the 75mm BM coat. Rate is including all require materials, labours, machineries, tools &amp; tackles, etc. all complete as per instructions by Engineer-in charge.</p>	Sqm	1800		
7	<p>Providing and laying premixed Hot mixed bituminous macadam 75mm thick compacted thickness using 60/70 grade asphalt including all materials, heating bitumen, premixing it with stone metal, in a hot mix, plant, transporting, laying the mix with sensor paver and compacting with vibratory roller, including initial cleaning of surface, tack coat using 80/100 grade asphalt etc. complete. (Asphalt to be used at 4.35% by weight of total mix). Rate shall include for cleaning the base coat laid before monsoon as part of this complete work. Rate is including all require materials, labors, machineries, tools &amp; tackles, etc. all complete as per instructions by Engineer-in charge.</p>	Sqm	3800		
8	<p>Providing and laying hot mix, hot laid premixed bituminous concrete 40 mm thick (Asphalt Concrete) using 60/70 grade asphalt including all materials, heating aggregate asphalt etc. and mixing in hot mix plant, transporting laying with paver, compacting and rolling etc. with vibratory roller (Asphalt to be used at 4.35% by weight of total mix). Rate is including all require materials, labors, machineries, tools &amp; tackles, etc. all complete as per instructions by Engineer-in charge.</p>	Sqm	3800		

9	Providing and laying liquid seal coat using 80/100 grade asphalt over asphalt concrete surface , including supplying all material preparing the existing road surface, heating and applying bitumen @ 1.70 kg/m <sup>2</sup> and spreading chips @ 0.02 m <sup>3</sup> /m <sup>2</sup> and rolling with power roller. Rate is including all require materials, labors, machineries, tools & tackles, etc. all complete as per instructions by Engineer-in charge.	Sqm	3800		
10	Treatment for damaged area of existing road - Providing and laying cationic bitumen emulsion 60% bitumen content for filling the pot holes, patch work on road surface. Filling the pot holes by HINCOL conforming to IS 8887, 1995. It is a surface treatment for structurally sound roads where the wearing course has deteriorated. Thickness shall be 25mm to 40mm. Rate is including all require materials, labors, machineries, tools & tackles, etc. all complete as per instructions by Engineer-in charge. <b>For this item the prior permission of site in charge shall be taken by contractor.</b>	Sqm	60		
11	Painting road surface marking with adequate no. of coats to give uniform finish with ready mixed road marking <b>thermoplastic paint</b> conforming to IS standards on concrete surface in white/yellow shade including cleaning the surface of all dirt, scales, oil, grease and foreign material etc. complete as per instructions by Engineer-in charge				
a	Yellow	Sqm	79		
b	White	Sqm	79		
12	Providing & supplying factory made ,precasted, well cured M20 grade kerb stone of size 200*400*600 or approved sample available at site including transportation, loading, unloading, stacking at site, etc. all complete as per instruction by Engineer In charge.	Rmt	560		
13	Fixing M20 grade kerb stone over DLC bed pointed with fine mortar 1:4 including finishing the top smooth including all materials ( except kerb stone), labor, tools, tackles etc. all complete as per drawing & instruction by Engineer In charge.	Rmt	560		

14	<p>Providing &amp; Painting Kerb stone surface with adequate no. of coats to give uniform finish with Enameled paint conforming to IS standards on concrete surface in Black/yellow shade or as approved including cleaning the surface of all dirt, scales, oil, grease and foreign material, applying approved paint as per manufacturer's specification including all materials, labor, tools, tackles etc. all complete as per drawing &amp; instruction by Engineer In charge.</p>	Sqm	250		
15	<p>Providing and fixing <b>Glow studs</b> of size 100x20 mm made of heavy duty body shall be moulded ASA (Acrylic styrene Acryloretrite ) or HIP (High impact polystyrene) or ABS having electronically welded micro- prismatic lens with abrasion resistant coating as approved by Engineer in charge. The cats eye shall support a load of 13635 kg tested in accordance with ASTM D4280. The slope of retro- reflective surface shall be 35 +/- 5 degrees to base .The reflective panels on both sides with at least 12 cm of reflective area up each side. The luminance intensity should be as per the specification and shall be tested as described in ASTM I: 809 as recommended in BS: 873 part 4 : 1973. The studs shall be fixed to the Road surface using the adhesive conforming to IS, as per procedure recommended by the manufacturer complete and as per direction of Engineer-in-charge</p>	nos	100		
16	<p>Providing, laying, leveling &amp; fixing M30 grade 80mm thick factory made cement concrete interlocking <b>pavers block of Grey &amp; Red shade</b> made by block making machine with strong vibratory compaction and of approved size and design/ shape as per approved sample available at site, laid in required color and pattern over and including 40mm thick compacted bed of course sand, filling the joints with coarse sand etc. all compacted bed of course sand, filling the joints with coarse sand etc. all complete as per the instructions by Engineer-in-charge.</p>	Sqm	QRO		

17	Supplying, installing, testing and commissioning of R.C.C NP2 class ( Heavy Duty) Hume pipes laid to the required level and grade with collars joining in CM 1:3 including require trench excavation, laying, jointing & testing pipes and filling the excavated trench with approved quality saturated sand on sides, bottom and top surface of pipe with all ends and lifts, making necessary connections as required Including all materials, labors, tools, tackles, machineries, etc. complete as per the instructions by Engineer-in-charge. (Provision for road crossings)				
a	100 mm dia	Rmt	50		
b	200 mm dia	Rmt	50		
c	250 mm dia	Rmt	25		
d	300 mm dia	Rmt	50		
e	450mm dia	Rmt	25		
f	600 mm dia	Rmt	25		
<b>B Storm Water Drain</b>					
18	<b>Excavation for foundation</b> in including removing the excavated materials with in site limit as specified, stacking, necessary dewatering unless provided elsewhere, preparing bed for the foundation and required back filling at extra excavation after completion of work with available earth / murum, ramming, watering etc. complete as directed excluding shoring and starting, etc. all complete as per instructions by Engineer-in charge.				
a	a) All kinds of soil /murum/soft rock	Cum	30		
b	b) Hard rock (chiseling )	Cum	QRO		
19	Providing and laying compacted 230 mm thick or more rubble packing with 150 mm maximum size of stone & filling the voids with 40 mm aggregates & coarse sand below the base course or as directed by the EIC as per specifications ;watering, rolling ,compacting with water & power roller or Vibratory compactor, etc. all complete as per instructions by Engineer-in charge.	Cum	280		

20	Providing and laying in situ cement concrete in proportion 1:3:6 of trap metal for foundation and bedding, including bailing out water manually, formwork, compacting and curing, etc. all complete as per instructions by Engineer-in charge.	Cum	200		
21	Providing and constructing uncoursed Random Rubble stone masonry with good quality basalt for SWD walls as per drawing in 1 : 6 cement sand mortar, complete with raking out joints, curing, providing 100mm dia PVC pipe to drain off road surface water if require, complete as per specifications, etc. all complete as per instructions by Engineer-in charge.	Cum	260		
22	Providing and laying 100 mm thick coping above UCR masonry in situ cement concrete in proportion 1:3:6 of trap metal for foundation and bedding, formwork, compacting and curing, etc. all complete as per instructions by Engineer-in charge.	Cum	50		
23	Providing and casting in situ cement concrete M20 of trap metal for Raft, side walls & slab for RCC culverts including centering, formwork, compacting, roughing the surface if special finish is to be provided as per drawing and curing , etc. complete. Rate is including all require materials (except reinforcement steel), labors, tools, tackles, shuttering materials & scaffolding at all leads & lifts, etc. all complete as per instructions by Engineer-in charge.	Cum	25		
24	Providing and fixing in position - M.S. / H.Y.S.D. /T.M.T. bar reinforcement of various diameters for R.C.C. drain, culvert or any other related work, etc. as per detailed designs, drawings and schedules, including, cutting, bending, hooking the bars, binding with 18 gauge GI binding wires, placing cement mortar or PVC cover blocks, etc. all complete as per instructions by Engineer-in charge.	Kg	500		
	<b>Total Amount including VAT</b>				
	<b>Service Tax</b>			<b>4.944%</b>	
	<b>Total Amount including all Taxes</b>				