

E-TENDER FOR STRUCTURAL REPAIR, STRENGTHENING & ROOF REPLACEMENT FOR AUDITORIUM BUILDING,  
AT SNTD JUHU CAMPUS MUMBAI.

**SHREEMATI NATHIBAI DAMODAR THACKERSEY  
WOMEN'S UNIVERSITY**

**(STRUCTURAL REPAIR, STRENGTHENING & ROOF REPLACEMENT FOR  
AUDITORIUM BUILDING AT SNTD JUHU CAMPUS, MUMBAI)**



**VOLUME 1: Conditions of Contract**

*TENDER DOCUMENT*

**CIVIL, STRUCTURAL & ALL SERVICES**

**OWNER:**

**The Registrar,**

1, Nathibai Thackersey Road,  
Churchgate, Mumbai 400 020

**Architect:**

**M/s. Shashi Prabhu & Associates**

Wankhede Stadium, Block A2 and B1,  
North Stand, 'D' Road,  
Churchgate, Mumbai - 400020

**INDEX**

<b>Sr. No.</b>	<b>Contents</b>	<b>Pages From</b>	<b>Pages To</b>
<b>Volume – I (Conditions of Contract)</b>			
1	Tender Notice	3	3
2	Detail Tender Notice A	4	9
3	Acknowledgement by Tenderer	10	11
4	Prequalification of Tenderer	12	18
5	Articles of Agreements	19	20
6	General Condition of Contract	21	51
8	Special Condition of Contract	52	76
<b>Volume – II (Technical Specifications)</b>			
9	<b>A) Technical Specifications Civil</b>		
10	Mode of Measurements	77	84
11	List of Approved brands of Materials( Civil)	85	86
12	Standards cement consumptions	87	89
13	<b>B) Technical Specifications Plumbing &amp; Sanitation</b>	90	103
14	List of Approved brands of Materials( Plumbing)	104	104
15	<b>C) Technical Specifications Electrical</b>	105	137
16	List of Approved brands of Materials( Electrical)	138	138
17	Letter of offer	139	139
<b>Volume – III (Price Bid)</b>			
18	BOQ (Civil, Plumbing, Electrical)	140	170
19	Drawings attached separately		

## **TENDER NOTICE**

**Ref No.:** Est. RUSA. / (RM/J)-2/2017-18/02

Dear Sir,

On behalf of, The Registrar **SNTD WOMEN'S UNIVERSITY** invites fresh Item Rate E-tenders for **STRUCTURAL REPAIR, STRENGTHENING & ROOF REPLACEMENT FOR AUDITORIUM BUILDING at SNTD Women's University on Plot bearing C.T.S. No. 1051, plot nos. 18-19 of T.P.S. VI, sub-plots 68, 69 & 70 at Juhu, Mumbai.**

Tender forms can be obtained from official web site of <http://sntd.ac.in/tender> and <https://maharashtra.etenders.in/> from 15.12.2017, 10.00 a.m. onwards.

Pre-bid meeting will be held on 9<sup>th</sup> January 2018 at 11.00 a.m. at Administration Building SNTD Women's University, Nathibai Thakersey Road, Churchgate, Mumbai - 400 020.

The sealed tenders will be submitted on or before 17<sup>th</sup> January 2018 upto 5.00 p.m. at Administration Building SNTD Women's University, Nathibai Thakersey Road, Churchgate, Mumbai - 400 020 and opening tender will be held in Churchgate campus will be held 19<sup>th</sup> January 2018, 10.00 am. Contractors should remain present at the time of opening. **Any change in the opening time and date same will be communicated to all contractors. The employer reserves the right to reject any or all tenders without assigning any reasons thereof.**

E-Tender Schedule is as below:

Seq No	ALLGOM Stage	Vendor Stage	Start Date & Time	Expiry Date & Time
1	Release of tender	-	15-12-2017 10:00	15-12-2017 15:00
2	-	Tender Download	15-12-2017 15:01	16-01-2018 17:00
3	-	Bid Preparation	15-12-2017 13:01	16-01-2018 17:01
4	Superhash Generation & Bid Lock	-	16-01-2018 17:01	17-01-2018 17:00
5	-	Control Transfer of Bid	17-01-2018 17:01	18-01-2018 17:00
6	Envelope 1 Opening	-	19-01-2018 10:00	19-01-2018 17:00
7	Envelope 2 Opening	-	19-01-2018 10:00	19-01-2018 17:00

**Sd/  
The Registrar  
SNTD Women's University  
1, Nathibai Thackersey Road,  
Churchgate Campus.**

## 1. DETAILED TENDER NOTICE

1.1 Sealed **Item Rate** tenders are invited from qualified Contractors for the work as per the following details:

<b>1.1.1</b>	<b>Name and Location of Work</b>	STRUCTURAL REPAIR, STRENGTHENING & ROOF REPLACEMENT FOR AUDITORIUM BUILDING at SNTD Women's University on Plot bearing C.T.S. No. 1051, plot nos. 18-19 of T.P.S. VI, sub-plots 68, 69 & 70 at Juhu, Mumbai.
<b>1.1.2</b>	<b>Cost of Tender</b>	<b>RS. 2,360 /- (Rs. Two Thousand including GST Only)</b> (Non refundable) in favour of <b>The Registrar, SNTD Women's University</b> payable at Mumbai drawn on Nationalized Bank only
<b>1.1.3</b>	<b>Scope of Work</b>	<b>All civil works including services works.</b>
<b>1.1.4</b>	<b>Date of Commencement</b>	Date of Work Order
<b>1.1.5</b>	<b>Time of Completion</b>	08 months (Eight Months including Monsoon) from the date of Work Order
<b>1.1.6</b>	<b>Date and Place of Submission of Tender</b>	<b>On or before 17<sup>th</sup> January 2018 upto 5.00 p.m.</b> at Administration Building SNTD Women's University, Nathibai Thakersey Road, Churchgate, Mumbai – 400 020
<b>1.1.7</b>	<b>Time of Opening</b>	<b>10.00 a.m. on 19<sup>th</sup> January 2018</b> at SNTD Women's University, Nathibai Thakersey Road, Churchgate, Mumbai – 400 020
<b>1.1.8</b>	<b>Earnest Money</b>	<b>Rs. 2, 34,000/- (Rs. Two Lakh Thirty Four Thousand only)</b> to be paid through Online Payment Modes i.e. Net Banking, Debit Card, Credit Card and NEFT/RTGS during Bid Preparation Stage.
<b>1.1.9</b>	<b>Total Security Deposit</b>	a) Total 2% of value of work (inclusive of all Taxes) including Initial Security Deposit. b) 2.05% (Including EMD) of accepted tendered amount (including all taxes) to be deposited within ten (10) days of acceptance of tender.
<b>1.1.10</b>	<b>Refund of security deposit</b>	a) 50% of security deposit to be refunded after issue of certificate. Virtual completion. b) Balance 50% of security deposited to be refunded After expiry of defects liability period of 12 months and its proper discharge.
<b>1.1.11</b>	<b>Defects Liability Period</b>	<b>12 months from date of Virtual Completion.</b>
<b>1.1.12</b>	<b>Liquidated Damage</b>	At the rate of 0.25% of contract value per week

**Note: Contractor should quote the rate by considering Goods and Service Tax (GST)**

**1.2** In the event of the tender being submitted by a firm, it must be signed by each partner thereof, and in the event of the absence of any partner, it shall be signed on his behalf by a person holding a Power of Attorney authorizing him to do so.

### **1.3 Earnest Money**

**1.3.1 Earnest money deposit shall be treated as a token of the tenderer's earnestness to carry out the work Rs. 2, 34,000/- (Rs. Two Lakh Thirty Four Thousand only)** to be paid through Online Payment Modes i.e. Net Banking, Debit Card, Credit Card and NEFT/RTGS during Bid Preparation Stage.

1.3.2 In the event of his tender being accepted, subject to the provisions of sub clause(1.5) below, the said amount of Earnest Money shall be appropriated towards the amount of Security Deposit payable by him under the General Conditions of Contract or refunded if the total security deposit is furnished.

1.3.3 After submitting the tender the Contractor withdraws his offer or modifies the same, or after acceptance of his tender the Contractor fails or neglects to furnish the balance of Security Deposit, then, without prejudice to another rights and powers of the Owner hereunder, or in Law, the Owner shall be entitled to forfeit the full amount of Earnest Money deposited by him.

1.3.4 In the event of his tender not being accepted, the amount of Earnest Money deposited by the Contractor shall, unless it is forfeited under the provisions of sub-clause (1.3.3) above, be refunded to him on his passing receipt thereof.

**1.4** Receipts for payments made on account of any work when executed by a firm, should also be signed by all the partners except where the Contractors are described in their tender as a firm in which case the receipts shall be signed in the name of the firm by one of the partners or by some other person having authority to give effectual receipts for the firm.

**1.5** Tender which proposes, any alteration in the works specified in the said form of invitation of tender or in the time allowed for carrying out the work or which contains any other conditions of any sort is liable to rejection.

**1.6** The tenders shall be opened in the presence of Contractors who have submitted tenders or their representatives who may be present at that time. In the event of a tender being accepted, the Contractor shall be present for the purpose of identification, sign copies of the specifications and other documents and the agreement. In the event of the tender being rejected, the Owner shall refund the amount of Earnest Money deposit to the unsuccessful Contractors on their letter of demand for refund EMD.

**1.7** The Owner reserves the right of rejecting all or any of the tenders without assigning any reason and is not bound to accept the lowest or any other tender.

### **6 Sign & Seal of Contractor**

**1.8** No receipt for any payment alleged to have been made by a Contractor in regard to any matter relating to this tender shall be valid and binding on the Owner unless it is signed by the Architect/ Owners Authorized representative.

**1.9** Tenders submitted without payment of Earnest Money Deposit will not be opened or accepted.

**1.10** Drawings can be inspected in the office of the Architects Agora designers during working hours.

**1.11** In case of any difference in the rates quoted in words and figures that given in words shall prevail.

**1.12** The offer of the tenderer shall remain open for a period of **180 days from date of submission**. During the period no tenderer will be allowed to withdraw his tender.

**1.13** The tender documents shall be submitted in a sealed inner cover and a sealed outer cover with the envelope, containing the Earnest Money placed in between. All the envelopes/covers shall be addressed to the '**The Registrar, SNTD Women's University**', Churchgate, Mumbai with the name of the Contractor given in the bottom left hand corner and superscribed Tender for Structural Repair of Auditorium Building. The top most cover will be opened first. The cover containing the tender documents will only be opened if it is found that the Earnest Money submitted by the tenderers is in the appropriate form.

**1.14** This is a Item rate tender.

1.15a Tenderer shall submit Rate Analysis of Civil Work items along with bid document at the time of submission.

**1.15** Under circumstances Contractor be entitled to claim enhanced rates for items in this contract in during the execution.

**1.16** All corrections and additions or pasted slips shall be initiated.

**1.17** Tenderer should submit last 3 years audited financial statement duly signed by chartered Accountant.

**1.18** No foreign exchange would be released by the Owner for purpose of construction materials, plants and machinery required for the execution of work contracted for.

**1.19** The tenders are requested to submit to the Architects in writing (electronically or other way) before **08 January 2018** (asking for any clarification or any variations or modifications that they would like to be made in the tender documents. Thereafter a pre-tender meeting will be held in Pune campus; at this meeting all issues raised by the tenderer will be discussed. Thereafter an amendment will be issued stating clearly as to the final modifications of the conditions which are acceptable to the Owner. This amendment will form part of the contract and the tenderer will be required to quote accordingly. Any other conditions given by the tenderer except those accepted in pursuance of the pre-tender meeting, will make the tender liable for rejection.

## **7 Sign & Seal of Contractor**

**1.20** Every page of the tender document shall have the seal of the Contractor and initialed, and full signature where specifically indicated.

**1.21** No loss/ compensation / damages shall be payable by the Employer / Owner to the Contractor / anyone if the work stopped by the order of any judicial / Higher Administrative authority.

**1.22 STUDY OF TENDER DOCUMENTS:**

1.22.1 Upon submission of the Tender, it will be presumed that the Contractor has thoroughly studied the Tender document with all the terms, conditions, specifications, mode of measurements and drawings and has completely understood the nature, extent and scope of the work and is completely aware of his liabilities and responsibilities in respect of the contracted work.

1.22.2 In the event of any contradictions or inadequate clarity in this Tender document, these should be brought to the notice of the University/ Architects BEFORE quoting, and got properly clarified. In any case, at all times, the interpretation and decision of University / Architects shall be final and binding on the Contractor.

1.22.3 For the purpose of this Tender and subsequent construction Contract, any reference to the "The Registrar, SNDT Women's University" shall be the duly authorized representative spokesman for the Board of Governors and the Building Committee of the project, with absolute final authority.

**1.22.4 VISIT TO SITE OF WORK**

The Contractor is expected to visit the site of work and personally see the site conditions regarding water, labour conditions, leads, lifts, soil conditions and strata and all other factors affecting the work before submitting the quotation. Leads, lifts and permissibility for disposal of excavated material shall also be studied and considered in the quotations. **No extras or escalation** shall be granted on account of any error of judgment or miscalculation or misunderstanding of scope of the work.

**1.22.5 UN CONDITIONAL QUOTATION**

Submitted Tenders shall NOT be subject to ANY conditions other than those stipulated in the Tender Document. Quoted rates and amounts shall be deemed to be completely unconditional and any conditional Tenders are liable to be rejected outright. Contractors are requested to abide by this instruction, in their own interest, for the purpose of enabling comparison between equals with complete parity. If any, observation, assumptions, suggestions are not required to be communicated; these may be separately addressed to the University without having any bearing or impact on the Item rate quotation in the sealed Tender, in the process of evaluation.

**2.1** Tender is to be submitted in two separate sealed envelopes as below:

**ENVELOPE NO. 1:**

The first envelope clearly marked as "ENVELOPE NO. 1" shall contain the following documents.

**8 Sign & Seal of Contractor**

i) Information regarding Income Tax Circle/Ward/District in which he is assessed for income tax valid and up to-date. Income Tax Clearance Certificate (in original) from the Income Tax Officer, or true copy thereof duly attested.

ii) List and details of other works tendered for in hand with the value of work unfinished on the last date of submission and the List of executed/completed projects. The names of Clients, Architects, PMCs, awarded value etc.

iii) Names of Owner/Partners/Director of the Firm/Company and their addresses.

iv) List of Machinery and Plants immediately available with the Tenderer for use on this work and list of machinery proposed to be utilized on this work but not immediately available and the manner in which it is proposed to be procured.

v) List of Technical Personnel, their qualifications and experience on the roll of the Tenderer and also of those to be appointed on this work.

vi) Forwarding letter along with list of documents, forms, statements, specifications, etc.

**viii) Conditional tenders are liable to be summarily rejected.**

### **2.3 ENVELOPE NO. 2: TENDER**

The second envelope clearly marked as "ENVELOPE NO. 2" shall contain only the main tender, including the common set of conditions/stipulations, if any issued by the SNTD University.

Tenderer should quote his offer in Schedule 'B' (i.e. Volume-II) of the tender on **Item above or below Estimated Cost** to be submitted only in Envelope no. 2. He should not quote this offer anywhere directly or indirectly in Envelope no. 1. The Contractor shall quote for the work as per details given in the main tender and also based on the detailed set of conditions issued if any, and/or any additional stipulations made by The SNTD Women's University.

### **2.4 SUBMISSION OF TENDER**

The two sealed Envelopes no. 1 and 2 shall be again put together in one common cover and sealed. This sealed cover shall be marked on the left-hand top corner as Tender for **"STRUCTURAL REPAIR & ROOF REPLACEMENT WORK FOR AUDITORIUM BUILDING AT JUHU CAMPUS"**, the full name and address of the tenderer and the name of the authorized agent delivering the sealed cover containing the tender shall be **STRUCTURAL REPAIR & ROOF REPLACEMENT WORK FOR AUDITORIUM BUILDING AT JUHU CAMPUS**

### **9 Sign & Seal of Contractor**

Written on the bottom left-hand corner. The date and time for receipt of envelope containing the tender shall strictly apply in all cases.

i) Tender shall be submitted to Owners Office as per Detailed Tender Notice 1.1.6

### **1.22.6 PERIOD OF DECISION**

The Tenders shall remain open for acceptance for a period of 120 days from the date on which they are due for submission, or any other extended date for their receipt, and during this period NO Contractor shall be allowed to withdraw his tender.

### **1.22.7 IMPROPER AND INCOMPLETE TENDERS**



E-TENDER FOR STRUCTURAL REPAIR, STRENGTHENING & ROOF REPLACEMENT FOR AUDITORIUM BUILDING,  
AT SNDT JUHU CAMPUS MUMBAI.

i) Quotations shall be tendered on Item Rate Basis in the annexed Schedule of Item Quantities. Please read the PREAMBLES prior to the item descriptions and specifications carefully before quoting the rates. Specific Brands of materials have been prescribed in some items, while acceptable options of Brand specifications have been listed in Chapter 16 in the Tender.

ii) The quotations in the Tender shall be written clearly and shall be free from erasures, over-writing or conversions of figures. Corrections, where unavoidable, shall be made by crossing out, initialing and rewriting.

iii) Tenders received without the Demand Draft for EMD attached to the Envelope will NOT be accepted. Tenders received with any terms and conditions in variation with those stipulated in the Tender document shall NOT be considered.

**1.22.8 ATTESTATION OF TENDER DOCUMENTS:**

Contractors must RETURN the Tender Documents complete with the specifications, schedule of quantities, and drawings, with the Item rates, and total amounts in figures and words, and every page duly signed. Seal and Signature of the Contractor should also be placed below the summary at the end of the Schedule of quantities. Any tender not bearing signature of the Contractor on all documents accompanying the Tender is liable to be rejected.

## **ACKNOWLEDGEMENT BY TENDERER**

To,

**The Registrar,** (hereinafter referred to as the Owner).  
**SNTD Women's University,**  
**1, Nathibai Thackersey Road,**  
**New Marine Lines, Churchgate,**  
**Mumbai 400 020**

Dear Sir / Madam,

I / We have visited the site, got all the information of site conditions and information regarding execution of contract, facilities available at site / offered by the University, read and examined all documents relating to the proposed work

- a. Notice inviting tender
- b. Prequalification form
- c. Articles of Agreement
- d. General Conditions of Contract
- e. Special Conditions of Contract
- f. General Specifications of Work
- g. Schedule of Quantities

I / We hereby tender for execution of the works referred to the in the aforesaid documents upon the terms and conditions contained or referred to therein and in accordance in all respects with the specifications, designs, drawings and other relevant details at the rate contained in the SCHEDULE OF QUANTITIES and within the period (s) of completion as stipulated in APPENDIX 'A' of the Special conditions of contract.

In consideration of I / we being invited to tender, I / we agree to keep the tender open for acceptance for 90 days from the due date of submission thereof and not to make any modification in its terms and conditions which are not acceptable to the Owner.

Online payment of **Rs. 2, 34,000/- (Rs. Two Lakh Thirty Four Thousand only)** should be done as describing e-tender notice. If I / we fail to keep the tender open as aforesaid or make any modification in the terms and conditions of the tender which are not acceptable to the Owner, I / we agree that the Owner shall, without prejudice to any other right or remedy, be at liberty to forfeit the amount of the above said earnest money absolutely. Should this tender be accepted, I / we agree to abide by and fulfill all the terms, conditions and provisions of the aforesaid documents.

If, after the tender is accepted, I / we fail to commence the execution of the works, as provided in the Special Conditions of Contract / we agree that the Owner shall, without prejudice to any other right or remedy, be at liberty to forfeit the above said earnest money absolutely.

I / we agree that should the Owner decide to forfeit earnest money as aforesaid, unless a sum equal to the earnest money sanctioned above is paid by us forthwith, the Owner may, at its option, recover it out of the deposit and in the event of deficiency, out of any other money due to me/us otherwise.

E-TENDER FOR STRUCTURAL REPAIR, STRENGTHENING & ROOF REPLACEMENT FOR AUDITORIUM BUILDING,  
AT SNTD JUHU CAMPUS MUMBAI.

DULY AUTHORIZED TO SIGN THE TENDER :

\_\_\_\_\_  
(ON BEHALF OF THE CONTRACTOR)

ADDRESS : \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

DATE : \_\_\_\_\_

PHONE NUMBER : \_\_\_\_\_

EMAIL ADDRESS : \_\_\_\_\_

**WITNESS** :  
\_\_\_\_\_

SIGNATURE IN THE CAPACITY OF : \_\_\_\_\_

ADDRESS : \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

DATE : \_\_\_\_\_

**PRE-QUALIFICATION OF TENDERERS**

**Pre-Qualification of the Contractors for the Work of:**

**“STRUCTURAL REPAIR, STRENGTHENING & ROOF REPLACEMENT WORK FOR AUDITORIUM BUILDING, AT SNTD JUHU CAMPUS MUMBAI.”**

1. The Registrar, on behalf of the Vice Chancellor, SNTD Women’s University, invited eligibility documents from firms/contractors of repute for Pre-qualification of the contractor for issue of tender for the following:

<b>Sr. No.</b>	<b>Name of Work</b>	<b>Estimated Cost</b>	<b>Period of Completion</b>
(1)	(2)	(3)	(4)
1	<b>STRUCTURAL REPAIR, STRENGTHENING &amp; ROOF REPLACEMENT WORK FOR AUDITORIUM BUILDING, AT SNTD JUHU CAMPUS MUMBAI</b>	<b>Rs. 4,67,24,618.64/-</b>	<b>08 months</b>

2. Application supported by prescribed annexure along with supporting documents in physical form, shall be placed in sealed envelopes marked "Pre-qualification Eligibility Documents" and shall be submitted as described in detail Tender notice.
3. Final decision making authority
  - 3.1. SNTD Women’s University reserves the right to accept or reject any bid and to annul the process and reject all bids at any time, without assigning any reason or incurring any liability to the parties.
4. General
  - 4.1. All information called for in the enclosed forms should be furnished against the relevant columns in the forms. If for any reason, information is furnished on a separate sheet, this fact should be mentioned against the relevant column. Even if no information is to be provided in a column, a "nil" or "no such case" entry should be made in that column. If any particulars/query is not applicable in case of the party, it should be stated as "not applicable" or "N.A.". The parties are cautioned that not giving true and complete information called for in the application forms or not giving it in clear terms or making any change in the prescribed forms or deliberately suppressing the information shall result in the summarily disqualifying the party. Pre-qualification documents received late will not be entertained.
  - 4.2. Overwriting should be avoided. Correction, if any, should be made by neatly crossing out, initialing, dating and rewriting. Pages of the eligibility criteria document shall be numbered. Additional sheets, if any added by the party, shall also be numbered. All the documents shall be sealed and signed by the party. They shall be submitted as a package with signed letter of transmittal.
  - 4.3. References, information and certificates from the respective clients certifying suitability, technical knowledge or capability of the party shall be submitted along with the tender documents.
  - 4.4. The party may furnish any additional information which he thinks is necessary to establish his capabilities to successfully complete the envisaged work. It is, however, advised not to furnish superfluous information. No information shall be

entertained after submission of eligibility criteria document unless it is called for by the SNTD Women's University.

4.5. Any information furnished by the party found to be incorrect either immediately or at a later date, would render him liable to be debarred from tendering/taking up of work in SNTD Women's University. If such party happens to be enlisted contractor in SNTD Women's University, it shall also be removed from the approved list of contractors.

5. Criteria for eligibility:

Contractors who fulfill the following requirements shall be eligible for pre-qualification.

5.1. Should have satisfactorily completed the works as mentioned below during the last 5 years ending 31<sup>st</sup> March 2017

5.1.1. Average Annual turnover during the last 3 years, ending 31<sup>st</sup> March of the previous financial year, should be at least 30% of the estimated cost or more.

5.1.2. Experience of having successfully completed similar works during last 7 years ending last day of month previous to the one in which applications are invited should be either of the following:

a) Three similar completed works costing not less than the amount equal to 40% of the estimated cost

OR

b) Two similar completed works costing not less than the amount equal to 50% of the estimated cost

OR

c) One similar completed work costing not less than the amount equal to 80% of the estimated cost.

5.1.3. Definition of "similar work" should be clearly defined.

5.2. Should not have incurred any loss in more than two (2) years during the last 3 years ending 31<sup>st</sup> March 2017. This should be duly audited by a Chartered Accountant.

5.3. Should have a solvency of ` 12 Crore, which should be certified by the bank.

5.4. Should have own constructions equipment as per list required for the proper and timely execution of the work. Else, he should certify that he would be able to manage the equipment by hiring etc., and submit the list of firms from whom he proposes to hire.

5.5. Should have sufficient number of Technical and Administrative employees for the proper execution of the contract. The party should submit a list of these employees stating clearly how these would be involved in this work.

5.6. Financial information

- 5.6.1. Party should furnish the Annual financial statement for the last three (3) years.
- 5.6.2. Party should furnish solvency certificate in Form "B".
- 5.7. Experience in works highlighting experience in similar works
  - 5.7.1. Party should furnish list of all works of similar nature successfully completed during the last seven years in Form "C".
  - 5.7.2. Party should furnish list of the projects under execution or awarded in Form "D".
  - 5.7.3. Particulars of completed works and performance of the party duly authenticated/certified by an officer not below the rank of Executive Engineer or equivalent should be furnished separately for each work completed or in progress in Form "E".
6. Letter of transmittal
  - 6.1. The party should submit the letter of transmittal attached with the document.
7. Selection criteria
  - 7.1. SNDDT Women's University reserves the right, without being liable for any damages or obligation to inform the party to reject any or all the applications without assigning any reason.
  - 7.2. Any effort on the part of the party or his agent to exercise influence or to pressurize the SNDDT Women's University would result in rejection of his application. Canvassing of any kind is prohibited.
  - 7.3. The party should disclose details of arbitration / litigation cases, if any, is pending or in progress. Hiding of such information would result in summarily rejection of his bid without assigning any reason.

**Form B**

Form of Bankers' Certificate from a Scheduled Bank for Certifying the Solvency  
of the Party

This is to certify that to the best of our knowledge and information that  
M/s.....having marginally noted  
address, a customer of our bank are/is respectable and can be treated  
as good for any engagement upto a limit of

, .....

Rupees .....

This certificate is issued without any guarantee or responsibility on the  
bank or any of the officers.

Date:

(Signature)

Authorized Bank Representative

Notes:

- 1 Bankers certificates should be on letter head of the Bank.
- 2 In case of partnership firm, certificate should include names of all partners as recorded with the Bank.







**Form E**

**Performance Report of Works Referred to in Form C & Form D**

- 1 Name of the work / project location :
- 2 Agreement No. :
- 3 Estimated Cost :
- 4 Tended Cost :
- 5 Date of Start of Work :
- 6 Date of Completion of Work :
  - i Stipulated Date of Completion :
  - ii Actual Date of Completion :
- 7 Amount of compensation levied for delayed completion, if any :
- 8 Amount of reduced rate items, if any :
- 9 Performance Report :
  - i Quality of Work : Very Good / Good / Fair / Poor
  - ii Financial Soundness : Very Good / Good / Fair / Poor
  - iii Technical Proficiency : Very Good / Good / Fair / Poor
  - iv Resourcefulness : Very Good / Good / Fair / Poor
  - v General Behaviour : Very Good / Good / Fair / Poor

Date:

(Signature)  
Authorized Client's Representative

**ARTICLES OF AGREEMENT**

Agreement made at Mumbai this \_\_\_\_\_ day of 2018 BETWEEN "The Registrar, SNTD Women's University, Mumbai" (hereinafter referred to as the Owner which expression shall include it **successors and assigns**) of the one part, AND, M/s \_\_\_\_\_ (hereinafter referred to as the Contractor which expression shall include his heirs, Executors, Administrators & Assigns) of the other part.

WHEREAS the Owner is desirous of **E-TENDER FOR STRUCTURAL REPAIR, STRENGTHENING & ROOF REPLACEMENT FOR AUDITORIUM BUILDING, AT SNTD JUHU CAMPUS MUMBAI.**

**NET TOTAL COST: Rs. \_\_\_\_\_**

(In words Rs. \_\_\_\_\_  
AND WHEREAS the Contractor has deposited as Security Deposit a sum of Rs.

(Rs. \_\_\_\_\_) with the owner for the due performance of this agreement.

NOW IT IS HEREBY AGREED AS FOLLOWS:

- 1) In consideration of the payments to be made to the contractor as hereinafter provided, he shall upon and subject to the said conditions execute and complete the works shown upon the said drawings and such further detailed drawings as may be furnished to him by the University and described in the said specifications and the said priced schedule of quantities.
- 2) The Owner shall pay the contractor such sums as shall become payable hereunder at the times and in the manner specified in the said conditions.
- 3) The drawings, specifications, and priced schedule of quantities above mentioned shall form the basis of this contract and the decision of the Engineers for the time being as mentioned in the conditions of contract in reference to all matters of dispute as to the material, workmanship or account and as to the intended interpretation of clauses of this agreement or any other document attached hereto shall be final and binding on both parties and may be made a Rule of Court.
- 4) The said contract comprises the constructions above mentioned and all subsidiary works connected therewith within the said site as may be ordered to be done from time to time by the said University for the time being even though such works may not be shown on the drawings of described in the said specifications or the priced schedule of quantities.
- 5) The Owner reserves to himself the right of altering the drawings and nature of the work and adding to or omitting any items of the work or of having portions of the same carried out departmentally or otherwise and such alterations or variations shall be carried out departmentally or otherwise and such alterations or variations shall be carried out without prejudice to this contract.

E-TENDER FOR STRUCTURAL REPAIR, STRENGTHENING & ROOF REPLACEMENT FOR AUDITORIUM BUILDING,  
AT SNDT JUHU CAMPUS MUMBAI.

- 6) The said conditions and appendix thereto shall be read and continued as forming part of this agreement and the parties hereto will respectively abide by and submit themselves to the conditions and stipulations and perform the agreement on their parts respectively in such conditions contained.
- 7) All disputes arising out of or any connected with this agreement shall be deemed to have arisen in Mumbai and only the Hon'ble Court in Mumbai shall have jurisdiction to determine the same.
- 8) The several parts of this contract have been read to us and fully understood by us.

As witness our hands this \_\_\_\_\_ day of 2018.

SIGNED BY THE SAID

**OWNER**

IN THE PRESENCE OF

1.

2.

SIGNED BY THE SAID

**CONTRACTOR**

IN THE PRESENCE OF

1.

2.

## **GENERAL CONDITIONS OF CONTRACT**

### **1. Definitions**

1.1. The contract document consists of the Agreement, the General Conditions of the Contract, Specification and Bills of Quantities (BOQ) including all modifications thereof incorporated in the document before the execution and the Contract Drawings prepared by the Owner from time to time. These form the contract.

1.2. The Owner:  
The Contractor:  
The Owner:  
The Consultant:

Are those mentioned as such in the Agreement and shall include their legal representatives, assigns or successors. They are treated throughout the Contract Document as if each were of the singular number and masculine gender.

1.3. "The Site" shall mean the site of the contract work, including and building and erections thereon and any other land allotted by the owner for contractor's use.

1.4. The term "Sub-Contractor" as employed herein, includes those having a direct contract with the Contractor and it includes one who furnishes material worked to a special design according to the plans or specifications of this work but does not include one who merely furnishes material not so worked.

Anyone doing work on a piece rate basis shall be deemed a Sub-Contractor.

1.5. Written notice shall be deemed to have been duly served if delivered in person to individual or to member of the firm or to an office of the corporation for whom it is intended or if delivered at or sent by registered mail to the last business address known to him who gives the notice.

1.6. The term "work" of the Contractor or Sub-Contractor includes labour or material or both.

1.7. All times limits stated in the Contractor Document are of the essence of the contract.

1.8. The law of the place work shall govern the construction under this contract.

1.9. The date of virtual completion of a project or specified area of a project is the date when construction is sufficiently completed, in accordance with the Contract Documents as modified by any change or variation orders agreed to by the parties so that the Owner can occupy the project for the use it was intended.

### **2. Contract Document**

2.1. The following documents shall constitute the contract documents:  
2.1.1. Articles of Agreement.  
2.1.2. General Conditions of Contract.  
2.1.3. Specifications.  
2.1.4. Bills of Quantities.

2.2. The Contract Documents is complementary. What is called for in any one shall be has binding as is called for by all.

- 2.3. The Contract Document shall remain in the custody of the Owner so as to be available at all reasonable times for the inspection of the Owner or of the Contractor. Immediately after the execution of the contract one copy of the Contract Document and two copies of the Contract Drawings shall, without charge, be supplied by the Owner to the Contractor and one copy of the Contract Document to the Owner.
- 2.4. So soon as is possible after the execution of this contract two copies of the Specifications, descriptive schedule or other like documents necessary for use in carrying the work shall without charge be supplied by the Owner to the Contractor.
- 2.5. Provided that nothing contained in the said Specifications, Descriptive schedules or other document shall impose any obligation beyond those imposed by the Contract Document namely by the Contract Drawing, the Contract Bills, the Articles of Agreement and these conditions. After the award of the Contractor the Contractor shall without charge be supplied with all such further drawings and details as may be prepared by the Owner and his Consultant, from time to time as the work proceeds as are reasonably necessary either to explain or amplify the Contract Drawings or to enable the Contractor to carry out and complete the work in accordance with these Conditions provided all such drawings shall be a reasonable development of the work described in the Contract Document.
- 2.6. The Contractor shall keep one copy of the Specifications, Descriptive schedule or other like document referred to in this clause and one copy of the contract Drawing and such other drawings and details supplied to him from time to time and referred to in this clause and written instructions referred to in this clause and clauses 9. and 30. at the site so as to be available to the Owner or his representative at all reasonable times.
- 2.7. None of the documents herein before mentioned shall be used by the Contractor for any purpose other than this contract and neither the Owner nor the Owner shall divulge or use except for the purpose of this contract any of the prices in the contract bills.
- 2.8. Upon final payment under the clause 31.6. of these conditions the Contractor shall if so requested by the Owner forthwith return to the Owner all Drawings, Details Specifications Descriptive Schedule and other Document of like nature which bears his name or that of the Consultant.

### **3. Type of Contract**

- 3.1. The Contract shall be an Item rate contract. The Contractor shall be paid for the actual quantity of work done, as measured at site or as per drawing whichever is less, at the rates mentioned in the Contract.

### **4. Schedule of Quantities**

- 4.1. The schedule of Quantities given in the Contract Bill is provisional and is meant to indicate the intent of the work and to provide a uniform basis for tendering. The Owner reserves the right to increase or decrease any of the quantities or to totally omit any item of work and the Contractor shall not claim any extras or damages on these grounds.
- 4.2. Any error in description or in quantity or omission of items from the Contract Bill shall not vitiate this Contract but shall be treated as a variation.

## **5. Contract Drawings**

- 5.1. In general the Drawings shall indicate dimensions, position and type of construction; the Specifications shall indicate the qualities and the methods; and the Bill of Quantities shall indicate the quantum and the rate for each item of work. Any work indicated on the Drawings and not mentioned in Specification or vice versa shall be furnished as though fully set forth in both. Work not specifically detailed, called for marked or specified shall be the same as similar parts that a detailed marked or specified.
- 5.2. The Contractor's work shall not deviate from the Drawings and the Specifications. The Owner's interpretation of these documents shall be final and without appeal.
- 5.3. Errors or inconsistencies discovered in the Drawings and Specifications shall be promptly brought to the attention of the Owner, through the clerk of works, for interpretation or correction. Local conditions, which may affect the work, shall likewise be brought to the Owner's attention. If at any time, it is discovered that work is being done which is not in accordance with the Contract Drawings and Specifications, the Contractor shall correct the work immediately. Corrections of defective work shall not be basis for any claim for extension of time. The Contractor shall not carry on work except with the knowledge of the Clerk-of -works.
- 5.4. Figured dimensions on the scale Drawings and large size details shall govern. Large size details shall not precedence over small-scale drawings. Any work done before receipt of such details, if not in accordance with the same, shall be removed and replaced or adjusted, as directed by the Contractor without expense to the owner. The general conditions apply with equal force to all the work including authorized extra works.
- 5.5. All drawings, Bills of Quantities and Specifications and copies thereof furnished by the Owner are his property. They shall not be used on any other work and shall be returned to the Owner at his request on completion or termination of the Contract.
- 5.6. Reinforcing steel bar bending schedules shall if requested by the owner be furnished to the Owner at least fifteen days prior to the fabrication of the reinforcement.

## **6. Contract Sum**

- 6.1. The contract sum shall not be adjusted or altered in any way whatsoever otherwise than in accordance with the express provisions of these conditions, and subject to clause 5.2. Of these conditions any error whether of arithmetic or not in the computation of the Contract sum shall be deemed to have been accepted by the parties hereto.

## **7. Contract Bills**

- 7.1. The quality and quantity of the work included in the contract sum shall be deemed to be that which is set out in the Contract Bills which Bills unless otherwise expressly stated in respect of any specified items shall be deemed to have been prepared in accordance with principles of the standard method of measurement of building works last before issued by the Indian Standard Institution but same as aforesaid nothing contained in the Contract Bills shall override, modify or affect in any way whatsoever the application or interpretation of that which is contained in these conditions.
- 7.2. Any error in description or in quantity or omission of items from the Contract Bills shall not vitiate this Contract but shall be corrected and deemed to be a variation required by the Owner.

## **8. Scope and Intent**

- 8.1. **Scope:** The general character and the scope of the work is illustrated and defined by the specifications and the bills of quantities herewith attached and by the signed drawings. If the Contractor shall find any discrepancy in or divergence between the contract drawings and or the contract bills he shall immediately give to the Owner a written notice specifying the discrepancy or divergence and the Owner shall issue instructions in regard thereto.
- 8.2. **Extent:** The contractor shall carry out and complete the work in every respect in accordance with this contract and with the directions of and to the reasonable satisfaction of the Owner. The Owner may in his absolute discretion and from time to time issue further drawings, details and/or written instructions, written directions and written explanations, all of which are collectively, referred to as Owners instructions. All such drawings and instructions shall be consistent with the contract document, true developments thereof and reasonably inferable there from.
- 8.3. **Intent:** The intention of the document is to include all labour and materials, equipment and transportation necessary for the proper execution of the work. All such drawings and instructions shall be consistent with the contract document, true developments thereof and reasonably inferable there from. Materials of work described in words, which so applied, have a well known technical or trade meaning shall be held to refer to such recognized standard.

## **9. Facilities and Co-operation**

- 9.1. In the case of works indicated on the drawings but not included in the contract the contractor shall provide necessary facilities and co-operation for any sub-contractor or supplier who may be approved by the owner. The contractor shall do all cutting, filling or patching of his work that may be required to make its several parts come together properly and fit it to receive or be received by work of other contractors shown upon or reasonably implied by the drawings and specifications for the completed structure, and he shall make good after them as the owner may direct. Any cost caused by the defective or ill-timed work shall be borne by the party responsible therefor.
- 9.2. The contractor shall not endanger any work by cutting, excavating or otherwise altering the work and shall not cut or alter the work of any other Contractor save with the consent of the owner.

## **10.Site**

- 10.1. Visit: Before tendering the contractor shall have visited and examined the site and satisfied himself as to the nature of the existing roads or the other means of communication and the character of the soil of the excavations, the correct dimensions of the work and the facilities for obtaining any special articles called for the contract document and shall have obtained generally his own information on all matters affecting the continuation and progress of the works.
- 10.2. No extra charge made in consequence of any misunderstanding or incorrect information or any of these points, or on the ground of insufficient description, will be allowed. Should the contractor after visiting the site, find any discrepancies, omissions ambiguities or conflicts in or among the contract document, or to be in doubt as to their meaning, he shall bring the question of the Owners attention, not later than ten days before the last date of submission of the tender.



- 10.3. Possessions: The contractor shall be allowed admittance to the site on the date of commencement stated in the appendix and he shall thereupon and forthwith begin the work and shall regularly proceed with and complete the same on or before the date of completion stated in the appendix subject nevertheless to the provision for extension of time hereinafter contained.
- 10.4. Treasures: Any treasures, coins or objects of Antiquity, which may be found at site, shall be handed over to the owner.

### **11.Samples and Shop Drawings**

- 11.1. After the award of the contract, the contractor shall furnish for the approval of the Owner, with such promptness as to cause no delay in his work or in that of any other sub-contractor, samples and shop drawings required by the specifications or by the Owner. Samples shall be delivered as directed by the Owner.
- 11.2. A schedule giving dates for the submission of samples shall be included in the schedule described under clause 14. Unless specifically authorized all samples must be submitted for approval within sixty days of signing the contract and not less than one hundred and twenty days before the date the particular work involved is scheduled to begin.
- 11.3. The Owner shall check and approve such samples, with reasonable promptness only for conformity with the design concept of the project and for compliance with the information in the contract documents. The work shall be in accordance with the approved samples.

### **12.Progress chart**

- 12.1. The contractor shall prepare progress charts and submit the same for approval of the owner and for his record within twenty-one days of the Award of the contract. The charts shall indicate the expected date of commencement and completion of each of the items of the work and shall be in a form approved by the Owner. The chart shall also indicate the scheduling of samples, Shop drawings, approvals, Monthly progress, etc. Photograph will be submitted to the owner at the time of submitting every bill.

The owner may in his absolute discretion and from time to time issue further drawings. Details and /or written instructions, written directions and written explanations in regard to:

- A. Variation or modifications of the design.
- B. The quality or quantity of works or the additions or omissions 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 materials therefor.
- 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.

- 12.2. Dismissal: The contractor shall on the request of the owner immediately dismiss from the works any person employed thereon by him who may in the opinion of the owner be incompetent or misconduct's himself and such person shall not be again employed on the work without the permission of the owner.

### **13. Performance Bond Cum Security Deposit**

- 13.1. Within ten days of the signing of this contract the contractor shall deposit with the OWNER for due performance of this contract as security deposit a sum which together with the earnest money shall be equal to that referred to in the appendix to this contract as security deposit.

The security Deposit shall be in the form approved by the Owner and shall remain so deposited with the Owner till the end of the defects Liability period referred to in the appendix.

The said security deposit shall indemnify the owner against loss from defects arising from any clause under this contract or due to the failure of the contractor to promptly carry out any matters arising under this contract.

### **14. Clerk of works**

- 14.1. The term clerk of works shall mean the person approved by the Owner and appointed and paid by the owner and acting under the orders of the Owner to inspect the works in the absence of the Owner; The contractor shall afford the clerk of works every facility and assistance for inspecting the works and materials and for checking and measuring time and materials. Neither the clerk of works nor any representative of the Owner shall have power to set out works or to revoke, alter, enlarge or relax any requirement of the contract or to sanction any day work, additions, alterations, deviations or omissions, or any extra work whatever except in so far as such authority may be specially conferred by a written order of the Owner.

The clerk of works, or any representative of the Owner, shall have power to give notice to the contractor or to his representative of non-approval of any work or materials and such work shall be suspended or the use of such materials shall be discontinued until the decision of the Owner is obtained. The works will from time to time be examined by the Owner

The clerk of works or the Owner's representative but such examination shall not in any way exonerate the contractor from the obligation to remedy any defects, which may be found to exist at any stage of the works or after the same is completed. Subject to the limitation of this clause the contractor shall take instructions only from the Owner.

### **15. Contractors field organization and Equipment**

- 15.1. Engineer-in-charge: The contractor shall constantly keep on his work during its progress one or more qualified and competent Engineers-in -charge who will be responsible for the carrying out of works to the true meaning of the drawings, Specifications and the schedule of quantities, Owners instructions and directions to the satisfaction of the Owner. Any directions or instructions given to him by the Owner shall be deemed to have issued the contractor. Attention is called to the importance of requesting instructions from the Owner before undertaking any work where Owners directions or instructions are required. Any such work done in advance of such instructions will be liable to be removed.

- 15.2. Equipment: The contractor shall provide and install all necessary hoists, ladders, scaffolding, tools, tackles, plants, all transport for labour materials and plant necessary for the proper carrying on execution and completion of the work to the satisfaction of the Owner. Details of laboratory equipment to be established at site are to be mentioned, for routine quality checking.
- 15.3. Office Accommodation: The contractor shall provide, erect and maintain where directed, simple watertight office accommodation for the foreman and the clerk of works. This accommodation shall be well lighted and ventilated and provided with windows, doors with a lock and a telephone. The clerk of works office shall be minimum of 100 sq. ft. and shall have a desk, chair and drawers for keeping drawings and tack board for displaying drawings. The accommodation to be demolished when directed.
- 15.4. Watchman: The contractor shall make his own security arrangements to guard the site and premises at all times, at his own expense. The security arrangements shall be adequate to maintain strict control on the movement of material and labour. The contractor shall extend the security arrangements to guard the material stored and/or fixed on the premises by the sub-contractors.
- 15.5. Storage of materials: The contractor shall provide erect and maintain proper sheds for the storage and protection of the materials etc. and also for the execution of work which may be prepared on the site.
- 15.6. Sanitary Conveniences: The contractor shall provide and erect all necessary sanitary convenience for the site staff and the workman, maintain in a clean orderly condition and clean and deodorize the ground after removal.
- 15.7. Telephone: The contractor shall provide a separate telephone for the works and shall pay all charges in connection with the same during the execution of the work.
- 15.8. Scaffolding, Staging, Guardrails: The contractor shall provide scaffolding, staging, guardrails, and temporary stairs, which shall be required during construction. The support for the scaffolding staging, guardrails and temporary stairs shall be strong, adequate for the particular situation. The temporary access to the various parts of the building under construction shall be rigid and strong enough to avoid any chance of mishaps. The arrangement proposed shall be subject to the approval of the Owner.

## **16.Taxes**

- 16.1. The contractor shall add to the amount of his tender the amount of all applicable taxes like GST legally payable and it shall be assumed his rates cover for all taxes and duties and no claim on this account will be entertained.

## **17.Statutory obligations, notice, fees and charges**

- 17.1. The contractor shall comply with and give all notices required by any Government authority, and instrument, rule or order made under any act of parliament or any regulation or Bye-Law of any local authority relating to the work or with whose system the same is or will be connected. The contractor before making any variation from the contract drawings or contract bills necessitated by such compliance shall give to the Owner a written notice specifying and giving reasons for such variations and the Owner may issue instructions in regard thereto. If within 10 days of having given the said written notice the contractor does not receive any instruction in regard to the matters therein specified, he shall proceed

with the work confirming to the act of parliament, instrument, rule, order, regulations or Bye-law in question and any variation thereby necessitated shall be deemed to be a variation required by the Owner.

- 17.2. The contractor shall pay and indemnify the owner against liability in respect of any fees or charges (including any rates and taxes) legally demandable under any Act of parliament, instrument, rule or order or any regulation or Bye-law or any local authority in respect of the work.

### **18.Royalties and patent rights**

- 18.1. All royalties or other sums payable in respect of supply and use in carrying out the work as desired by or referred to in Contract bills of any patented articles, process or inventions shall be deemed to have been included in the contract sum, and the contractor shall indemnify the owner from and against all claims, proceedings damages, costs and expenses which may be brought or made against the owner or to which he may be put by reason of the contractor infringing or being held to have infringed any patent rights in relation to any such articles, processes and inventions.

### **19.Licenses and permits for materials under government control**

- 19.1. Licenses and permits for all materials under Government control shall be obtained by the contractor through the collaboration and help of the owner, the contractor shall include in his tender all transport charges and other expenses likely to be incurred to bring the materials to the site.

### **20.Water for construction/Electrical Supply**

- 20.1. The contractor shall make application for metered water service at the point indicated in the site plan; the contractor shall pay for all fees in connection with such service and shall pay the supply authority for all water used prior to the completion of the work. The contractor shall also provide any temporary service piping and taps as required for his own use on the work, and remove the same on completion.
- 20.2. The contractor shall fix provisional sub meter from main meter of college through License Holder Electrician only. If contractor found using electricity of college points will be panelized.

### **21.Assignment or sub-letting**

- 21.1. The contractor shall not without the written consent of the Owner assigns this contract, and shall not without the written consent of the Owner (which consent shall not be unreasonably withheld to the prejudice of the contractor) sub-let any portion of the work.

### **22.Sub-contractor**

As soon as practicable and before awarding any sub-contract, the contractor shall notify the Owner in writing the names of the sub-contractor proposed for the principal parts of the work and for such other parts as the Owners may direct, and shall not employ and to whom the Owner or the owner may have a reasonable objection.

The Owner, however, shall have power to obtain estimate and select other agencies to carry out any of the work as described below:

- 22.1. All specialists, merchants, tradesmen, and other executing any works or supplying and fixing any goods, who may be nominated or selected by the Owner shall be deemed to be sub-contractors employed by the contractors and are to be referred as nominated sub-contractors. No nominated sub-contractor shall be employed on or in connection with the work against whom the contractor shall make reasonable objection or (save where the Owner and contractor shall otherwise agree) who will not enter into a contract providing.
- 22.1.1. That the nominated sub-contractor shall carry out and complete the sub-contract works in every respect to the reasonable satisfaction of the contractor and of the Owner and in conformity with all the reasonable direction and requirements of the contractor.
- 22.1.2. That the nominated sub-contractor shall observe, perform and comply with all the provisions of this contract on the part of the contractor to be observed, performed and complied with (other than clause 47.1. of these conditions, if applicable) so far as they relate and apply to the sub-contract works or to any portions of the same.
- 22.1.3. That the nominated sub-contractor shall indemnify the contractor against the same liabilities in respect of the contract work as those for which the contractor is liable to indemnify the owner under this contract.
- 22.1.4. That the nominated sub-contractor shall indemnify the contractor against claims in respect of any negligence, emission or default of such sub-contractor, his servants or agents or any misuse by him or them of any scaffolding or other plant, and shall insure himself against any such claims and produce the policy, or policies and premium and premium receipts as and when required by the contractor or Owner.
- 22.1.5. That payment in respect of any work, materials or goods comprised in the sub-contract shall be made within fourteen days after receipt by the contractor of the Owners certificate under clause 29. of these conditions which states as due an amount calculated by including the total value of such work, materials or goods and shall when due be subject to the retention by the contractor of the sums mentioned in sub-paragraph 26.1.9.
- 22.1.6. That the Owner and his representative shall have right of access to the workshops and other places of the nominated sub-contractor as mentioned in clause 15. of these conditions.
- 22.1.7. That the sub-contract work shall be completed within the period or (where they are to be completed in sections) periods therein specified, that the contractor shall not without the written consent of the Owner grant any extension of time for the completion of the sub-contract work or any section thereof, and that the contractor shall inform the Owner of any representations made by the nominated sub-contractor as to the cause of any delay in the progress of completion of the sub-contract work or of any section thereof.
- 22.1.8. That if the nominated sub-contractor shall fail to complete the sub-contract work or (where the sub-contract works are to be completed in sections) any sections thereof within the period therein specified or within any extended time granted by the contractor with the written consent of the Owner, and the Owner certifies in writing to the contractor that the same ought reasonably so to have completed the nominated sub-contractor shall

pay or allow to the contractor either a sum calculated at the rate therein agreed as Liquidated and Ascertained damages for the period during which the said work or any section thereof, as the case may be shall so remain or have remained incomplete or (where no such rate is therein agreed a sum equivalent to any loss or damage suffered or incurred by the contractor and caused by the failure of the nominated sub-contractor as aforesaid.

- 22.1.9. That the contractor shall retain from the sum directed by the Owner having been included in the calculation of the amount stated as due in any certificate issued under clause 31. of these conditions in respect of the total value of work, materials or goods executed or supplied by the nominated sub-contractor the Item of such value named in the appendix to these conditions as Item of certified value retained upto a total amount exceeding a sum which bears the same ratio to the sub-contract price as the unreduced sum named in the appendix to these conditions as limited of retention fund bears to the contract sum and the contractors interest in any sums so retained (by whomsoever held) shall be fiduciary as trustee for the nominated sub-contractor (but without obligation to invest); and that the nominated sub-contractors beneficial interest in such sums shall be subject only to the right of the contractor to have recourse thereto from time to time for payment of any amount which he is entitled under the sub-contract to deduct from any sum due or to become to the nominated sub-contractor and that if and when such sums of any part thereof are released to the nominated sub-contractor they shall be paid in full if paid within 14 days of the date fixed for their release in the sub-contract.
- 22.2. Before issuing any certificate under clause 31. of these conditions the Owner may request the contractor to furnish to him reasonable proof that all amounts included in the calculation of the amount stated as due on previous certificates in respect of the total value of work materials or goods executed or supplied by any nominated sub-contractor have been duly discharged and if the contractor fails to comply with any such request the Owner shall issue a certificate to that effect and thereupon the owner may himself pay such amounts to any nominated sub-contractor concerned and deduct the same from any sums due or to become due to the contractor.
- 22.3. The following provisions of these conditions shall apply for the treatment of the sub-contractor as Contractor's responsibility.
- 22.3.1. The contractor shall not grant to any nominated sub-contractor any extension of the period within which the sub-contract work or (where the sub-contract works are to be completed in sections) any sections thereof is to be completed without the written consent of the Owner. Provided always that the contractor shall inform the Owner of any representation made by the nominated sub-contractor as to the cause of any delay in the progress in completion of the sub-contract work or any section thereof and that the consent of the Owner shall not be unreasonably with-held.
- 22.3.2. If any nominated sub-contractor fails to complete the sub-contract work or (where the sub-contract works are to be completed in sections) any section thereof within the period specified in the sub-contract or within the extended time granted by the contractor with the written consent of the Owner then if the same ought reasonably so to have been completed the Owner shall certify in writing accordingly. Any such certificates shall be issued to the contractor and immediately upon issue the Owner shall send a duplicate copy thereof to the nominated sub-contractor.

- 22.4. If the Owner desires to secure final payment to any nominated sub-contractor before final payment is due to the contractor, and if such sub-contractor has satisfactorily indemnified the contractor against any latent defects then the Owner may in an Interim certificate include an amount to cover the said final payment and thereupon the contractor shall pay such nominated sub-contractor the amount so certified. Upon such final payment the amount named in the appendix to these conditions as limit of retention fund shall be reduced by the sum which bears the same ratio to the said amount as does such sub-contractors sub-contract price to the contract sum, and save for latent defects the contractor shall be discharged from all liability for the work materials or goods executed or supplied by such sub-contractor under the sub-contract to which the payment relates.
- 22.5. Neither the existence nor the exercise of the foregoing powers nor anything else contained in these conditions shall render the owner in any way liable to any nominated sub-contractor.
- 22.6. Where the contractor in the ordinary course of his business directly carried out works for which Prime cost or Provisional sums are included in the contract bills and the Owner is prepared to receive tenders from the contractors for such items, then the contractor shall be permitted to tender for the same or any of them but without prejudice to the owner right to reject the lowest or any tender. If the contractors tender is accepted he shall not sub-let the work without the consent in writing of the Owner.
- 22.7. It shall be a condition of any tender accepted under this paragraph that clause 30. of these conditions shall apply in respect of the item work included in the tender as if for the reference therein to the contract drawings and the contract bills there were references to the equivalent documents included in or referred to in the tender.
- 22.8. The contractor shall allow for general attendance upon sub-contractors including free use of plant scaffolding and is to allow them the use of sanitary conveniences, storage facilities for storing materials, other amenities and affording them all reasonable facilities for carrying out their contracts.

### **23.Prime Cost**

The following provisions of these conditions shall apply where prime cost sums are included in the contract bills or arises as a result of Owners instructions given in regard to the expenditure of provisional sums in respect of any materials or goods to be fixed by the contractor.

- 23.1. Such sums shall be understood to mean the net cost to be defrayed as a prime cost after deducting any trade or other discount and shall include sales-tax where applicable and other taxes and duties and the cost of packing carriage and delivery.
- 23.2. Such sums shall be expended in favour of such persons as the Owner shall instruct and all specialists, merchants tradesman or others who are nominated by the Owner to supply materials or goods are hereby declared to be the suppliers to the contractor and are referred to in these conditions as "nominated suppliers" provided that the Owner shall not (save where the Owner and contractor shall otherwise agree) nominate as a supplier a person who will not enter into a contract of sale which provides (inter alia):

- 23.2.1. That the materials or goods to be supplied shall be to the reasonable satisfaction of the Owner.
- 23.2.2. That the nominated supplier shall make good by replacement or otherwise any defects in the materials or goods supplied which appear within such period as is therein mentioned and shall bear any expenses reasonably incurred by the Contractor as a direct consequence of such defects, provided that.
  - i. Where the materials or goods have been used or fixed such defects are not such that examination by the contractor ought to have revealed them before using or fixing.
  - ii. Such defects are due solely to defective workmanship or material in the goods supplied and shall not have been caused by improper storage by the contractor or misuse or by any act or neglect of either the contractor, the Owner or the owner or by any person or persons for whom they may be responsible.
- 23.2.3. That delivery of the materials or goods supplied shall be commenced and completed at such times as the contractor may reasonably direct.
- 23.3. All payments by the contractor for materials or goods supplied by a nominated supplier shall be in full, and shall be paid within 30 days of the end of the month during which delivery is made.

#### **24. Artists and tradesman**

- 24.1. The contractor shall permit the execution of work not forming part of this contract by artists, tradesmen or others engaged by the owner. Every such person shall for the purpose of clause 45. of these conditions be deemed to be a person for whom the owner is responsible and not be a sub-contractor.

#### **25. Separate contracts**

- 25.1. The owner reserves the right to let other contracts in connection with his work under similar general conditions. The contractor shall afford other contractors reasonable opportunity for the introduction and storage of their materials and the execution of their work and shall properly connect and coordinate his work with theirs. If any part of contractors or sub-contractors work depends for proper execution or results upon the work of any other contractor or sub-contractor the contractor shall inspect and promptly report to the Owner any defects in such work that render it unsuitable for such proper execution and results. Failure of the contractor to so inspect and report shall constitute an acceptance of the other contractor's work as fit and proper for the reception of his work except as to defects which may develop in the other contractors or sub-contractor work after the execution of the work to ensure the proper execution of his subsequent work the contractor shall measure work already in place and shall at once report to the Owner any discrepancy between the executed work and the drawings.

#### **26. Variations, Provisional and Prime Cost sums**

- 26.1. The Owner may issue instruction requiring a variation and he may sanction in writing any variation made by the Contractor otherwise than pursuant to an instruction of the Owner no. variation required by the Owner or subsequently sanctioned by him shall vitiate this contract.



- 26.2. The term variation as used in these conditions means the alteration or modification of the design quality or quantity of the work as shown upon the contract drawings and desired by or referred to in the contract bills and includes the addition omission or substitution of any work the alteration of the kind of standard of any of the materials or goods to be used in the work and the removal from the site of any works materials or goods executed or brought thereon by the contractor for the purposes of the work other than work materials or goods which are not in accordance with this contract.
- 26.3. The Owner shall issue instructions in required to the expenditure of Prime cost and provisional sums included in the contract bills and of Prime cost sums which arise as a result of instruction issued in regard to the expenditure of provisional sums.
- 26.4. All variation required by the Owner or subsequently sanctioned by him in writing and all work executed by the contractor for which provisional sums are included in the contract bills (other than work for which a tender made under clause 26.6 and clause 26.7. of these conditions has been accepted) shall be measured and valued by the Owner who shall give to the contractor an opportunity of being present at the time of such measurement and of taking such notes and measurements as the contractor may require. The valuation of variations and of work executed by the contractor for which a provisional sum is included in the contract bills (other than work for which a tender has been accepted as aforesaid) unless otherwise agreed shall be made in accordance with the following rules.
- 26.4.1. The price in the contract bill shall determine the valuation of work of similar character executed under similar conditions as work priced therein.
- 26.4.2. The said prices where work is not of a similar character or executed under similar conditions as aforesaid shall be the basis of prices for the same so far as may be reasonable, failing which a fair valuation thereof shall be made.
- 26.4.3. Where work cannot properly be measured and valued the contractor shall be allowed day work rates on the prices prevailing when such work is carried out (unless otherwise provided in the contract bills).
- i. At the rates if any inserted by the contractor in the contract bills or in the form of tender or
- ii. When no such rates have been inserted at the rates prevailing in the market for material and labour and at the control rates for the controlled materials including all cases the rate for delivery of the material at the work.
- Provided that in any case voucher specifying the time daily spent upon the work (and if required by the Owner the workmen's names) and the materials employed shall be delivered for verification to the Owner or his authorized representative not later than the end of the week following that in which the work has been executed.
- 26.4.4. The price in the contract bill shall determine the valuation of items omitted, provided that if omissions substantially vary the conditions under which any remaining items of work are carried out the price for such remaining items shall be valued under sub-clause 30.4.2.

- 26.5. Effect shall be given to the measurement and valuation of variations under sub-clause 30.4.4. of this condition in interim certificates and by adjustment of the contract sums and effect shall be given to the measurement and valuation of work for which a provisional sum is included in the contract bill under the said sub-clause in interim certificate and by adjustment of the contract sum in accordance with clause 31.5. of these conditions.
- 26.6. If upon written application being made to him by the contractor the Owner is of the opinion that a variation or the execution by the contractor of work for which a provisional sum is included in the contract bills (other than work for which a tender made under clause 26.6. of these conditions has been accepted) has involved the contractor in direct loss and/or expense for which he would not be reimbursed by payment in respect of a valuation made in accordance with the rules contained in sub-clause 30.4.4 of the condition and if the said application is made within a reasonable time of the loss or expenses having been incurred then the Owner shall ascertain the amount of such loss or expense. Any amount from time to time so ascertained shall be added to the contract sum, and if an interim certificate is issued after the date of ascertainment any such amount shall be added to the amount which would otherwise be stated as due in such certificate.

## **27. Certificates and payment**

- 27.1. At the period of interim certificate named in the appendix to these conditions the Owner shall issue a certificate stating the amount due to the contractor from the owner and the contractor be entitled to payment therefore within the period for honouring certificates named in the appendix to these conditions interim valuation shall be made whenever the Owner considers them to be necessary for the purpose of ascertaining the amount to be stated as due in an interim certificate.
- 27.2. The amount stated had due in an interim certificate shall subject to any agreement between the parties as to stage payments, to the total value of the work executed and of the materials and goods delivered to or adjustment to the work for use thereon upto and including a date not more than seven days before the day of the said certificate less any amount which may be retained by the owner (as provided in sub-clause 31.3. of this conditions) and less any installments previously paid under this condition provided that such certificate shall only include the value of the said materials and goods as and from such time as they are reasonably properly and not prematurely brought to or placed adjustment to the work and then only if adequately protected against weather or other casualties.
- 27.3. The owner may retain the Item of the total value of the work materials and goods referred to in sub-clause 31.2. of this condition, which is named in the appendix to these conditions as retention Item. Provided always that when the sum of the amounts so retained equals the amount named in said appendix as limit of retention fund or that amount has reduced in pursuance of clause 26.1.9 of these conditions as the case may be, no further amount shall be retained by virtue of this sub-clause.
- 27.4. The amount retained by virtue of sub-clause 31.3 of this condition shall be subject to the following rules.
- 27.4.1. The owners interest in any amounts so retained shall be fiduciary as trustee for the contractor (but without obligation to invest) and the contractor beneficial interest therein shall be subject only to the right of the owner to have recourse thereto from time to time for payment of any

amount which he is entitled under the provision of this contract to deduct from any sum due or to become due to the contractor.

- 27.4.2. On the issue of the certificate of virtual completion the Owner shall issue a certificate for one moiety, of the total amounts then so retained and the contractor shall be entitled to payment of the said moiety within the period for honouring certificate named in the appendix to this condition.
- 27.5. The measurement and valuation of the work shall be as follows:
- 27.5.1. The measurement and valuation of the work shall be completed within the period of final measurement and valuation stated in the appendix to these conditions and the contractor shall be supplied with a copy of the priced bills of variation not later than the end of said period and before the issue of the final certificate under sub-clause 31.6. of this condition.
- 27.5.2. Either before or within a reasonable time after virtual completion of the work, the contractor shall send to the Owner all documents necessary for the purposes of the computations required by these conditions including all documents relating to the accounts of nominated sub-contractors and nominated suppliers.
- 27.5.3. In the settlement of accounts the amount paid or payable under the appropriate contracts by the contractor to nominated sub-contractor or nominated suppliers the amounts paid or payable by virtue of clause 21.2. of these conditions in respect of fees or charges or which a provisional sum is included in the contract bills the amounts paid are payable in respect of any insurance maintained in compliance with clause 46. and 47.1., of these conditions, the tender sum (or such other sum as is appropriate in accordance with the terms of the tender). For any work which a tender made under clause 26.6. of these conditions is accepted and the value of any work executed by the contractor for which a provisional sum mentioned in the contract bill or arising under Owner instruction is issued under clause 30.3. of these conditions as the case may be and the balance, after allowing in all cases prorata for the contractor's profit at the rates shown in the contract bills, shall be added to or deducted from the contract sum. Provided that no deduction shall be made in respect of any damages paid or allowed to the contractor by any-subcontractor or supplier.
- 27.6. So soon as is practicable but before the expiration of the period the length of which is stated in the appendix to these conditions from the end of the defects liability period also stated in the said appendix or from completion of making defects under clause 40. of this condition or from receipt by the Owner of the documents referred to in sub-clause 40.1.5. of these conditions whichever is the latest, the Owner shall issue the final certificate. The final certificate shall state:
- 27.6.1. The sum of the amount paid to the contractor under interim certificate amount named in the said appendix as limit of retention fund, and,
- 27.6.2. The contract sum adjusted as necessary in accordance with the terms of these conditions, and the difference (if any) between the two sums shall be expressed in the said certificate's balance due to the contractor from the owner or to the owner from the contractor as the case may be, and subject to any deduction authorized by these conditions, the side balance shall as from the fourteenth day after the issue of the said certificate be a debt payable as the case may be by the owner to the contractor or by the contractor to the owner.

- 27.7. Unless a written request to concur, in the appointment of an Arbitrator shall have been given under clause 56 of these conditions by either party before the certificate has been issued or by the contractor within 28 days after such issue. The said certificate shall be conclusive evidence in any proceedings arising out of this contract (Whether by Arbitration under clause 56 of these conditions or otherwise) that the works have been properly carried out and computable in accordance with the terms of these contract and that if any necessary effect has been given to all terms of this contract which require an adjustment to be made to the contract, except and in so far as any sum mentioned in the said certificate is erroneous by reason of:-
- 27.7.1. Fraud dishonesty of fraudulent concealment relating to the work, or any part thereof, or to any matter dealt with in the said certificate, or
  - 27.7.2. Any defects (including any omission) in the works, or any part thereof which reasonable inspection or examination at any reasonable time during the carrying out of the works or before the issue of the said certificate would not have disclosed, or
  - 27.7.3. Any accidental inclusion or exclusion of any work, materials, goods or figure in any computation or any arithmetical error in any computation.
- 27.8. Save as aforesaid no certificate of the Owner shall of itself be conclusive evidence that any work materials or goods to which it relates are in accordance with contract.

### **28.Claim for extra**

- 28.1. When any instructions or decisions at site involve an extra or whereby the contractor may plan to claim an extra, it shall be the responsibility of the contractor to inform the Owner of the extra amount and get return authorization from the Owner before proceeding with the work involved.
- 28.2. Any modification carried out for expediting or simplifying work at the request of the contractor or his representatives shall not be taken as the basis for claiming an extra. However, if such modification shall also involve an extra, the rate for such modification shall be settled in advance and written authorization contained by the contractor from the Owner before proceeding with the work involved. If no such information is given by the contractor in writing to the owner such modification shall not be accepted as the basis for extra charge.

### **29.Deduction for uncorrected work**

- 29.1. If the Owner deems it inexpedient to correct work damaged or not done in accordance with the contract, an equitable deduction from the contract price shall be made therefore.

### **30.Fluctuations**

- 30.1. The contractor shall not claim any extra for fluctuation of price and the contract price shall not be subject to any rise or fall of prices.

### **31.Unfixed goods and materials**

- 31.1. Unfixed materials and goods intended for, delivered to and placed on or adjacent to the work shall not be removed except for the use upon the work unless the

owner has consented in writing to such removal which consent shall not be unreasonably withheld. Where the value of any such materials or goods has in accordance with clause 31.2. of this conditions been included interim certificate under the contract for which the contractor has received payment, such materials and goods shall become the property of the owner but subject to clause 47. of these conditions (if applicable) the contractor shall remain responsible for loss or damage to the same.

### **32.Materials and workmanship**

- 32.1. All materials and workmanship shall be as per the relevant code of I.S.I. Specification and of approved type and the contractor shall immediately remove from the work any materials and / or workmanship which in the opinion of the Owner are defective or unsuitable and shall substitute proper materials and /or workmanship at his own cost. The term approval used in connection with this contract shall mean the approval of the Owner.
- 32.2. The contractor shall if required submit satisfactory evidence as to the kind and quality of material.
- 32.3. Where special makes or brands are called for they are mentioned as standard. Others of equal quality may be used provided approval is first obtained in writing from the owner unless substitution are requested no deviation from the specification will be permitted. Failure to propose the substitution of any article after 30 days after signing of the contract will be deemed sufficient cause for denial of the request for substitution.
- 32.4. The contractor shall indicate and submit evidence in writing of the materials or articles called for in the specification that are not obtainable for installation in the work within the time limits of the contract. Failure to indicate the above, within 30 days after the signing of the contract, will be deemed sufficient cause for the denial of request for the execution of the contract time.
- 32.5. All materials shall be delivered so as to insure a speedy and uninterrupted progress of the work such materials shall be stored so as to cause no obstruction and so as to prevent overloading of any portion of the structure, and the contractor shall be entirely responsible for damage or loss by weather or other cause.
- 32.6. Within 30 days after signing the contract the contractor shall submit for approval of the Owner a complete list of all materials he and his sub-contractors propose to use in the work of definite brand or make which differ in any respect from those specified, also the particular brand of any article where more than one is specified as a standard. He shall also list items not specifically mentioned in the specifications but which are reasonably inferred and necessary for the completion of the work.

### **33.Inspection**

- 33.1. All materials and workmanship shall be subject to inspection examination, and test by the Owner at any and all times during manufacture and/or construction. The Owner shall have the right to reject defective materials and workmanship or require its correction. Rejected workmanship shall be satisfactorily replaced with proper material without additional charge therefore and the contractor fails to proceed at once with the replacement of rejected material from the works. If the contractor fails to proceed at one with the replacement of rejected materials and or the correction of defective workmanship, the Owner may by contract or

otherwise replace such materials and /or corrects such workmanship, and charge the cost thereof to the contractor, or may terminate the right of the contractor to proceed further with the work.

The contractor shall furnish promptly without additional charge or reasonable facilities, labour and materials necessary for the safe and convenient inspection \and test that may be required by the Owner.

### **34.Defects**

- 34.1. The contractor shall make good at his own cost and to the satisfaction of the Owner, all defects shrinkage's or small faults arising in the opinion of the Owner from work or materials not being in accordance with the drawings or specifications or schedule of quantities or the instructions of the Owner, which may appear within "defects Liability Period' referred to in the appendix.
- 34.2. Such defects, shrinkage's shall upon direction in writing of the Owner and within such reasonable time as shall be specified therein be amended and made good by the contractor at his own cost unless the Owner shall decide that he ought to be paid for such amending and making good and in case of default the owner may employ and pay the contractor to amend and make good such defects, shrinkage's, settlements or other faults and all damages loss and expense consequent thereon or incidental thereto shall be made good and borne by the contractor and such damage, loss or expense shall be recoverable from him by the owner or may be deducted by the owner upon the Owners certificate in writing from any amount due or may become due to the contractor or the owner may, in lieu of such amending and making good by the contractor deduct from any moneys due to the contractor a sum to be determined by the Owner as equivalent to the cost of amending such work and in the event of the retention amount being insufficient recover the balance from the contractor, together with any expenses the owner may have incurred in connection therewith.

### **35.Possession completion and postponement**

- 35.1. On the date for commencement stated in the appendix to these conditions possession of the site shall be given to the contractor who shall thereupon begin the works and regularly and diligently proceed with the same, and who shall complete the same on or before the date of completion stated in the said appendix subject nevertheless to the provisions for extension of time contained in clause 40 of these conditions.
- 35.2. The Owner may issue instructions in regard to the postponement of any work be executed under the provisions of this contract.
- 35.3. If at any time or times before virtual completion of the work the owner with the consent of the contractor shall take possession of any part of the same for handing over to the finishing contractor or other agency, then notwithstanding anything expressed or implied elsewhere in this contract:
  - 35.3.1. Such part or parts shall not be deemed to be virtually completed.
  - 35.3.2. Virtual completion of such part or parts would occur on the completion of the last part of the structure under this contract.
  - 35.3.3. The contractor shall not claim that such part or parts complete and request refund of payments in lieu thereof.

### **36.Extension**

- 36.1. Upon it becoming a reasonably apparent that the progress of the works is delayed, the contractor shall forthwith give written notice of the cause of the delay to the Owner, and if in the opinion of the Owner the completion of the work is likely to be or has been delayed beyond that date for completion stated in the appendix to these conditions or beyond any extended time previously fixed under this clause.
- 36.1.1. By force majeure. Or
  - 36.1.2. By reason of any exceptionally inclement weather. Or
  - 36.1.3. By reason of loss or damage of occasioned by any one or more of the contingencies referred to in clause 47. of these conditions. Or
  - 36.1.4. By reason of civil commotion, local combination of workmen strike or lockout affecting any of the trades employed upon the works or any of the trades engaged in the preparation, manufacture or transportation of any of the goods or materials required for the work. Or
  - 36.1.5. By reason of Owner's instructions issued under clause 9, clause 30.1. or clause 38.2. of these conditions. Or
  - 36.1.6. By reason of the contractors not having received in due time necessary instructions, drawings, details of levels from the Owner for which he specifically applied in writing on a date which having regard to the date for completion stated in the appendix to these conditions or to any extension of time then fixed under this clause was neither unreasonably distant from nor unreasonably close to the date on which it was necessary for him to receive the same. Or
  - 36.1.7. By delay on the part of nominated sub-contractors or nominated suppliers which the contractor has taken all practicable steps to avoid or reduce. Or
  - 36.1.8. By delay on the part of artists, tradesmen or other engaged by the owner in executing work not forming part of this contract. Or
  - 36.1.9. By reason of the opening up for inspection of any work covered up or of the testing of any of the work, materials or goods in accordance with clause 37. of these conditions (including making good in consequence of such opening up or testing) unless the inspection of test showed that the work materials or goods were not in accordance with this contract. Or
  - 36.1.10. By reason of the contractor's inability for reason beyond his control and which he could not reasonably have foreseen at the date of this contract to secure such labour goods or materials as are essential to the proper carrying out of the works.

Then the Owner shall as soon as he is able to estimate the length of the delay beyond the date or time aforesaid make in writing a fair and reasonable extension of time for completion of the works, provided always that the contractor shall use constantly his best endeavors to prevent delay and shall do that may reasonably be required to the satisfaction of the Owner to proceed with the work.

### **37.Damages for non-completion**

- 37.1. If the contractor fails to complete the works by the date specified in these conditions or within any extended time fixed under clause 39. of these conditions and the Owner certifies in writing that in his opinion the same ought reasonably so to have been completed, the contractor shall pay or allow the owner a sum calculated at the rate stated in the appendix as agreed liquidated damages for the period during which the said work shall so remain or have remained incomplete, the owner may deduct such damages from any monies otherwise payable to the contractor under this contract.

### **38.Virtual completion and defects liability period**

- 38.1. When in the opinion of the Owner the works are practically completed, he shall forthwith issue a certificate to the effect and virtual completion of the works shall be deemed for all the purpose of this contract to have taken place on the day named in such certificate.
- 38.2. Any defects shrinkage or other faults which shall appear within the defects liability period stated in the appendix to this condition and which are due to materials and workmanship not in accordance with this contract shall be specified by the Owner in a schedule of defects which he shall deliver to the contractor not less than 14 days after the expiration of the said defects liability period and within a reasonable time of the receipt of such schedule the Defects Shrinkages and other faults therein specified shall be made good by the contractor and (unless the Owner shall otherwise instruct in which case the contract sum shall be adjusted accordingly) entirely at his own cost.
- 38.3. Notwithstanding sub-clause 42.2. of this condition the Owner may whenever he considers it necessary so to do, issue instructions requiring any defect, shrinkages or other fault which shall appear within the defects liability period named in the appendix to these conditions and which is due to materials and workmanship not in accordance with this contract to be made good and the contractor shall within a reasonable time after receipt of such instructions comply with the same (and unless the Owner shall otherwise instruct in which case the contract sum shall be adjusted accordingly) entirely at his own cost. Provided that no such instruction shall be issued after 14 days from the expiration of the said defects liability period.
- 38.4. When in the opinion of the Owner any defects shrinkages or other defaults which he may have required to be made good under sub-clause 42.2. and 42.3. of this condition shall have been made good he shall issue a certificate to that effect, and completion of making good defects shall be deemed for all the purposes of this contract to have taken place on the day named in such certificates.
- 38.5. In no case shall the contractor be required to make good at his own cost any damages which may appear after virtual completion of the work unless the Owner shall certify that such damages is due to injury which took place before virtual completion of the works.

### **39.Loss and expense caused by disturbance of regular progress of the works**

- 39.1. If upon written application being made to him by the contractor the Owner is of the opinion that the contractor has been involved in direct loss/or expense for which he would not be reimbursed by a payment made under any other provision in this contract by reason of the regular progress of the works or of any part thereof of having been materially affected by.



- 39.1.1. The contractor not having received in due time necessary instructions, drawings details or levels from the Owner for which he specifically applied in writing on a date which having regard to the date of the completion stated in the appendix to these conditions was neither unreasonably distant from nor unreasonably close to the date on which it was necessary for him to receive the same , Or
- 39.1.2. The opening for inspection of any works covered up or the testing of any work material or goods in accordance with clause 37. of this condition (including making good in consequence of such opening up or testing) , unless the inspection or test showed that the work materials or goods were not in accordance with this contract. Or.
- 39.1.3. Any discrepancy or divergence between the contract drawings and /or the contract bills; Or
- 39.1.4. Delay on the part of the artists tradesmen or others engaged by the owner in executing work not forming part of this contract; or.
- 39.1.5. Owner instruction issued in regard to the postponement of any work to be executed under the provision of this contract ; and if the written application is made within a reasonable time of it becoming apparent that the progress of the work or of any part thereof has been affected as aforesaid.

Then the Authorized signatory shall ascertain the amount of such loss and or expense any amount from time to time so ascertained shall be added to the amount which would otherwise be stated as due in such certificate. Authorized signatory will comprise of Owner and Owner.

- 39.2. The provisions of this condition are without prejudice to any other rights and remedies which the contractor may possess.

#### **40. Payments withheld**

The Owner may withhold or on account of subsequently discovered evidence nullify the whole or a part of any certificate to such extent as may be necessary in his reasonable opinion to protect the owner from loss on account of:

- 40.1. Defective work not remedied.
- 40.2. Failure of the contractor to make payments properly to subcontractor or for materials or labour.
- 40.3. A reasonable doubt that the contract can be completed from the balance then unpaid.
- 40.4. Damage to another contractor or sub-contractor.
- 40.5. Claims filed on reasonable evidence indicating probable filing of claims.

When the above grounds are removed payment shall be made for amounts withheld because of them.

#### **41. Injury to person and property owner**

- 41.1. The contractor shall be liable for and shall indemnify the owner against any liability, loss, claim or proceedings whatsoever arising under any statute or at common law in respect of personal injury to or to the death of any person whomsoever arising out of or in the course of or caused by the carrying out of the works, unless due to any act or neglect of the owner or of any person for whom the owner is responsible.
- 41.2. Except for such loss or damages as is at the risk of the owner under the clause 47. of these conditions (if applicable) the contractor shall be liable for and shall indemnify the owner against any expense liability loss claim or proceedings in respect of any injury or damage whatsoever to any property real or personal in so far as such injury or damage arises out of or in the course of or by reason of the carrying out of the works and provided always that the same is due to any negligence, omission or default of the contractor his servants or agents or of any sub-contractor, his servant or agent.

#### **42. Insurance against injury to person and property**

- 42.1. Without prejudice to his liability to indemnify the owner under clause 45. of these conditions, the contractor shall maintain and shall cause any sub-contractor to maintain:
- 42.1.1. Such insurance's as are necessary to cover the liability of the contractor or as the case may be of such sub-contractor in respect of personal injuries or deaths arising out of or in the course of or caused by the carrying out of the work, and
- 42.1.2. Such insurance's as may be specifically required by the contract bill in respect of injury or damage to property real or personal out of in the course of or by reason of the carrying out of the work, and caused by any negligence, omission or default of the contractor his servant or agents, or as the case may be of such sub-contractor, his servants or agents.

The contractor shall produce or cause any sub-contractor to produce for inspection the relevant policy or policies of insurance's together with the receipt in respect of premiums paid under such policy or policies as and when required so to do by the Owner provided always that as and when may be reasonably required by the Owner the production by either the contractor or any sub-contractor of a current certificate of insurance from the company or firm which shall have issued policy or policies aforesaid shall be a good discharge of the contractors obligation to produce or to cause the production of the policy or policies and the receipts in respect of premium paid.

- 42.2. Maintenance of insurance shall be as per the following:

- 42.2.1. The contractor shall maintain in the joint names of the owner and contractor such insurance's as may be required in respect of any expense, liability loss, claim or proceedings which the owner may incur or sustain by reason of injury or damage to property real or personal arising out of or in the course of or by reason of the carrying out of the work, and caused otherwise than by the negligence, omission or default of the contractor or his servant or agents or any sub-contractor, his servants or agents.

42.2.2. Any such insurance as is referred to in the immediately preceding paragraph shall be placed with insurers to be approved by the Owner and the contractor shall have to deposit with him the policy or policies and the receipts in respect of premium paid.

42.2.3. Should the contractor or any sub-contractor make default in insuring or in continuing to insure as provided in sub-clauses 46.2.1 and 46.2.2 of this condition the owner may himself insure against any risk with respect to which the default shall have occurred and may deduct a sum equivalent to the amount paid in respect of premiums from any monies due to or become due to the contractor.

### **43. Insurance of the work against fire etc.**

43.1. Insurance of work against fire, etc. shall be as per the following:

43.1.1. \*The contractor shall in the joint names of the owner and contractor insure against loss or damage by fire, storm, tempest, lightning, flood, earthquake, aircraft or anything dropped therefrom, aerial objects, riots and civil commotion for the full value of thereof all work executed and all unfixed materials and goods intended for, delivered to and placed on or adjacent to the work, but excluding temporary building plant, tools and equipment owned or hired by the contractor or any sub-contractor and shall keep such work materials and goods so insured until virtual completion of the work. Such insurance's shall be with insurers approved by the Owner and the contractor shall deposit with the Owner the policy or policies and the receipt in respect of premium paid : and should the contractor make default in insuring or continuing to insure as aforesaid the owner may himself insure against any risk with respect of which the default shall have occurred and deduct a sum equivalent to the amount paid by him in respect of premium from any monies due to or to become due to the contractor.

Provided always that if the contractor shall independently of his obligations under this contract maintain a policy of insurance which covers (inter alia) the said work, materials and goods against the aforesaid contingencies to the full value thereof then the maintenance by the contractor of such policy shall if the owners interests is endorsed thereon, be a discharge of the contractor's obligation to insure in the joint names of the owner and the contractor and the production by the contractor as and when may reasonably be required by the Owner of a current certificate of insurance from the company or firm which shall have issued the said policy shall be a discharge of the contractors obligation to deposit with the Owner a policy or policies and the receipt in respect of premiums paid.

43.1.2. Upon settlement of claim under the insurance's aforesaid the contractor with due diligence shall restore work damaged replace or repair unfixed materials or goods which have been destroyed or injured, remove or dispose of any debris and proceed the carrying out and completion of work all monies received from such insurance's shall be paid to the contractors by installments under certificates of the owners issued at the period of internal certificates named In the appendix to these conditions. The contractor shall be entitled to payment in respect of the restoration of work damaged, the replacement & repair of any unfixed material or goods & the removal disposal of debris other than the monies received under the said insurance's.

- 43.2. All work executed and all unfixed materials and goods intended for, delivered to and placed on or adjacent to the works (except temporary building, plant, tools and equipment owned or hired by the contractor or any sub-contractor) shall be at the sole risk of the owner as regards loss or damage by fire, storm, tempest, lightning flood, earthquake, aircraft or anything dropped therefrom, aerial objects riot and civil commotion. If any loss or damage affecting the work or any part thereof or any such unfixed materials or goods is occasioned by any one or more of the said contingencies then:
- 43.2.1. The occurrence of such loss or damage shall be disregarded in computing any amounts payable to the contractor under or virtue of this contract.
  - 43.2.2. The contractor with due diligence shall restore work damaged, replace or repair any unfixed materials or good which have been destroyed or injured, remove and dispose of any debris and proceed with carrying out and completion of the work. The restoration of work damaged, the replacement and repair of unfixed materials and goods and the removal and disposal of debris shall be deemed to be a variation required by the Owner.
- 43.3. The existing structure together with all the contents thereof and the works and all unfixed materials and goods intended for, delivered to and placed on or adjacent to the works(except temporary buildings, plant tools and equipment owned or hired by the contractor or any sub-contractor) shall be at the sole risk of the owner as regards loss or damage by fire, storm tempest, lighting, flood, earthquake, aircraft or anything dropped therefrom, aerial object riot and civil commotion, and the owner shall maintain adequate insurance against that risk if any loss or damage affecting the work or any part thereof or any such unfixed materials or goods is occasioned by any one or more of the said contingencies then:
- 43.3.1. The occurrence of such loss or damage shall be disregarded in computing any amounts payable to the contractor under or by virtue of this contract.
  - 43.3.2.
    - 43.3.2.1. If it is just and equitable so to do the employment of the contractor under this contract may within 28 days of the occurrence of such loss or damage be determined at the option of either party by notice by registered post or recorded delivery from either party to the other. Within seven days of receiving such notice (but not thereafter) either party may give to the other a written request to occur in the appointment of an Arbitrator under clause 53 of these conditions in order that it may be determined whether such determination will be just and equitable.
    - 43.3.2.2. Upon the giving or receiving by the owner of such a notice of determination or, where a reference to Arbitrator upholding the notice of determination the provisions of clause 47.2 of these conditions shall apply.
    - 43.3.2.3. If no notice of determination is served as aforesaid or where reference to Arbitration is made as aforesaid, if the Arbitrator decides against the notice of determination then.

43.3.2.3.1. The contractor with due diligence shall reinstate or make good such loss or damage and proceed with the carrying out and completion of the works.

43.3.2.3.2. The Owner may issue instructions requiring contractor to remove and dispose of any debris and

43.3.2.3.3. The reinstatement and making good of such loss or damage and (when required) the removal and disposal of debris shall be deemed to be a variation required by the Owner.

#### **44. Determination by the owner**

44.1. Default: If the contractor shall make default in any one or more of the following respects, that is to say.

44.1.1. If he is without reasonable cause wholly suspends the carrying out of the works before completion thereof, or

44.1.2. If he fails to proceed regularly and diligently with the works, or

44.1.3. If he refuses or persistently neglects to comply with a written notice from the Owner requiring him to remove defective work or improper materials or goods and by such refusal or neglect the work is materially affected, or

44.1.4. If he fails to comply with the provision of clause 25.

Then the Owner may give him the notice by registered post or recorded delivery specifying the default, and if the contractor either shall continue such a default for 14 days after receipt of such a notice and shall at any time thereafter repeat such a default (whether previously repeated or not). Then the owner without prejudice to any other rights or remedies may within 10 days after such continuance or repetition of notice by registered post or recorded delivery forth with determine the employment of the contractor under this contract, provided that such notice shall not be given unreasonably or vexatiously.

44.2. Bankruptcy of the contractor: In the event of the contractor becoming bankrupt or making a composition or arrangement with his creditors or being a company having a winding up order made or (except for purposes of reconstruction) a resolution for voluntary winding up passed or a receiver or manager of his business or undertaking duly appointed or possession taken. By or on behalf of the holders of any debentures secured by a floating charge, of any property comprised in or subject to the floating charge, the employment of the contractor under this contract shall be forthwith automatically determined but the said employment may be reinstated and continued if the owner and the contractor, his trustee in bankruptcy, liquidate, receiver or manager as the case may be shall so agree.

44.3. The owner shall be entitled to determine the employment of the contractor under this contract. If the contractor shall have offered or given or agreed to give to any person any gift or consideration of any kind as an inducement or reward for doing or forbearing to do or for having done or forborne to do any action in relation to the obtaining or execution of this contract with the owner, or for showing or forbearing to show favour or disfavour to any person in relation to this contract or any other contract with the owner, or if the like acts shall have been done by any person employed by the contractor or acting on his behalf (whether with or without the knowledge of the contractor), or if in relation to this contract or any other contract with the owner the contractor or any person

employed by him or acting on his behalf shall have committed any offense under the prevention of corruption act, or shall have given any fee or reward the receipt of which is an offense under the local government Act.

44.4. In the event of the employment of the contractor being determined as foresaid and so long as it has not been reinstated and continued, the following shall be the respective rights and duties of the owner and the contractor.

44.4.1. The owner may employ and pay other persons to carry out and complete the works and he or they may enter upon the Works and use all temporary buildings, plant, machinery, appliances, goods and materials intended for, delivered to and placed on or adjacent to the works and may purchase all materials and goods necessary for carrying out and completion of the works.

44.4.2. The contractor shall if so required by the owner or Owner within 14 days of the date of determination assign to the owner without payment the benefit of any agreement for the supply of materials or goods and / or for the execution of any works for the purpose of this contract but on the terms that a supplier or sub-contractor shall be entitled to make any reasonable objection to any further assignment thereof by the owner. In any case the owner may pay any supplier or sub-contractor for any materials or goods delivered or works executed for the purpose of the contract (whether before or after the date of determination) in so far as the price thereof has not already been paid by the contractor. The owners' rights under this paragraph are in addition to his rights to pay nominated sub-contractor as provided in clause 26.2. and payments made under this paragraph may be deducted from any sum due to become due to the contractor.

44.4.3. The contractor shall as and when required in writing by the Owner so to do (but not before remove from the works any temporary buildings, plants, tools, equipment's, goods and materials belonging to or hired by him. If within a reasonable time after any such requirements has been made the contractor, has not complied therewith then the owner may (but without being responsible for any loss or damage) remove and sell any such property of the contractor, holding proceeds less all costs incurred to the credit of the contractor.

44.4.4. The contractor shall allow or pay to the owner in the manner hereinafter appearing the amount of any direct loss and / or damaged caused to the owner by the determination. Until after completion of the works under sub-clause 48.4.1 the owner shall not be bound by any provisions of this contract to make any further payment to the contractor, but upon such completion and the verification within a reasonable time of the accounts of any therefor the Owner shall certify the amount of expense properly incurred by the owner and the amount of any direct loss/ or damage caused to the owner by the determination and if such amounts when added to the monies paid to the contractor before the date of determination exceed the total amount which would have been payable on due completion in accordance with this contract, the difference shall be a debt payable to the owner by the contractor, and if the said amounts, when added to the said monies be less than the said total amounts, the difference shall be a debt payable by the owner to the contractor.

#### **45.Determination by the contractor**

45.1. Without prejudice to any other rights and remedies which the contractor may possess, if

45.1.1. The owner does not pay to the contractor the amount due on any certificate within the period for honouring certificates named in the appendix to these conditions and continues such default for Twenty One days after receipt by registered post or recorded delivery of a notice from the contractor starting that notice of determination under this condition will be served if payments is not made within Twenty One days from receipt thereof: Or.

45.1.2. The owner interferes with or obstructs the issue of any certificates due under this contract: Or

45.1.3. The carrying out of the whole or substantially the whole of the uncompleted works (other than the execution of work required under clause 42 of these conditions) is suspended for a continuous period of the length by reason of:

45.1.3.1. Force majeure, Or

45.1.3.2. Loss or damage occasioned by any one or more of the contingencies referred to in clause 47.1.1. or clause 47.1.2. of the conditions (if applicable). Or.

45.1.3.3. Civil commotion, Or

45.1.3.4. Owners instructions issued under clause 5.3., clause 30.1. or clause 39.2. of these conditions, Or

45.1.3.5. The contractor not having received in due time necessary instructions drawings, details levels from the Owner for which he specifically applied in writing on a date which having regard to the date of completion stated in the appendix to these conditions or to any extension of time then fixed under clause 40. of these conditions was neither unreasonably distant from nor unreasonably close to the date on which it was necessary for him to receive the same. Or

45.1.3.6. Delay on the part of the artists, tradesmen or others engaged by the owner in executing work not forming part of this contract, Or

45.1.3.7. The opening up for inspection of any work covered up or of the testing of any of the work materials or goods in accordance with clause 37. of these conditions (including making good in consequence of such opening up or testing) unless the inspection or test showed that the work materials or goods were not in accordance with this contract.

Then contractor may thereupon by notice by registered post or recorded delivery to the owner or Owner forthwith determine the employment of the contractor under this contract; provided to such notice shall not be given unreasonably or vexatiously.

45.2. Upon such determination, then without prejudice to the accrued rights or remedies of either party or to any liability of the classes mentioned in clause 43. of these conditions which may accrue either before the contractor or any sub-contractors shall have removed his or their temporary buildings, plant, machinery, appliances goods or materials or by reason of his or their so removing the same, the respective rights and liabilities of the contractor and the owner shall be as follows that is to say.

45.2.1. The contractor shall with all reasonable dispatch and in such manner and with such precautions as will prevent injury, death or damage of the classes in respect for which before the dates of determination he was liable to indemnify the owner under clause 43. of these conditions remove from site all his temporary buildings, plant, machinery, appliances, goods and materials and shall give facilities for his sub-contractors to do the same but subject always to the provisions of sub-clause 49.2.2.3.

45.2.2. After taking into account amounts previously paid under this contract the contractor shall be paid by the owner.

45.2.2.1. The total value of the works completed at the date of determination.

45.2.2.2. The total value of the works begun and executed but not completed at the date of determination the value being ascertained mutatis in accordance with clause 30.4. of these conditions.

45.2.2.3. The cost of materials or goods properly ordered for the works for which the contractor shall have paid or of which the contractor is legally bound to pay, and on such payment by the owner materials or goods so paid for shall become the property of the owner.

45.2.2.4. Any direct loss and / or damage caused to the contractor by the determination.

Provided that in addition to all other remedies the contractor, upon such determination, may take possession of and shall have a lien upon all unfixed materials which may have become the property of the owner under clause 32. until payment of all monies due to the contractor from the owner.

#### **46.Co-ordination of works**

46.1. At the commencement of work, and from time to time, the contractor shall confer with the sub-contractors, persons, engaged on separate contracts in connection with the work, and with the Owner for the purpose of the co-ordination and execution of the various phases of the work.

46.2. The contractor shall ascertain the sub-contractors, persons engaged on separate contracts in connection with the works, the extent of all chasing, cuttings and forming of all openings, holes grooves, etc. as may be required to accommodate the various services, the contractors shall ascertain the routes of all services and the positions of all floor outlets, traps, etc. in connection with the installation of a plant and services and arrange for the construction of work accordingly. The breaking and cutting of completed work must be avoided.



#### **47.Labour**

- 47.1. The contractor shall employ no child labour under 14 years of age on the work. If female labour is engaged these shall make necessary provision for safeguarding small children and keeping them clear of the site of operations. No labour shall reside within the compound except authorized guards.

#### **48. Protections of trees and shrubs**

- 48.1. Trees and shrubs designated by the Owner shall be protected from damage during the course of the work and the earth level shall not be changed within three feet of such tree. Where necessary such trees and shrubs shall be protected by means of temporary fencing.

#### **49. Guarantee**

- 49.1. Besides guarantee required elsewhere, the contractor shall guarantee the work in general for one year as noted under clause of the conditions.
- 49.2. All required guarantees shall be submitted to the Owner by the contractor when requesting certification of accounts for payment by the owner.

#### **50. Antiquities**

- 50.1. All fossils, antiquities and other objects of interest or value which may be found on the site or in excavating the same during the progress of the work shall become the property of the owner. The contractor shall carefully take out and preserve all such objects and shall immediately or as soon as conveniently may be after the discovery of such articles deliver the same into the possession of the Owner or of the clerk-of-works uncleaned and as excavated.
- 50.2. If in the opinion of the Owner compliance with the provisions of the preceding sub-clause has involved the contractor in direct loss and / or expense for which he would not be reimbursed by a payment made under any other provision in this contract then the Owner shall ascertain the amount of such loss and or expense any amount from time to time so ascertained shall be added to the contract sum, and if an Interim certificate is issued after the date of ascertainment any such amount shall be added to the amount which would otherwise be stated as due in such certificates.

#### **51. Excepted matters**

- 51.1. The decision, opinion, direction, certificate (except for payment) with respect to all or any of the matters under clauses 5., 9., 19., 25., 26., 36., 40.1.1., 40.1.2., 40.1.4., 40.1.7 and 40.1.8 and 48. hereof (which matters are herein referred to as the excepted matters) shall be final and conclusive and binding on the parties hereto and shall be without appeal. Any other decision, opinion, direction, certificate or valuation of the Owner or any refusal of the Owner to give any of the same shall be subject to any right of Arbitration and review in the same way in all respect (including the provisions as to opening the reference) as if it were a decision of the Owner under the following clause.

#### **52. Arbitrator**

- 52.1. All dispute and differences of any kind whatever arising out of or in connection with the contract or the carrying out of the works (whether during the progress of the works or after their completion and whether before or after the determination,

abandonment or breach of the contract) shall be referred to and settled by the Owner who shall state his decision in writing. Such decision may be in the form of a Final certificate or otherwise. The decision of the Owner with respect of any of the excepted matters shall be final and without appeal. But if either the owner or the contractor be dissatisfied with the decision of the Owner on any matter, question or dispute of any kind (except any of the excepted matters) or as to the withholding by the Owner of any certificate to which the contractor may claim to be entitled then and in any such case either party (the owner or the contractor) may within 28 days after receiving notice of such decision give a written notice to the other party through the Owner requiring that such matters in dispute be Arbitrated upon. Such written notices shall specify the matters which are in dispute and such dispute or difference of which such written notice has been given and no other shall be and is hereby referred to the Arbitration. Final decision of a single Arbitrator to be agreed upon and appointed by both the parties, or in case of disagreement as to the appointment of a single Arbitrator, to the Arbitration of two arbitrators one to be appointed by each party, which Arbitrators shall before taking upon themselves the burden of reference appoint presiding Arbitrator.

- 52.2. The Arbitrator, the Arbitrators as the case may be shall have power to open up review and revise any certificate, opinion, decision, requisition or notice save in regard to the excepted matters referred to in clause 55. and to determine all matters in dispute which shall be submitted to him or them and of which notice shall have been given as aforesaid.
- 52.3. Upon every or any such reference the cost of and incidental to the reference and award respectively shall be in the direction of the Arbitrator or Arbitrators or the umpire as the case may be who may determine the amount thereof or direct the same to be taxed as between Attomeys and clients or as between party and party and shall direct by whom and to whom and in what manner the same shall be borne and paid. This submission shall be deemed to be a submission to Arbitration within the meaning of the Indian Arbitration & Conciliation Act 1996 or any modification thereof for the time being in force, the award of the arbitrator or arbitrator's or the umpire as a case maybe shall be final and binding on the parties such reference except as to the withholding by the Owner of any certificates under clause 49. to which the contractor claims to be entitled shall not be open or entered upon until after the completion or alleged completions of the works or until after the practical cessation of the work arising from any cause unless with written consent of the owner and the contractor. Provided always that the owner shall withhold the payment of an interim certificate nor the contractor except with the consent in writing of the Owner in any way delay the carrying out of the works by reason of any such matters, question or dispute being referred to Arbitration but shall proceed with the work with all due diligence and shall until the decision of the Arbitrator or Arbitrator's or the umpire as the case may be given abide by the decision of the Owner and no award of the Arbitrator or the arbitrator's or umpire as the case maybe shall relieve the contractor of his obligations to adhere strictly to the Owners instructions with regard to the actual carrying out of the works. The owner and the contractor hereby also agree that Arbitration under this clause shall be a condition precedent to any right of action under the contract.

### **53. Protection and cleaning**

- 53.1. The contractor shall protect and preserve the work from all damage or accident providing any temporary roof, window and door coverings, boxing or other construction as required by the Owner. This protection shall be provided for all property adjacent to the site as well as on the site.

53.2. The contractor shall properly clean the work as it progresses and shall remove all rubbish and debris from the site from time to time as is necessary and as directed. On completion the contractor shall ensure that the premises and / or site are cleaned surplus materials debris, sheds etc. removed, areas under floors cleared of rubbish gutters and drains cleared, doors and sashes eased, locks and fastenings oiled, keys clearly labeled and handed to the clerk of works so that the whole is left fit for immediate occupation or use and to the satisfaction of the Owner.

#### **54.Tolerance**

54.1. The contractor shall exercise every care to ensure that all structural members are sufficiently plumb and true to dimensions called for on the drawings to receive prefabricated finishing elements such as doors, windows, cabinet work, ceramic work, concrete tiles etc. Any variations may require rectification in the structural members or may involve remaking or replacing the finishing elements fabricated to fit into the openings or spaces, as called for on the drawings.

54.2. In case of separate contract, the contractor whose work does not conform to dimensions called for shall be liable for all the expenses which may have to be incurred for rectification or replacement as may be required by the Owner for the proper installation of the finishing elements. The Owners decision in this respect shall be final and binding on the parties concerned.

#### **APPENDIX HEREINBEFORE REFERRED TO**

38.1. Defects Liability Period: \_\_\_\_\_

31.5. Period of final Measurement and valuation: \_\_\_\_\_

39.1. Date of commencement: \_\_\_\_\_

39.1. Date of completion: \_\_\_\_\_

41.1. Agreed Liquidated damages:

31.3. Retention Item \_\_\_\_\_

31.3. Limit of retention fund \_\_\_\_\_

31.1. Period of honoring certificate \_\_\_\_\_.

### **SPECIAL CONDITIONS OF CONTRACT**

SNTD Women's University proposes to **STRUCTURAL REPAIR, STRENGTHENING & ROOF REPLACEMENT FOR AUDITORIUM BUILDING, AT SNTD JUHU CAMPUS MUMBAI**. Thus description of work is generally described below and in schedule of works in detail.

#### **Definitions:**

OWNER / CLIENT will mean	SNTD Women's University or its authorised representative.
CONTRACTOR will mean	Successful Bidder
MILESTONE will mean	Established progress completion dates set forth.
CONTRACT SCHEDULE will mean	Time schedule agreed by the parties for the completion of project.

#### **1. Scope of Work**

The detailed scope of work is as described in the schedule of works (B. O. Q.) However the works comprises of Providing & constructing Structural Repair, Strengthening & roof replacement work for Auditorium building at SNTD University's Juhu Campus, Mumbai, including all services work. Time of execution of work will be **08 Months period**.

All works are to be executed as per the detailed drawings and instructions given by the Owner.

#### **2. General**

Contractor shall read and study the following conditions carefully, quote his rates and execute the work accordingly. Conditions mentioned herein shall override any condition mentioned anywhere in the contract.

The tender drawings are meant for guidance only and may not represent the exact size and shape of the building part. However they will give a fair idea of the work involved. The contractor shall verify the dimensions given in the drawings before starting the work and point out discrepancies, if any.

It is understood that the Contractor has experience in executing similar works and has competence and commensurate technical expertise to carry out work with good engineering practice.

Attention of the Contractor is drawn to the fact that since this is a repair work of an existing old building, he shall take utmost precaution to cover carefully the existing structures and/or Client's property for dust control. He shall take suitable precautions so as to avoid any hindrance in conducting regular activities of Clients. **No extra time and price will be allowed to Contractor for inconvenience or delays caused on this account.**

Contractor shall also take safety precautions to protect injury to Client's staff, students and employees as well as general public.

The work will be carried out in phases, as per the Client's convenience, and no extra time and price will be allowed to the Contractor for the same.

### 3. Site Conditions

The Contractor shall be solely responsible for satisfying himself concerning the nature of work, site conditions, local conditions including but not limited to the following:

- a. The site, its conditions, its geographical conditions, its topography, its access, **space available** for storing materials (which is limited to a great extent), etc.
- b. Local conditions, rules regulations, etc., and any such things required to be known for fulfilment of this contract.
- c. Attention of the Contractor is drawn to the fact that the work will be executed in the campus, which will be working at all times, and therefore the existing facilities have to be protected from disturbance from noise / movement of workers, material movement, etc. Safety norms will have to be observed strictly.
- d. Contractor should satisfy himself about the working hours possible for construction under this contract. Contractor shall also ensure that day to day working of the campus shall not be hampered.

The Contractor shall draw his own conclusions after examination of the above conditions. The failure on the part of the Contractor will not relieve him of his responsibilities, for not properly estimating the time and price, required for successful performance of the contract. Neither the Owner nor the Contractor assumes any responsibility whatsoever in respect of sufficiency or accuracy of the information, records, reports investigations or claim that the information available is true representation of the actual conditions.

### 4. Cleaning

Contractor shall, at all times, keep the site safe, clean and tidy. As the work is to be executed in a functional campus, the Contractor shall protect Client's material and not allow dirt and dust to accumulate and spread in the premises and other area. The site has to be maintained clean at all times. Client reserves right to keep the site clean at Contractor's expense, if required.

When the work is nearing completion, he shall clear the site by removing the temporary structures, his surplus materials, debris, and equipment to any nearby place at his cost for remaining part of work.

Upon completion of work, the Contractor shall, at his expense, leave the premises in a clean neat and safe condition.

### 5. Water and Electricity for Construction

Contractor will make his own arrangement for water and its distribution as Clients/Owners will not provide the same.

The Client/Owner shall provide electricity at a single point near the construction site. Further distribution of water and electrical power shall be in the scope of the Contractor. **For providing the electrical connection, 1% of the cost of work including all materials will be deducted from every bill of the Contractor.**

For meeting the emergency requirement, (in event of failure/unavailability of regular electrical supply), the Contractor may have to get D.G. set as standby so that the work is not hampered due to unavailability of power.

## **6. Site Office, Cement Godown, Labour Camp, etc.**

- 54.3. Contractor shall not be given space by the Client/Owner for his office unless specifically agreed by them in writing. Contractor shall check with Owner about the space required by him for his site office, before quoting for the work.
- 54.4. Cement Godown: The Contractor shall construct a sound, secure, water-tight Godown sufficient for storing cement (approximately 1000 bags at any time), before starting the construction work, at his own cost. Contractor shall check with Owner if such space is available.
- 54.5. Labour Camps: The Contractor shall not be given space to put up labour camps.
- 54.6. The Contractor shall make adequate sanitary arrangements for the staff and workers, which shall conform to the rules and regulations of SNTD and the local authorities.

## **7. Independent and Experienced Contractor**

The Contractor shall work as an independent Contractor and not agent of Owner, Owner or any of the Consultants appointed for the project.

The Contractor represents that he is fully experienced, properly qualified, registered, licensed, equipped, organised and financed to perform the works under this contract. The Contractor represents that he understands the specifications, nature and present scope of work and claims that he has carried out similar work and worked under similar specifications and he is conversant with good engineering practices involved in civil construction. The Contractor promises to execute the work in a professional manner in the given time frame and as per good engineering practice and will hand over the project in trouble-free condition, even at times by suggesting additional specifications, (at extra cost) if the need arises.

Attention of the Contractor is drawn to the fact that the Contractor has to guarantee to the performance of each item of work mentioned in the B.O.Q. of this contract. The building will not have any construction defect left after the building is handed back to the Owners.

The Contractor shall test and verify accuracy, strength, reliability of his materials, equipment, systems used to carry out work and he will be solely responsible for its performance, safety while executing the performance and he will indemnify Owners, Owners and Consultants of any damages or consequential damages in case of its failure for any performance-based specifications. Approval from the Owners, Owners or his Consultants to design, specifications of his equipment, will not absolve Contractor from his sole responsibility and obligations which have to be met solely by him.

## **8. Authorised Representative**

Before starting the work the Contractor shall appoint and inform the Owner in writing the name of the authorised representative who will represent him and is empowered to take the decisions on behalf of the Contractor and the limitations of the representatives. If the work is suspended, he shall be available for discussions at all times with Owner. All the communications made with the authorised representative will be binding on the Contractor. Any change in the authorised representative will be informed to the Owner sufficiently in advance. All the correspondence regarding the CONTRACT will be addressed and sent to the Owner, unless otherwise informed.

## **9. Contractor's Staff**

Contractor shall appoint full-time experienced engineers, supervisors, etc., in the different fields of engineering and who have sufficient previous experience of similar nature of work. Contractor shall inform Owners and convince him about adequacy of his staff. He will have to appoint additional staff, if in the opinion of the Owner it is necessary to do so in the interest of work. Such staff shall not be removed unless alternative arrangements are made for replacement and only after informing the Owner.

Contractor shall get his sub-Contractors approved from the Owner and/or Consultant before they are allowed to work at site.

## **10. Order of preference**

Unless otherwise specified, in case of discrepancy in the contract documents, the contract conditions will be applicable in following order.

1. Special Conditions of Contract
2. Drawings
3. Bill of Quantities (Schedule of works)
4. General Specifications
5. General Conditions of contract
6. Articles of Agreement of **INDIAN INSTITUTE OF OWNERS.**

In case of discrepancy between wording of the General Specifications and that of Schedule of Quantities the wording of the Schedule of Quantities will have precedence over the wording of specifications.

Large-sized details will take precedence over small-sized details.

Owner's drawings will take precedence over Consultant's drawings.

## **11. Applicable Laws, Rules and Regulations**

Contractor shall be responsible to comply with regulations of the local authorities & all applicable laws of Government of India, State, at which the site is situated and the state in which contract is signed, in effect the time of the duration of contract will apply to the contract and the Contractor.

In case of any discrepancy in the contract, the law of the country will prevail.

If any law is changed during the performance of the contract, and which has an effect on the performance and price of the contract, the same shall be brought to the notice of Owner and Owner. In such a case an equitable solution should be found within one month of the time it was brought to the attention of the Owner, in writing.

Contractor shall comply with the instructions of Owner and maintain all books; registers, challans, bills and documents related to work and maintain the records applicable under any law of local-authority, state-govt. Or central-govt. Or the general norms followed for the similar contract.

Owners have the right to deny access to any worker, staff or Contractor's representative by giving the Contractor a written notice, in case any default on their part in complying the provisions of contract or any law.

Contractor will perform all his obligations applicable under the labour laws which are applicable for the work to be performed under this contract. The copies of all the

licences/documents required under the laws shall be maintained by the Contractor at site and a copy of the same will be given to the Owner.

Due to the omission on the part of the Contractor, if the Owner is liable to pay to the Government agency, under any provisions of the applicable laws in force at the time of signing the contract, the Owner will make such payment without referring to the Contractor. Such amount will be deducted from the amount due to the Contractor.

## **12. Permits**

Except as otherwise specified, the Contractor shall procure and pay for all permits, licenses, certifications and other applicable governing authority requirements and inspections, other than inspections performed by Owner or Owner and shall furnish any documentation, bonds, security or deposits required to permit performance of the work.

This clause does not cover payments made to statutory authorities for Building permits / sanctioning of plans, etc.

## **13. Security**

The Contractor shall provide identity cards to his workers and his staff with their photographs and names written on it. It will be necessary to get records of staff and workers checked from local police station as the site is a university for women.

The Contractor shall make his own security arrangements of work in progress, equipment at site, materials received (including those supplied by Owner, if any) at site.

As the site is situated in the existing working campus of the Owner, the Contractor shall take proper precautions and ensure that no one:

- a. Damages Owner's property by the actions of his workers and staff.
- b. Enters in their premises.
- c. Interferes or obstructs the use of their premises.
- d. Obstructs the access to their premises.
- e. Uses their facilities.

The Contractor shall comply with the Owner's security requirements for the work site. Such compliance will not be limited to the above and will not relieve the Contractor of his obligation for maintaining proper security nor will it relieve him of his responsibility to establish and maintain secured conditions at the work site.

## **14. Tender drawings**

The tender drawings are meant for guidance only and may not represent exact size and shape but will give a fair idea of the work involved. Complete list of tender drawings available for inspection is given elsewhere in the tender.

Contractor shall examine the relevant tender drawings (which shall be issued along with the tender documents) and specifications of work. No claims shall be entertained for the assumptions made by the Contractor, if any. Contractor shall not write any comments/conditions/figures or change the tender by writing on the same in any manner.

In case price of item is quoted as lump sum item in the B.O.Q. the work described in the tender drawings will be added to the work described in the item of work in the schedule as if it is included in the scope of work where lump sum price is quoted. No extra payment will be made for the work shown in the tender drawings.



## 15. Shop drawings, Data, Samples & Reports

It is clearly understood that shop drawings are prepared by the Contractor. Owner/Consultant giving approval of shop drawings, and samples, and permission to proceed with the work does not constitute acceptance to design, method of working, testing or certificates submitted by the Contractor and does not relieve him of his responsibility of his contractual obligations.

### 15.1 Shop drawings

Shop drawings shall be submitted under following cases whichever is applicable.

- a) All specialised items for which the Contractor draws the specifications.
- b) Large-scale drawings showing fixing details of fixers, equipment and showing co-ordination with other services.
- c) Showing any changes in layout in the Consultant's drawings.
- d) Equipment layout, ducting, piping and wiring diagram.
- e) Manufacturer or Contractor's fabrication drawings for any materials or equipment supplied by him.

The Owner will give the Contractor design drawings of various parts and sections of the project. These drawings will give all the information to the Contractor to prepare shop drawing for the work. The Contractor shall check immediately the specifications and compared the same with the drawings. He will also check whether all the information required is available in the drawing and if any discrepancy, if exists should be pointed out to Owner/Consultant, in writing.

Based on the design drawings, the Contractor shall prepare and submit **four copies** of the shop drawings to Owner for himself and/or to his consultants.

The shop drawings shall be submitted at the Mumbai office of the Owner/Consultant. Contractor shall also submit all the required information/calculations along with the shop drawings. In case of incorrect information/discrepancy, Contractor shall arrange to depute a competent person to the Owner/Consultant's Mumbai office to explain/clarify the details in the shop drawings. Under no circumstances the distance between site of work and the Owner's office, the expenses involved in deputing a person or the extra time required will be entertained as an excuse to condone the preparation of shop drawings.

The Contractor shall submit four copies of catalogues, manufacturer's drawings, equipment characteristics data or performance charts as required by the Owner.

Owner will send two copies of the approved drawings to the contractor with any one of the following comments:

- i. Approved for Construction (AFC)
- ii. Approved as noted (AAN)
- iii. Rejected and to be revised 'or' Revise and Resubmit (RAR).

However, the Contractor shall not carry out the work unless he receives the design and/or shop drawing with a stamp of Approved for Construction.

Such Approved for Construction (AFC) drawings will form part of the contract and if there is any change in the original specification as a result of AFC drawings such change should be brought to the notice of Owner / Owner and change order is to be made before such item is executed.

Any variation between AFC drawings, Good for Construction (GFC) drawings and tender drawing will not make the contract void and the Contractor cannot refuse to carry out the work as per AFC drawings.

### 15.2 Samples

The Contractor shall submit the samples of finishing items as instructed by the Consultant/Owner for his approval. The samples shall be submitted in triplicate. Each sample will have Project Name and Item number of the contract, Manufacturer's name, etc. Rejected samples should be immediately removed from site.

Out of three approved samples, one sample will remain with the Owner and one will be displayed at site on Sample board. Only the approved sample shall be kept at site. The materials used in the work shall strictly conform to the approved sample.

### 15.3 List of Approved Makes

As far as possible Contractor shall use the materials, for construction, specified in the **LIST OF APPROVED MAKES**. In case of discrepancy/doubt regarding the materials being not specified clearly, the Contractor shall take prior approval from Owner before using such materials. In no case shall non-IS specified materials be used for construction/execution.

### 15.4 Reports and Review Meetings

The Contractor shall submit **3 copies** each of the following reports:

No.	Report	Duration
1.	Quality Control	Whenever requested
2.	Progress Report and comparison with approved schedule, information required and reasons for delay, if any.	Every two weeks

The reports mentioned above shall include the following information:

#### Fortnightly Progress Reports

The Contractor shall submit on first day of each month an updated **M.S. PROJECT** report showing the actual rate of progress till that day. The report will include 2 copies of photographs, with the date on which it is taken, of post card size for work in progress, as directed by Owner. In the event of actual rate of progress falls behind the scheduled progress as indicated in the bar chart the Contractor shall accelerate the works within next 7 days so as to make up the lost works and time within 15<sup>th</sup> of each month to the satisfaction of the Owner.

The monthly report shall also include resource planning for the next month and also the expected value of the next month's R.A. bill.

#### Site Register

The Contractor shall maintain at the site, a diary showing an accurate record of the progress of the works, item-wise the number of men employed under each trade, plant

and equipment operating at site. Reasons for stoppage of work will also be noted in the register.

### Review Meetings

A senior representative of the Contractor (Senior than the Site Manager) shall attend weekly review meetings at the work site. The Contractor shall give the list of information required by him, in writing, to the Owner well in advance. In addition, co-ordination meetings shall be called monthly or fortnightly, as the need be. The meeting will be attended by the Owner/Owner's representative, Consultants, Owner and the Contractor (partner/chief executive) to review the progress of work and sort out problems, if any, with an idea of ensuring the completion of the project within the stipulated time period.

### **16. Specifications**

Entire work shall be as per specifications given in the tender, which will be taken as minimum specifications and as per relevant specifications of INDIAN STANDARD SPECIFICATION in case the specifications are not given in the contract.

Contractor shall inform Owner about deficiency in specifications, if any, at the time of submitting the tender and get the clarifications about the specifications. In case of deficient specifications found by the Contractor, affecting his performance guarantee, he must suggest his specifications at the time of finalising the contract and settle the revision in the rates quoted by him in the tender.

At no time the Contractor shall give excuse of defective/inadequate specifications for not providing the building which is free from defects and will be responsible for the quality of work executed by him.

### **17. Right to delete part of work**

The Owner have the right, at their discretion, to add or delete any item in part or full and/or to alter any drawings and the Contractor shall not be entitled for any compensation for such commission. However, the Owner cannot award such work, omitted from the Contractor's agreed scope of work, to another agency without permission of the Contractor. However, in the opinion of Owner, if the quality of the work executed by the Contractor is not satisfactory, the Owner will have authority to get the same work done by any agency of his choice at the expense of Contractor. The Owner's decision in this regard will be final, binding on the Contractor and without appeal.

In case of any of the items in the scope of this tender are given to any agency for execution, because of Contractor's inability to perform the work in a manner acceptable to Owner, and if the agency claims extra amount due to extra work necessary to be re-done because of the main Contractor's defective workmanship, all such extra amounts claimed by that agency, will be deducted from the main Contractor's dues. Or if, there are no dues to the main Contractor, this extra amount will be deducted from his retention money.

### **18. Good for Construction (GFC) or Approved for Construction (AFC) Drawings**

Contractor shall indicate the dates on which he requires drawings before starting the work. Contractor shall give a notice of 15 days to Owner / Consultant about the requirement of the drawing/decisions required by him to complete the project as per schedule. It is understood that all the drawings are not required at the beginning of the project for completing the project on time.

Consultant shall forward the drawings to the Contractor. Contractor shall, immediately on receipt of 'GOOD FOR CONSTRUCTION' (GFC) drawings, check all specifications (technical specifications and pay item specifications/description) and GFC drawings and shall promptly (within a maximum time limit of three weeks) notify in writing to the Owner of any such omissions or discrepancies in such specifications or drawings.

Any claim/claims, which may result due to non-compliance of the above, shall not be entertained and work, shall be executed/completed at the cost and consequence of the Contractor.

Contractor shall call for the missing information/drawings from the Consultants in the prescribed form (Request for Information (RFI)) only. Contractor shall give a time of 10 days to supply such necessary information required by him. Without specific request from the Contractor, about information required, it will be construed that all the information is available with the Contractor.

Any delay in giving drawings/decisions/approval of samples shall be recorded by the Contractor and specific extension of time to complete the contract shall be given against such delays to the Contractor for completing the project. At the end of each month Contractor shall inform Owner/Owner about such cumulative delays affecting the schedule and obtain confirmation about the same. In the absence of such confirmation from time to time, Contractor's claim for extension of time will not be granted.

The Owner / Consultant will grant suitable extension in time if there is delay of supplying the information than specified above.

The decision of the Owner / Consultant on the extension of time is binding on the Contractor and will be outside the purview of arbitration

## **19. Contract Schedule & Mile Stones**

### **19.1 Time and Starting Date**

Work is carried out in two parts: Structural repairs and allied works, and Renovation work.

No extension of time will be allowed due to change in quantity within the limits specified elsewhere in the contract unless satisfactory justification is given to the abnormal increase in the quantity affecting schedule of work.

Site shall be considered as handed over to the Contractor on the date of letter of intent though Contractor shall not have any **lien** on the site.

Contractor shall be given 7 days from and including the date on the letter of intent to start work and time period will be calculated from the 8th day from and including date on which letter of intent was handed to the Contractor.

### **19.2 Milestones**

Contractor should submit the Milestones and should stick with these milestones by without hampering Quality of Work.

<b>No.</b>	<b>Contract Mile Stones.</b>	<b>Time period from LOI</b>
1.	Excavation for Footing	

<b>No.</b>	<b>Contract Mile Stones.</b>	<b>Time period from LOI</b>
2.	Casting of Footing (i /c. Curing Complete)	
3.	Casting of Stub Columns (i /c. Curing Complete)	
4.	Casting of Plinth Beam (i /c. Curing Complete)	
5.	Plinth PCC (i /c. Curing Complete)	
6.	Ground Floor Columns (i /c. Curing Complete)	
7.	First Floor Slab (i /c. Curing Complete)	
8.	First Floor Columns (i /c. Curing Complete)	
9.	Second Floor Slab (i /c. Curing Complete)	
10.	Stub Column above terrace (i /c. Curing Complete)	
11.	Ground Floor B/W (i /c. Curing Complete)	
12.	First Floor B/W (i /c. Curing Complete)	
13.	Terrace parapet wall (i /c. Curing Complete)	
14.	Internal Plaster ground Floor (i /c. Curing Complete)	
15.	Internal plaster first Floor (i /c. Curing Complete)	
16.	Window Work	
17.	Flooring Of GF	
18.	Flooring of FF	
19.	External plaster(i /c. Curing Complete)	
20.	Internal Painting	
21.	External painting	
22.	All services	
23.	Project complete Date	

### 19.3 Contract Schedule

Within 7 days of the issue of letter of intent/work order, Contractor shall prepare bar chart on **M. S. PROJECT ONLY showing linking of each activity and critical path** and finalise the same in consultation with Owner before mobilisation advance is paid to the Contractor. This bar chart will also indicate inputs from Owner and Owner. The bar chart shall include procurement of materials, approval of samples, drawing requirements along with proper linkages. The bar chart should include and confirm the milestones to be achieved as mentioned in the contract elsewhere.

Not submitting the bar chart in appropriate form could lead to delay in payment of mobilisation advance. The Contractor will not be eligible to claim extension of time or damages in any form if the delay in payment of mobilisation advances due to above reason.

Contractor shall carry out work as per bar chart.

If at any time the Contractor's actual progress does not conform to milestones mentioned in clause 20.2 above, the Owner/Owner will notify the Contractor to improve upon his progress. The Contractor upon such notification must improve his labour, number of shifts, material position, and equipment, etc., without additional cost to the Owner. Failure to issue such notice will not relieve Contractor of his obligation to achieve the necessary progress and milestones. Failure to act on the notice of Owner/Owner shall be sufficient grounds for termination of the contract.

Owners have the right to terminate the contract, without prejudice to the other rights and compensations to be recovered from the Contractor and without any compensation payable to the Contractor, if Contractor fails to achieve the milestones as agreed by both

parties. Under the circumstance Contractor shall vacate the site within one month of such termination notice.

## 20. Termination

Owner reserves the right to terminate the contract at intermediate stage and charge the Contractor liquidated damages at the agreed rate in case

- Contractor fails to execute the project as per agreed milestones,
- Owner feels that Contractor will not be able to complete the work as per schedule.
- Persistent default in quality of work not as specified and not acceptable to the Owner/Consultant.

No compensation will be granted for such termination of the contract. Contractor shall prepare his final bill within one month of notice of such termination of work is given to him. Contractor shall not prevent another Contractor from moving on to site after such notice is given. Owner shall settle Contractor's bill within 45 days including time required for certifying the bill. Any additional time in settling the bill will attract interest burden at the rate of 12% per annum on the net amount due to the Contractor, as per certificate of Owner.

## 21. Performance Bond-cum-Security Deposit

Successful Contractor, within 7 days of letter of intent, shall submit irrevocable and unconditional security Bank Guarantee for 5% of contract value in the approved form, towards the guarantee of successful completion of contract as per specifications and time.

This guarantee shall be valid from the date of letter of intent till 90 days after final completion date of project.

This guarantee will be released after ascertaining that there is no claim against the Owner and/or Contractor from any party and after ascertaining that Owner has no claim on the Contractor.

This deposit shall be forfeited if Contractor refuses or fails to complete the project as per terms of the contract.

## 22. Finance and Payments

### 22.1 Mobilization Advance

Contractor shall be paid interest free mobilisation advance based on 10% of the contract value on submission of bank Guarantee from NATIONALIZED bank of equivalent amount which will be paid in following manner:

Contractor shall be paid 5% interest free mobilization advance based on the contract value, which will be paid in following manner

- *5% advance based on value of contract shall be given to the Contractor against a suitable confirmed Bank Guarantee from a Nationalized Bank after the letter of intent is given and Contractor submits **a bar-chart in the form of M. S. PROJECT giving following information:***

- a. Time required for each activity and their relationship.
- b. Quantities in each activity.

- c. Schedule of drawings required by him for completing the project as per chart.

Important: The release of the above 5% mobilization advance is subject to written approval of bar chart by the Owner.

Contractor will be bound to provide the minimum resources shown in the bar chart. In case it is found at any interim stage that the progress of work is slow and completion time of any activity is likely to extend beyond the target dates, the Contractor will have to increase the planned resources. The advance will not be paid till Owner approves the planning program.

Provision of time will be made by the Contractor for other agencies to carry out their part of the work and the Contractor will consider such lapse of time in the planning schedule. No compensation will be paid for idle labour due to work of other Contractors.

- Additional 5% interest-free advance will be paid to him after repair work, chemical treatment to min. 10 m<sup>2</sup> of concrete surface starts, after following due process of supporting structure, chipping off damaged concrete, etc.

This advance will be recovered from the Contractor from the first running bill onwards at the rate of 15% of the cost of work done.

### **22.2 Secured Advance**

No secured advance shall be paid.

### **23. Bills and Procedure for payments**

Following procedure for measurement of quantities, certification of bills and issue of certificate of payments shall be followed.

Contractor will make one bill in a month.

- i. The Contractor will take joint measurements of work done with clerk of works up to 25<sup>th</sup> of each month in triplicate book.
- ii. Owner's representative (Site Engineer) and Contractor will sign such joint measurements.
- iii. Owner's representative will record any dispute in measurements, in a separate sheet.
- iv. Any work, not fully completed, as per schedule of work, will not be measured. Part rate giving recommendation of Item of completed work e.g. door fixing without hardware or paint, etc. will not be paid.
  - One copy of corrected measurement sheets and the bill is to be given to Owner's representative for records.
  - Three copies of corrected measurement sheets are to be handed over to the Owner's representative to forward to Owner/Consultants along with three copies of the bill.
  - One copy of corrected measurement sheets is to be forwarded to Owner along with bill.
  - One copy of corrected measurement sheets and the bill is to be retained by the Contractor.

- v. Contractor must make a bill after measurements are checked and submit the bill to the Consultant for certification.
- vi. Contractor shall submit following with the bill.
  - 1. One soft copy of his bill.
  - 2. Measurement sheets duly signed by Owner's representative.
  - 3. Challans /Invoices of materials signed by Owner's representative.
  - 4. Summary sheet in a Performa similar to Certificate of Payments as issued and directed by Owner.
- vii. Owner/Consultant shall issue certificate of payment without cost of extra items, which have not already been settled in the previous bill within ten days of submission of bill as stated above. Two copies of the bill (including measurement sheets) will be returned to the Client who will retain one copy and forward one copy to the Contractor.
- viii. Extra items will be scrutinised and paid only after Owner approves the rates. Contractor should note that there would be inherent delay in certifying the cost of extra items if the relevant documents are not presented with the analysis of extra item.
- ix. Extra item, once certified, will be treated like normal item rates.
- x. Owner shall make payments as per the certificate of payment within 15 working days of submitting the certificate to them. (100 % payment for tender (settled items) in each R.A. bill shall be released).
- xi. The quality of the work shall be certified by Owner. Owner withholds the right to deduct reasonable money/or not pay for the defective /substandard quality of work, which cannot be dismantled, removed for bad workmanship.
- xii. Giving interim certificate of payment does not mean that the quantity of work has been accepted. Owner, if disapproves the quality, the amount of the certified/paid will be recovered in the next certificate/s.
- xiii. Escalation in contract rates will be considered if applicable due to increase in direct taxes; the same can be claimed in a separate bill for which separate certificate will be issued.
- xiv. Contractor should raise his claims, if any, in every running bill. Claims raised after two months after they are due will not be considered.

Any amount, which may be otherwise payable, may be withheld in whole or part if Owner files any claim on Contractor.

Contractor is in default on any of the contract conditions including but not limited to safety, quality, time schedule, insurance, and adjustments due to over payment from previous bills, payments if not made by the Contractor to the nominated sub-Contractor after he receives payment from the Owner.

After withholding such payments as per the reasons stated above, the Owner will make payment to the Contractor, the amount certified by Owner/Consultant after deducting taxes as per law of the country.

If claims are filed against the Contractor connected with this contract in which Owner will be held liable, if unpaid, the Owner may deduct all such expenses required to pay and/or



defend the claim from the amount due to the Contractor and if the money is insufficient from the bills, the same will be deducted /withheld from the performance guarantee given by the Contractor.

#### **24. Rates**

All rates will be inclusive of cost of all materials, cement and steel.

No escalation shall be allowed in prices during the tenure of the contract

The tender is an item rate tender. If the rate of any item is on lump sum basis, the work involved in the item will be taken as that described in the item together with what is shown in the tender drawings.

The rates quoted by the Contractor shall include charges for royalty, octroi, excise sales tax, levies of local-authority, state-govt.& central-govt. and any other taxes as applicable and constituted by law INCLUDING **works contract tax/ Goods & Service tax.**

However the Contract, Goods and Service Tax on the Bill amount will be shown separately.

In case contractor provides other services which have not been covered under the Owners' scope of services and also which categorise as consultancy services then the component of service tax will be shown and be paid separately.

Rates quoted in schedule of works are to be full and inclusive of the works described in the item together with other associated items such as general risk, liabilities and obligations, construction of temporary stores, watching, lighting the area, insurance of men and materials and other insurance mentioned elsewhere in the tender, cleaning the site before and after completion of work, etc.

Rates quoted for same items for different building/works shall remain same. In case Contractor quotes different rates for same item the lowest of all the rates shall be made applicable for that item.

#### **25. Rates of extra items**

All the extra item rates will be settled by the Owner (before starting the work), whose decision will be final in this regard, by deriving them from similar items already quoted in the tender. In case this is not possible, the extra item rates shall be calculated as per the cost of the materials (including taxes and transport and wastage) plus cost of labour plus 20% of cost of materials and labour to cover his overheads and profits. The Owner's decisions in settling the rates of extra items shall be final and binding on the Contractor.

The Contractor shall furnish, on request from the Owner all documents required to justify his claim of rates of non-tender items/extra items, which he may be called upon to carry out.

The Owner will approve all extra item rates. No work shall be carried out unless rate of extra item is approved.

All extra items and their cost implications shall be prepared well in advance. These extra items shall only be executed after written approval from Owner.

## **26. Taxes**

The Contractor will be reimbursed statutory increase made by the Government in taxes, after the award of this work, which have direct financial effect on the quoted rates after producing documentary evidence of its levy and subsequent payment. The amount equal to the increase will only be paid and no extra on any other account will be paid.

Likewise, if there is statutory decrease, it will be deducted from the bills raised by the Contractor.

## **27. Retention money**

10% value of the cost of the work shall be retained from every running bill towards retention money. No interest will be paid on the retention amount. This retention money will be retained in the form of cash. 50% of the retention money will be released on Owner issuing final completion certificate. And remaining 50% of the money which can be in the form of Bank Guarantee, will be released after two years after the final completion certificate after deducting for the expenses made by the Owner on cost of rectification/replacement of defective work or any other claim by the owner, in case Contractor refuses to carry out such rectification/replacement of defective work as may be advised by Owner. The defects liability period of such work will be extended by one more year from the date of rectification/replacement.

## **28. Interest on delayed payments**

Any reasonable delay in making payments will not vitiate the schedule or make contract void. Contractor will be entitled to charge interest on delayed payment. Contractor will be entitled for extension of time (without any claims other than interest and escalation) for persistent delays in making payments. Contractor has a right to stop the work if his two successive bills certified by Owner remain unpaid. In such a case, Contractor can claim the damage due to idle time and labour to be certified by Owner/consultant, whose decision will be binding on Owner and Contractor and will be out of purview of arbitration.

## **29. Guarantees Warranties to be submitted by the Contractor**

The entire Bank Guarantees to be submitted shall be irrevocable, unconditional and without referring to the Contractor.

- 1) Mobilisation advance.
- 2) Performance Guarantee
- 3) Retention money
- 4) 10 years Guarantee for Anti-termite treatment
- 5) 10 years Guarantee for Waterproofing treatment

All Bank guarantees shall be from a NATIONALISED BANK ONLY.

## **30. Variation in the Contract Sum**

Contract will be valid for variation of up to  $\pm$  50% of contract amount.

## **31. Basic Rates**

The basic rates of the material will be as follows:

**Cement: Rs. 6500/- per metric tonne**

**Reinforcing Steel: Rs. 54000/- per metric tonne**

**Structural Steel: Rs. 62500/- per metric tonne**

### **32. Owner Supply of Materials**

Not Applicable.

### **33. Indenting Materials supplied by Owner**

Not Applicable.

### **34. Reconciliation of Cement and Steel supplied by Owner**

Not Applicable.

### **35. Inspection, Quality Surveillance, Rejection of Materials and Workmanship**

All material and equipment furnished and work performed shall be properly inspected by Contractor at his expense, and shall at all times be subject to quality surveillance and quality audit by Owner or his authorised representatives who, upon reasonable notice, shall be afforded full and free access to the shops, factories or other places of business of Contractor and its suppliers and sub-Contractors of any tier for such quality surveillance or audit. Contractor shall provide safe and adequate facilities, drawing, documents and samples as requested, and shall provide assistance and co-operation including stoppage of work to perform such examination as may be necessary to determine compliance with their equipment's of this contract. Any work covered prior to any quality surveillance or test by Owner shall be uncovered and replaced at the expense of Contractor if such covering interferes with or obstructs such inspection or test. Failure of Owner to make such quality surveillance or to discover defective design, equipment, materials or workmanship shall not relieve Contractor of its obligations under this contract nor prejudice the rights of Owner thereafter to reject or require the correction of defective work in accordance with the provisions of this contract.

If any work is determined by Owner to be defective or not in conformance with this contract the provisions of the general condition titled "warranty" shall apply.

### **36. Testing**

Unless otherwise provided in the contract, testing of equipment, materials or work shall be performed by contract at its expense and in accordance with contract requirements. Should Owner desire tests in addition to those required by this contract, Contractor would be given reasonable notice by Owner to permit such testing. Such additional test will be at Owner's expense.

Contractor shall furnish samples as requested and shall provide reasonable assistance and co-operation necessary to permit tests to be performed on materials or work in place including reasonable stoppage of work during testing.

Contractor shall conduct and carry out tests for quality of cement, steel and other materials from every batch procured by him, and see that the same satisfies the criterion of I. S. Code. Further if any material is rejected, Contractor shall intimate Owner immediately in writing and arrange to segregate the rejected materials. Actual cost of testing the same will be also be borne by the Contractor. However the rolling margin criterion will be ignored and will not be the reason for rejecting the material.

### **37. Warranty**

Contractor shall submit draft copies of all WARRANTIES that would be required to be submitted by the Contractor as per the conditions of contract along with the duly-filled tender proposal.

All workmanship shall be first class and performed in accordance with sound construction practices acceptable to Owner. All equipment, materials and workmanship shall also conform to the requirements of this contract.

Contractor warrants all equipment and material it furnished and all work it perform against defects in design, equipment, materials or workmanship for a period from work commencement to a date **twenty-four (24) months** after acceptance of the work.

If at any time during the warranty period, Owner, Owner or Contractor discovers any defect in the design, equipment, materials, or workmanship immediate written notice shall be given to the other parties. Contractor shall within a reasonable time propose corrective actions to sure such defects to meet the requirements of this contract act as follows:

1. Rework, repair, or remove and replace defective equipment and materials or re-perform defective workmanship to acceptable quality at a time and in a manner acceptable to Owner.
2. Co-operate with other agencies assigned by Owner to correct such defects and pay to Owner all actual costs reasonably incurred by Owner in performing or having performed corrective action. or
3. Propose and negotiate in good faith an equitable reduction in the contract in lieu of corrective action.

All costs incidental to corrective actions including demolition for access, removal, disassembly, transportation, and re-installation, re-construction, re-testing and re-inspection as may be necessary to correct the defect and to demonstrate that the previously defective work conforms to the requirements of this contract shall be borne by Contractor.

Contractor further warrants any and all corrective actions it performs against defects design equipment, materials and workmanship for a period of twenty four (24) months in addition to any existing warranty period, following acceptance by Owner.

### **38. As-Built Drawings**

At the time of submitting final bill or within 30 days of it, the Contractor will submit as-built drawings of items which have been executed by him or for proprietary items, items for which the Contractor had sought deviations from working drawing, catalogues, guarantees, warrantee manuals of equipment, maintenance manuals to the Owner. All the revisions, variations in the original drawings and contract must reflect in the As-Built Drawings. The Contractor will submit two hard copies of the complete set of drawings and two soft copies of the same in the format as specified by the Owner. Final payment will not be made unless As-Built drawings are received by Owner/Owner. Contractor shall issue a certificate to state that the As-Built drawings are accurate and complete after recording all deviations. The Owner will sign the acceptance of such as-built drawings before final payment is released.

### **39. Site Photographs**

The Contractor shall take photographs of the works every month, and submit copies of the same showing the date of the photograph, to the Owner and Owner. The

E-TENDER FOR STRUCTURAL REPAIR, STRENGTHENING & ROOF REPLACEMENT FOR AUDITORIUM BUILDING,  
AT SNTD JUHU CAMPUS MUMBAI.

photographs should be sufficient to show the progress of work at site. Without photographs the claims of delay from the Owner/Owner will not be entertained.

The photographs shall be submitted with each bill and without which the Contractor's R.A. bills will not be entertained.

#### **40. Measurements**

Unless otherwise specified, measurements shall be based on I.S. 1200 (latest edition). The work will be measured in M.K.S. Units.

All measurement shall be recorded in the format approved by the Owner. All measurement shall be recorded for the work done up to 25<sup>th</sup> of the month. The recording of the measurements shall be carried out between 25<sup>th</sup> to 30<sup>th</sup> of the month.

#### **41. Defective work**

Defective work will not be measured if defects are found after the work was measured. Owner will have right to delete the quantities of such defective work and reduce the cost of the work payable to the Contractor at any stage of the contract, till the defective work is rectified. All the tolerances will be as per relevant I.S. Codes, and in special cases also at the discretion of the Owner.

#### **42. Use of Completed Portion of Work**

Not Applicable.

#### **43. Non - waiver**

Failure by Owner or Owner to insist upon strict performance of any terms or conditions of this contract, or failure or delay to exercise any rights or remedies provided herein or by law, or failure to properly notify Contractor in the event of breach, or the acceptance of or payment for any goods or services hereunder, or the review or failure to review design shall not release Contractor from any of the warranties or obligations of this contract and shall not be deemed a waiver of any right of Owner to insist upon strict performance hereof or any of its rights or remedies as to any prior or subsequent default hereunder nor shall any termination of work under this contract by Owner operate as a waiver of any of the terms hereof.

#### **44. Virtual Completion**

Will be issued by owner after completed work satisfactorily.

#### **45. Final Completion**

On final completion of work, Owner, along with Owner and Contractor, shall inspect the work and shall give final approval, in the form of certificate for acceptance of work, for the work executed by the Contractor and certify that the work is complete as per terms and conditions of contract.

Contractor shall give an undertaking to the Owner that payroll, bills of materials and equipment, all charges by Contractor and sub-Contractors and other indebtedness connected with the work have been paid for before final certificate of payment is given.

For any dispute arising out of this contract, the judicial jurisdiction will be Mumbai.

#### **46. Insurance**

All the insurance cover as stated below will remain valid during till the contract is in force and the Owner accepts project. The contractor should provide Marine Insurance on an "All Risk" basis.

a. Workman's Compensation/Employer's Liability

The Contractor shall absolve the Owner of any payment on account of Worker's Compensation Act/Labour Rules/ESIS, if applicable/Provident Fund/Workers and Employees of Contractor's and their sub-Contractor's, etc., and any other regarding Indemnity Insurance as applicable by law of the country.

Contractor shall take all insurance policies as required by law.

b. Contractor's All-Risk Policy

Contractor shall take out insurance of any damage to property during construction to cover all risks. The value of such insurance shall be equal to total value of the tender + 10% of the replacement cost to cover, design and management cost and for covering the work.

c. Public liability policy

The Contractor will take out comprehensive insurance liability policy for personal injury and property damage. It will cover any third party, Owner, and Owner along with their representatives for personal injury of not less than Rs.10,00,000/- (Rupees Ten Lakhs Only) for any one claim per person and for Rs. 50,00,000/- in total per year, when they visit site. This will be in addition to the other insurance he has to take out as per various clauses of conditions of contract.

The above policies and the limits specified therein will not relieve Contractor of his obligation to pay the actual damages

Contractor will deposit two copies of all the above policies with the Owner out of which one will be marked with Attention of Owner within one month of accepting the Letter of intent/work order.

Contractor shall also provide to Owner/Owner copies of the insurance premium receipts in respect thereof and should the Contractor make default in insuring or continuing to insure as aforesaid the Owner may himself insure against any risk with respect of which the default shall have occurred and deduct a sum equivalent to the amount of premium so paid from any amounts due or to become due to the Contractor.

d. Contractor's plant and machinery

Contractor shall take out insurance of any damage to his own property during construction to cover all risks.

#### **47. Indemnity**

- i. The Contractor shall indemnify the Owner member, officer and employee of the Owner against all actions, proceedings, claims, demands, costs and expenses whatsoever arising out of any failure by the Contractor in the performance of the obligations of relevant labour laws, acts, regulations etc., and under the contract documents. The Owner shall not be liable for or in respect of any damage and or compensation payable by law in respect or in consequence of any accident or injury to any workmen or any other person in employment of the Contractor or his sub-

Contractor and Contractor shall indemnify and keep indemnified the Owner against all such damages and compensation against all claims, damage, proceedings costs, charges and expenses whatsoever in respect there of or in relation thereto. **He will indemnify Owners, Owners and Consultants of any damages or consequential damages in case of its failure of the system, materials employed by him for executing work as stated elsewhere in this contract.**

- ii. Should the Owner have to pay any money in respect of such claims or demand as aforesaid the amount so paid and the costs so incurred by the Owner shall be charged to the Contractor and the Contractor shall not be at liberty to dispute or question the right of the Owner to make such payment, notwithstanding same may otherwise to the contrary. The above-mentioned amounts shall be deducted from Contractor's dues.
- iii. In every case which by virtue of the provision of Workmen's Compensation Act, or other applicable provision of any other Act in force the Owner pays compensation to Contractor's workers during the execution of works, the Owner will recover from the Contractor's the amount of the compensation so paid and without prejudice to other rights, the Owner shall be at the liberty to recover such amount or sum due to the Contractor whether under this contract or otherwise. The Owner shall not be bound to contest any act, except on the written request of the Contractor and upon his right giving right becoming liable in consequence of contesting such claims.

#### **48. Units**

In units of schedule of quantities, the abbreviations shall mean following:

Cu. M	=	Cubic Metre	R. M. or R. Mt	=	Running Metre
Sq. M	=	Square Metre	MT.	=	Metric Tonne
Q. R.	=	Quote Rate Only			

#### **49. Sub-Contractors**

The Contractor is not allowed to sublet the work.

Sub-Contractors appointed by the Contractor for any important works such as Anti-termite treatment, false ceiling, Aluminium works, curtain walling, etc., should be approved and acceptable to Owner.

#### **50. First Aid Facilities**

Where Owner has first aid facilities at the job site they may, at their option, make available such first aid facilities for the treatment of employees of Contractor who may be injured or become ill while engaged in the performance of the work under this contract. Contractor should provide his own First-Aid Kits at the site.

If first aid facilities and/or services are made available to Contractor's employees then, in consideration for the use of such facilities and the receipt of such services, Contractor hereby agrees:

1. To include as part of its obligation under the general condition titled "indemnity" the obligation to release, defend, indemnify and hold harmless Owner, Owner and Owner from all claims, demands and liabilities arising from the use of such services or facilities and
2. In the event any of Contractor's employees require off site medical services, including transportation thereto, to promptly pay for such services directly to the providers thereof.

## 51. Safety Precautions

To ensure effective enforcement of the Rules and Regulations relating to Safety Precaution, the arrangement made by the Contractor shall be open to inspection by the Welfare Officer, or Safety Engineer or any persons nominated by the Owner or their representatives.

The Contractor shall be solely responsible for conducting operations under this contract to avoid risks involved in performing the work to all concerned.

He should follow, as a minimum, the following safety codes but not limit himself to only those mentioned below.

1. In respect of all labour, directly or indirectly employed in the work for the performance of Contractor's part of this agreement, the Contractor shall at his own expense arrange for all the safety provisions mentioned in the following:

Safety codes of CPWD  
Indian Standards Institution  
The Electricity Act  
The Mines Act  
OWNER safety policy  
Any other Act as applicable

2. Before starting construction work, Contractor shall consult Owner and he (Contractor) must make safety plan to their satisfaction.
3. The Contractor should strictly follow all the existing labour laws, and also should execute the work strictly adhering to the following labour regulating & safety codes.
  - 1) No labour below the age of 18 years shall be employed on work.
  - 2) The Contractor shall not pay less than what is provided under law to labourers engaged by him or his sub-Contractors on this work
  - 3) In respect of all labour, directly or indirectly employed in the work for the performance of Contractor's part of this agreement the Contractor shall at his own expense arrange for all the safety provisions as per safety codes of CPWD, Indian standards institutions, the Electricity Act, the mines act and such other acts as applicable.

The Contractor shall adhere to safe construction practice and guard against hazardous and unsafe working conditions.

Some of the safety rules of CPWD as set forth herein.

- 1) Contractor shall maintain First Aid facilities for his employees and those of his Sub-Contractors.
- 2) Contractor shall make outside arrangements for Ambulance service and for the treatment of industrial injuries. Names of those providing these services shall be furnished to the resident engineer prior to start of construction and their telephone number shall be prominently posted in Contractor's field office.



- 3) All critical industrial injuries shall be reported promptly to the resident engineer, as also copy of Contractor's report covering each personal injury requiring the attention of a Physician shall be furnished.
- 4) No person shall carry any photographic files, inflammable materials within the premises of the projects.
- 5) Contractor shall erect and maintain barricades in the form of Metal sheets around all nearby buildings, required in connection with this operation to guard or protect site and also along the compound wall
  - a) Excavation
  - b) Hoisting areas
  - c) Area adjudged hazardous by Resident Engineers or Owner's Safety Engineers.
  - d) Existing property subject to damage by Contractor's Operations.
  - e) Rail-road unloading spots.
  - f) Blasting operations, if required to be carried out.
- 6) Contractor's employees and those of his Sub-Contractors shall become acquainted with barricading practice of CPWD and shall respect the provisions thereof.
- 7) Barricades and hazardous areas adjacent to and along normal routes of travel shall be marked by approved by type of electric red flasher lights at night.
- 8) Suitable warning boards of standard traffic type shall be erected 30m away from each road barricades as well as barricades of work spots within 2m of road curb.
- 9) Suitable scaffolding should be provided for workers for all works that cannot safely be done from the ground or from solid construction except such short period work as can be done safely from ladders. When a ladder is used, an extra labourer shall be used for holding ladder and if the ladder is used for carrying materials as well, suitable footholds and handholds shall be provided on the ladder and the ladder shall be given an inclination not steeper than 1 in 4 (1 horizontal to 4 vertical).
- 10) Scaffolding or staging more than 35m above the ground or floor swing or suspended from an overhead support or erecting with stationery support shall have a guard rail properly attached, bolted, braced and otherwise rewarded at least 1m high above the floor or platform of such scaffolding or staging and extending along the entire length of the outside and ends thereof with only such openings as may be necessary for delivery of the materials, such scaffolding or staging shall be so fastened as to prevent it from swaying from the building or structures.
- 11) Working platform, gangway or the stairways should be so constructed that they should not sag unduly or unequally and if the height of the platform or the gangway or the stairway is more than 3.5m above ground level or floor lever, they should be closely boarded. It should have adequate width and should be suitably fastened.
- 12) Every opening in the floor of a building or in a working platform be provided with suitable means to prevent the fall of persons or materials by providing suitable fencing or railing whose minimum height shall be 1m.
- 13) Safe means of access shall be provided to all working platforms and other working places. Every ladder shall be securely fixed. Adequate precautions shall be taken to prevent danger from electrical equipment. No materials on the sites of work shall be so stacked or placed as to cause danger or inconvenience to any person or public. The Contractor shall also provide all necessary fencing and lights to protect the workers and staff from accidents, and shall be bound to bear the expenses of

defence of every suit, action or other proceedings at law that may be brought by any person for injury sustained owing to neglect of the above precautions and to pay any damages and cost which may be awarded in any such suit or action or proceedings to any such persons or which may with the consent of the Contractor be paid to compromise any claims by any such persons.

- 14) All trenches, 1.2m or more in depth, shall at all times be supplied with at least one ladder for every thirty meter length or fractions thereof.
- 15) Ladder shall be extended from bottom of the trench to at least one meter above the surface of the ground. The size of the trenches, which are 1.5m, or more in depth shall be stepped back to give suitable slope, or securely held by timber bracing so as to avoid the danger of sides to collapse. The excavated material shall not be placed within two meters of the edge of the trench or the trench depth whichever is more. Cutting shall be done from top to bottom with proper slope. Under no circumstances shall undermining or undercutting be done.
- 16) Before any demolition work is commenced and also during the process of the work:
  - a. All roads and open area adjacent to the work site shall either be closed or suitably protected.
  - b. Electric cable or apparatus which is liable to be a source of danger or a cable or apparatus used by the operator shall not remain electrically charged.
  - c. All practical steps shall be taken to prevent danger to persons employed, from risk of fire or explosion or flooding. No floor, roof or other part of the building shall be so overloaded with debris or material as to render it unsafe.
- 17) All necessary personal safety equipment, as considered adequate by Resident Engineer, should be kept available for the use of the persons employed on site and maintained in a condition suitable for immediate use, and Contractor should take adequate steps to ensure proper use of equipment by those concerned.
- 18) Workers employed on mixing asphalt materials, cement and lime mortars shall be provided with protective footwear and protective gloves.
- 19) Those engaged in white washing and mixing or stacking of cement bags or any materials which are injurious to the eyes shall be provided with protective goggles.
- 20) Those engaged in welding and cutting works, shall be provided with protective goggles and protective clothing and seated at sufficiently safe intervals.
- 21) When workers are employed in sewers and manholes, which are in use, the Contractor's shall ensure that the manhole covers are opened and are ventilated at least for an hour before the workers are allowed to get into the manholes, and the manholes so open shall be cordoned off with suitable railing and provided with warning signals or boards to prevent accident to the public.
- 22) No paint containing lead or lead product shall be used except in the form of paste or ready-made paint.
- 23) Suitable face masks should be supplied for use by the worker when paint is applied in the form of spray or a surface having lead paint dry rubbed and scrapped.

- 24) Overalls shall be supplied by the Contractor to the workmen and adequate facilities shall be provided to enable the working painters to wash during and on cessation of work.
- 25) Every rope used in hoisting or lowering materials or as a means suspension shall be of durable quality and adequate strength and free from patent defects.
- 26) Every crane driver or hoisting appliances operator shall be properly qualified and no person under the age of 21 years should be in charge of any hoisting machine including any scaffolding winch or give signals to the operator.
- 27) In case of every hoisting machine and of every chain ring, hook, shackle, swivel and pulley block used in hoisting or lowering or as means of suspension, the safe working load shall be ascertained by adequate means. Every hoisting machine and all gear referred to above in this paragraph shall be plainly marked with safe working load and the conditions under which it is applicable shall be clearly indicated. No part of any machine or any other gear referred to above in this paragraph shall be loaded beyond the safe working load except for the purpose of testing.
- 28) As regards Contractor's machine, the Contractor shall notify the safe working load of the machines to the Owner wherever he brings any machinery to site of work and get it verified by the Owner, if he so desires.
- 29) Motors, gearing, transmission, electric wiring and other dangerous parts of hoisting appliances should be provided with efficient safeguards. Hoisting appliances should be provided with such means as will reduce, to the minimum risk of accidental descent of the load. Adequate precautions should be taken to reduce to the minimum, the risk of any part of a suspended load becoming accidentally displaced. When workers are employed on electrical installations, which are already energized, insulating mass working apparels such as gloves, sleeves and boots and insulated tools as may be necessary should be provided. The workers shall not wear any rings, watches and carry key or other materials, which are good conductors of electricity.
- 30) All scaffolds, ladders and other safety devices mentioned or described herein shall be maintained in safe conditions and no scaffold, ladder or equipment shall be altered or removed while it is in use. Adequate washing facilities should be provided at or near places of work.

These safety provisions should be brought to the notice of all concerned by displays on a notice board at a prominent place at the work spot. The person responsible for compliance of the safety code shall be named therein by the Contractor.

To ensure effective enforcement of the Rules and Regulations relating to safety precautions, the arrangements made by the Contractor shall be open to inspection by the Welfare Officer, Resident Engineer or Safety Engineer of the Owner or their representatives.

Notwithstanding the above clauses, there is nothing in these to exempt the Contractor from the operations of any other act or rules in force in Republic of India.

## **52. Assistance to other Contractor**

Not Applicable.

### 53. Labour Licence

The Contractor shall obtain work-permit & labour-licence for the number of people to be employed. The contractor shall ensure that the number does not exceed the limit, as specified in the licence, at any point of time. The contractor should ensure minimum wages and also the other statutory benefits to the workers.

### 54. Statutory Records & Safety Precautions

The Contractor shall maintain attendance registers, muster-roll, record of ESIC & P.F. numbers for each worker including the supervisors. The contractor shall register each workman under Building Contract Labour Act with the labour department. The contractor shall submit the bills along with the P.F. & ESIC challan.

The Contractor shall ensure that all the workers follow the safety procedures. Contractor shall give them Personal protective Equipment / safety-kit for the safe working environment.

### 55. Setting Out

1. The contractor is to execute the work in accordance with the drawings. The contractor shall carry out precisely the center line layout on the site as per the center line plan and he will be responsible for the correctness of the above and any inaccuracies are to be rectified at his own expenses.
2. The Contractor shall take levels of the site before setting out and put them on record without extra charge.
3. The contractor shall layout (outer lines only) all the buildings to be constructed in the site to check that they fit within the site as per layout plan.

#### 4. Benches:

The contractor is to construct and maintain proper benches at the intersection of all main walls in order that the lines and levels may be accurately checked at any time.

### APPENDIX (for financial conditions)

1.	Defects Liability Period	24 months
2.	Period of final Measurement and valuation	2 months
3.	Date of commencement	7 days after L.O.I.
4.	Date of completion	7 months after L.O.I.
5.	Agreed Liquidated damages	0.25% of contract value per week, subject to maximum of 5% of contract value.
6.	Value of work for interim certificates	One bill a month
7.	Period of Honouring the Certificate issued by the Consultant for quantum of work completed.	21 days after certificate of payment by Owner.

**Note: Time period will be taken as time from 08<sup>th</sup> day from the date of issue of letter of intent to time of final completion. However, the defects mentioned before completion will have to be rectified by the Contractor at his expenses only after which final completion certificate will be given. Contractor's defects liability period will start after final completion certificate is issued.**

**TECHNICAL SPECIFICATIONS:**

**1.00** Unless otherwise specified, PWD specifications latest Volume I – VI with uptodate correction slip shall be followed in general. Any additional item of work if taken up subsequently, shall also conform to the relevant PWD specifications mentioned above. Should there be any difference between description of items as given in the Schedule of Quantities, nomenclature and specifications for individual items of work (special conditions) and I.S. codes, work shall be got done in the following order of precedence :

- i) Description of items as given in Bill of Quantity.
- ii) Drawings
- iii) Technical Specifications, Special Conditions of Contract and General Conditions.
- iv) PWD specifications.
- v) I.S. Codes.
- vi) Architects decision in writing

In case of items not covered by the PWD specifications referred to above, or particular specifications attached, reference shall be made to appropriate latest I.S. codes and the decision of the Engineer-in-charge / Architect shall be final and binding on the Contractor.

1.01 All stone aggregate and stone ballast shall be hard stone variety to be obtained from approved quarries at Mumbai region, or any other source to be got approved by the Architect.

1.02 The river sand shall also be obtained from Vaitarna / Mahad region or any other source to be got approved by the Architect and shall be screened as required for satisfying the specifications. If the sand brought to site is dirty it must be washed in clean water.

1.03 Bricks shall be of crushing strength not less than 35 kg./sq.cm. The average water absorption of brick shall not be more than 20% of its dry weight when immersed in water for 24 hours.

1.04 The standard sectional weights considered for conversion of length of various sizes of M.S. bars and Tor steel bars into weight are as under:

Size (Diameter)	Weight Kg./m.	Size (Diameter) mm.	Weight Kg./m.
6.	0.222	25	3.853
8.	0.395	28	4.834
10.	0.617	32	6.313
12.	0.888	36	7.990
16.	1.578	40	9.865
18.	1.998	45	12.485
20.	2.467	50	15.413
22.	2.984		

1.05 Rate for every item of work to be done under this contract shall be for all lifts and leads, heights and depths, length and widths excepts when specially mentioned in the item otherwise and nothing extra will be paid on any account.

The rate for all items of work shall be unless clearly specified otherwise, includes cost of all labour, materials and other inputs involved in the execution of the item.

No extra payment shall be made for richer mix of concrete which flows from one member to another member during concreting of junction of beams, slabs etc.

The rate for all items in which use of cement is involved is inclusive of charges for curing.

- 1.06 The foundation trenches shall be kept free from water, while all the works below ground level are in progress. Nothing extra shall be paid for the same.
- 1.07 The masonry work shall be suitably recessed for provision of vertical electrical conduits and metal boxes according to the elevational drawings for electrical services. The horizontal electrical conduits shall generally be placed along joints of courses resorting to minimum cutting of masonry.  
After the conduits and boxes are fixed by the Electrical Contractor the chase shall be closed neatly with cement mortar of same mix as that of plaster and nothing extra shall be paid for this. The Contractor shall have to work in co-operation with the Contractor for electrical work. No deduction for the recesses will be made in the measurement for masonry work and nothing extra shall be paid for making and closing the recessed chases.
- 1.08 All the materials equivalent to the specified one should be got approved by the Architects in writing before using such materials on the work.
- 1.09 The sanitary fittings, paints and other materials shall be obtained from one of the firms on the list of approved manufacturers of ISI mark. The materials shall be tested as per provision in relevant I.S. codes. The Contractors rates for items involving the use of the above materials shall be deemed to cover the cost of samples. Cost of packing, transportation and testing charges shall be borne by the Contractor.
- 1.10 The Contractor should submit a tentative programme of work within 15 days from the date of awarding the work.
- 1.11 The work of water supply, internal sanitary installations and drainage shall be carried out according to Municipal bye-laws. Nothing extra shall be paid to the Contractor for this. It shall be the Contractors sole responsibility to get the fixtures approved and the same connected to the Municipal main and delay in this regard shall be at Contractor's own risk and cost.
- 1.12 The tenderer should not quote unnecessary conditions contradicting the general conditions and particular specifications given in this tender, as such conditions apart from being not agreed to, can lead to rejection of the tender.
- 1.13 Any damage to work resulting from rains or from any other cause until the work is taken over by the department after completion shall be made good by the Contractor at his Own cost.

## **2.00 INTERNAL CEMENT PLASTER:**

- 2.01 Preparation of surface : The walls to be plastered to have all joints raked out to a depth of 5 / 10 mm. if not already done RCC surface shall be properly hacked to get good key to the plaster. All dust and oily matter if any shall be brushed and cleaned and the surface to be plastered shall be kept wet for 6 hours before plastering is commenced.
- 2.02 Proportion of mortar : Unless otherwise mentioned, the proportion of internal cement plaster for walls and ceiling shall be 1:4 (1 cement : 4 sand). Sand shall

be from approved source, free from foreign matter and as applicable to internal wall and ceiling plastering. No more cement mortar shall be prepared than that can be used within half an hour.

- 2.03 Application of Plaster : The mortar shall be applied evenly with force on the surface to be plastered. The mortar surface shall be finished at once by being rubbed over with a trowel till the cement appears on the surface. All corners, angles and junctions shall be truly vertical and horizontal as the case may be, carefully and neatly finished. Rounding of corners and junctions where required shall be done without extra charge. The mortar shall adhere to the surface intimately when set and there shall be no hollow sound when struck. The thickness of plaster shall be minimum 12 mm. over the proudest part of the surface of brick wall and RCC surfaces and 20 mm. over stone walls. Plaster for ceiling shall not be more than 8 mm.
- 2.04 When neat cement finish is specified over the plaster surface, a coat of pure Portland cement slurry 1.5 mm. thick shall be applied and well rubbed to the plastered surface while the plaster surface itself is fresh.
- 2.05 When no finish is specified, the plastered surface shall be rubbed well to an even plane with a wooden float for external surface and finished smooth with a steel trowel for internal surface.
- 2.06 Rates to include : Apart from other factors mentioned elsewhere in this contract, rates for the item of plaster shall include for the following :
- (i) Erecting, dismantling and removing the scaffolding.
  - (ii) Preparing the surface to receive the plaster.
  - (iii) Providing cement plaster of the specified average thickness.
  - (iv) All labour, materials, use of tools and equipment to complete the plastering as per specifications.
  - (v) Curing for 14 days.
  - (vi) Any moulding work is shown on the drawings or as specified unless : separately provided in the tender.
  - (vii) Plaster work in jambs, arises, rounded angles, fair edges, narrow returns, quirks, `V' joints, splays, drip mouldings, making good to metal frames, junctions with skirting or dado, narrow widths and small quantities, marking good around pipes, conduits, timbers, sills, brackets, railings etc. and making good after all the Sub-Contractors or nominated Sub-Contractors have done their work.
  - (viii) Neeru or cement finish when specified in the item.
- 2.07 Mode of Measurements: Plaster shall be measured in Square Meters.
- (a) Walls:
    - (i) The measurements of wall plastering shall be taken between the walls or partitions (the dimensions before plastering shall be taken) for the length, and from the top of floor skirting / dado (as the case may be) to the ceiling for the height.
    - (ii) Deductions:
      - (A) For jambs, soffits sills etc. and for opening not exceeding 0.5 sq.mt. each in area, ends of joists, beams, posts, girders, steps etc. not exceeding 0.5 Sq.mt. each in area and openings not exceeding 3 Sq.mt. each, deductions and additions shall be made in the following manner.
      - (a) No deduction shall be made for ends of joists, beams, posts etc. and openings not exceeding 0.5 sq.mt. each, and no addition shall be made for reveals, jambs, soffits, sills etc. of these openings nor for finishing the plaster around ends of joists, beams, posts etc.

- (b) Deductions for openings exceeding 0.5 sq.mt. but not exceeding 3 sq.mt. each shall be made as follows and no addition shall be made for recess, jambs, soffits, sills etc. of these openings :
  - (1) When both faces of wall are plastered with the same plaster deduction shall be made for one face only.
  - (2) When two faces of wall are plastered with different plasters or if one face is plastered and the other pointed, deduction shall be made from the plaster or pointing out the side of frames for doors, windows etc. on which the width of reveals is less than that on the other side, but no deduction shall be made on the other side.
- B. In case of openings of area above 3 Sq.mt. each, deductions shall be made for the openings but jambs, soffits and sills shall be measured.
  - (b) Ceiling:
    - (i) Ceiling shall be measured between the walls for partitions and the dimensions before plastering shall be taken.
    - (ii) Ceiling with projected beams shall be measured over beams and the plastered sides of beams shall be measured and added to plastering on ceilings.

### **3.0 EXTERNAL PLASTER.**

- 3.0 The external plaster shall be applied in two coats and finished Sand faced. All the precautions such as covering windows by plywood / tin sheet and tying stitched Hessian to external face of the scaffolding shall be taken. The debris shall be taken down and stacked or carted away as directed.

The existing plaster if cracked, damaged or spalled, the loose and damaged plaster shall be broken and removed carefully by chipping or by light chiseling, so as not to disturb the sound concrete inside or so as not to break the brick wall.

If the plaster is to be applied on repaired concrete surface, the same shall be made rough to provide a key to the plaster. If brickwork is to be plastered, the joints shall be cracked out at least 12 mm deep and cleaned.

If the existing masonry is not maintained in proper line & level or the masonry is caved while removing of external plaster, the same shall be provided with dash coat in cement sand (1:4) to maintain the external original wall surface.

The surface to be plastered shall be cleaned of loose materials, thoroughly watered and kept adequately wet during plastering.

If plaster is done in patches, approved bond coat must be applied on the edges of old plaster in contact with new plaster. The external plaster shall be applied in two coats.

- (a). The first coat is made of 12 mm thick mortar in cement sand (1:4) with water cement ratio not exceeding 0.55. The workability and imperviousness of mortar is achieved by a addition of super plasticizers/waterproofing & polypropylene fibers(125 Grams/bag or as per manufacturer specification) . The first coat is made rough to provide a key to the second coat is applied & shall not be allowed to dry for at least Five days.
- (b). The Second coat shall be a thin layer of 8 mm thick mortar with cement: sand (1:4) with addition of super plasticizers/waterproofing material &



polypropylene fibers. Precaution shall be taken that water cement ratio not exceeding 0.55. The workability and imperviousness of mortar is achieved by a addition of super plasticisers & polypropylene fibers (125 Grams/bag as per manufacturer specification). Finishing to plaster with granular texture by a rubber sponge. The final line, level and plane shall match with the existing unbroken plaster.

- (c). Second coat shall be kept moist by watering and shall not be allowed to dry for at least Ten days.

Measurement: - The plaster shall be measured as per IS 1200 mode of measurement.

#### **4.0 CERAMIC TILES / GLAZED TILES IN FLOORING & DADO:**

##### 4.01 Flooring:

##### 4.1.1 Tiles:

Ceramic Tiles including special shall be of approved make and quality and shall conform to IS: 777 in all respects. Samples of tiles shall be got approved by the Engineer-in-charge who will keep them in his office for verification as to whether the materials brought for use conform to the approved samples. Ceramic tiles shall be of the size as specified in BOQ.

##### 4.1.2 Mortar Bedding:

Cement sand mortar for bedding shall be prepared in a mortar mill. The amount of water added shall be minimum necessary to give just sufficient plasticity for laying and satisfactory bedding. Care shall be taken in preparing the mortar to ensure that there are no hard lumps that would interfere with the even bedding of the tiles. Before spreading mortar, sub-floor or base shall be cleaned off all dirt, scum, loose materials and laitance if any, by scrubbing with coir or steel wire brush or by hacking if necessary and then well wetted without forming any pools of water on the surface. Before laying the mortar, the sub-grade shall be got approved by the Engineer-in-charge. In case of RCC floors, the top shall be left a little rough. All point of level for the finished paving surface shall be marked out. The mortar shall then be evenly and smoothly spread over the base by the use of screed battens only over so much area as well as covered with tiles before the setting of the mortar. The thickness of the mortar bed shall not be less than 15 mm. and not more than 25 mm. Unless otherwise specified, the proportion of mortar bedding shall be C.M. 1:4.

Sand for mortar bedding shall be from approved source and shall conform to I.S. no. 2116-1965 as applicable to unreinforced masonry work.

##### 4.1.3 Laying finishing, curing and cleaning:

The tiles before laying shall be soaked in water for atleast 2 hours. Tiles which are fixed in the floor adjoining the wall shall be so arranged that the surface of the round edge tiles shall correspond to the skirting or dado. Neat cement grout of honey like consistency shall be spread over the bedding mortar just to cover so much area as can be tiled within half an hour. The edges of the tiles shall be smeared with neat white cement slurry and fixed in this grout one after the other each tile being well pressed and gently tapped with a wooden mallet till it is properly bedded and in level with the adjoining tiles. There shall be no hollows in bed or joints shall be kept as close as possible and in straight lines. The joints between the tiles shall not exceed 1.5 mm. wide. After fixing the tiles finally, in

an even plane, the flooring shall be covered with wet saw dust. The tile flooring shall be cured for 14 days.

After the tiles have been laid in a room or the day's fixing work is completed the surplus cement grout that may have come out of the joints shall be cleaned off before it sets. Once the floor has set the floor shall be carefully washed, cleaned and dried. When dry, the floor shall be covered with oil free dry saw dust which shall be removed only after completion of the construction work and just before the floor is occupied.

4.1.4 Rates to include :

Apart from other factors mentioned elsewhere in this contract, the Contractors rates quoted shall include for the following :

- i) Cleaning the base and providing and laying bedding mortar and levelling.
- ii) Providing and fixing the tiles including all specials like round edges, corner cups, angles etc. in neat cement float over the bedding mortar.
- iii) Filling the joints of tiles with neat white cement slurry.
- iv) Finishing, curing and cleaning.
- v) All labour materials and use of tools for carrying out the item as specified above.
- vi) In dado keystone should be pre-set on the back side of the tiles as instructed by the Engineer-in-charge.

4.1.5 Mode of Measurement : Measurement for flooring tiles shall be square meters as provided.

**5.1.0 Ceramic Tiles Dado:**

- (a) Tiles:  
Ceramic tiles shall be same as described under Ceramic tiles flooring.
- (b) Mortar backing:  
All the joints in the face work shall be raked out to a depth equal to not less than the width of the joints or as directed by the Engineer-in-charge. Concrete surface shall be properly hacked. All dirt, dust, oil or any other material that might interfere with satisfactory bond shall be removed. The surface shall be cleaned and scrubbed with fresh water and kept wet for 6 hours prior to applying and hacking mortar. The dado work shall not be commenced unless the preparatory work is passed by the Engineer-in-charge. The proportion of mortar for backing shall be 1:3 cement mortar. Sand in mortar bedding shall be from approved source, as applicable to internal wall and ceiling, plastering and external wall plastering. The thickness of mortar backing shall not be less than 12 mm. not more than 20 mm.
- (c) Fixing dado tiles:  
Dado work shall be done only after fixing tiles on the floor key stone / chips are to be fixed at the back of tile with Araldite or any other epoxy based synthetic solution as per instructions of the Engineer-in-charge. The Ceramic tiles shall be soaked in water for atleast 2 hours before being used for dado work.  
Tiles shall be fixed when the cushioning mortar is still plastic and before it gets very stiff. The back of tiles shall be covered with a thin layer of neat cement paste and the tile shall then be pressed in the mortar and gently tapped against the wall with a wooden mallet. The fixing shall be done from bottom of wall upwards without any hollows in the bed or joints. Each tile shall be fixed as close as

possible to the one adjoining. The tiles shall be jointed with white cement slurry. Any difference in the thickness of tiles shall be evened out in cushioning mortar so that all tiles faces are in one vertical plane. The joints between the tiles shall not exceed 1.5 mm. in width and they shall be uniform. While fixing tiles in dado work care shall be taken to break joints vertically. After fixing the dado, they shall be kept continuously wet for 14 days. If doors, windows, or other openings are located within the dado area, the sills, jambs, angles etc. shall be provided with white ceramic tiles and appropriate specials according to the foregoing specification and such tiles area shall be measured not alongwith the dado.

(d) Cleaning:

After the tiles have been fixed the surplus cement grout that may have come out of the joints shall be cleaned off before it sets. After the complete curing the dado or skirting work shall be washed thoroughly clean.

5.1.2 Rates to include:

Apart from other factors mentioned elsewhere in this contract the rates for the item of dado or skirting shall include the following :

- i) Backing mortar.
- ii) Providing and fixing tiles including all specials like round edges angles, capping etc. in neat cement float over backing mortar.
- iii) Jointing of the tiles with white cement slurry.
- iv) Curing
- v) Cleaning.
- vi) Alllabour material, use of tools and equipments for carrying out the items as specified above.

5.1.3 Mode of Measurements: Dado shall be measured in square meters as provided.

## **6.0 SPECIFICATIONS FOR GENERAL STRUCTURAL REPAIRS**

- 6.1. This covers the general requirements of items involved in Structural repairs viz. Breaking and chiseling. Surface preparation and treatment: restoration and curing etc. Since there is an element of judgment and actual extent of deterioration involved, definite instructions of these can be given only at site during actual execution.

All repairs to the affected Structural members must be preceded with a proper support system. This structural support system shall be worked out for various members. Necessary suitable propping is required to be provided to ensure release of loads on the treated members. The Contractor shall compulsorily seek prior approval of the intended support system from the Consultants. However the ultimate responsibility of the support system rests with the Contractor.

### **6.2 Chiseling of concrete surface:-**

The surface of the reinforced concrete element viz. Column, beam, slab, wall etc. will be exposed using chisel and hammer carefully up to the reinforcement rods. All corrosion on the rods shall be physically removed by chiseling in order to further expose them. Where there are deep cracks in the concrete element, special precaution will be taken while chiseling so as to avoid further distress to the element. Steel rods or mesh may also be required to be removed along with chiseling. The chiseled surface shall be cleaned with water and wire brush.

### **6.3. Breaking of plaster:-**

The coats of plaster over concrete and masonry wall will be removed carefully with chisel and hammer such that the masonry / concrete element underneath is not damaged. All coats of the plaster shall be removed along with visible traces of cement / lime and the surface thoroughly cleaned and hacked where required, receiving new coats of plaster. For ease and neatness in working, the edges of the exposed portions shall be straightened.

Measurement for breaking plaster shall be taken as the actual area exposed projected to the original surface of the element. Where the plaster is removed together with the chiseling or breaking of concrete no measurements shall be taken separately for this.

#### **6.4. Breaking of reinforced concrete:-**

Part of full reinforced concrete element viz. Slab beam, wall, column, fin, etc. will be broken carefully using chisel and hammer. For neatness of work, the edges of the broken portion shall be fairly straight. The broken surface shall be chiseled straight and cleaned so as to facilitate bond with new mortar /concrete. All highly deteriorated steel reinforcement shall be provided with extra steel as directed. Where insufficient lap length for new reinforcement is available, additional concrete may have to be broken in order to expose adequate length of the existing reinforcement may be directed.

Measurement shall be taken as actual volume of concrete broken with the steel based on the original dimension of the concrete element.

#### **6.5. Application of Rust remover:-**

The entire surface of the exposed reinforced concrete element should be thoroughly cleaned. The reinforcement rods must be thoroughly cleaned using a chisel, scrapper, wire brush and emery paper. The rust remover is to be applied carefully on the exposed dry surfaces of the reinforcement rods with a brush. The rust remover must be applied as per the manufacture's specification. Allow air-drying of 24 hours before any further treatment is done on this surface after cleaning.

Measurement shall be taken of the entire chiseled area where reinforcement rods are exposed and rust remover applied or Actual quantity used (see BOQ)

#### **6.6. Scaffolding:-**

Scaffolding shall be safe to erect. Under no circumstances will holes be allowed to be made in the walls to support the scaffoldings. Tying of scaffolding to the old pipes of the building will be disallowed. Temporary props between balconies or chajjas to give lateral support to the scaffolding will be permitted where feasible.

#### **6.7. Sand:-**

Sand for concrete and plaster mortar shall be only river sand of proper gradation. Silt and other impurities must not exceed 4%. If it is more than the same should be thoroughly washed to reduce the silt contents at site. Improper sand shall be immediately removed from the site and the decision of the Consultant shall be final.

#### **6.8. Curing:-**

New concrete shall be maintained damp for a period of 2 weeks minimum. New plaster shall be cured a latest 3 times a day for a period not less than 8 days. The 1<sup>st</sup> coat of plaster shall be cured for a period not less than 8 days. If required the surface shall be maintained damp using a wet Hessian cloth.

**APPROVED MAKES OF MATERIALS- CIVIL**

**NOTE :**

1. All materials shall be of first quality as produced by the manufacturer. This is particularly applicable to glazed and ceramic tiles, paints and sanitary fittings.
2. In case it is established that brands specified below or not available in the market or the delivery period is too long; equivalent brands may be used after approval by the Architects, in which case contractor shall produce all necessary documents such as catalogs, certificates etc., to prove their suitability.
3. Approved samples shall be kept at site in the office of the clerk-of-works.
4. Where specifically called for, warranties shall be obtained from the manufacturers in favor of the owner.

<b>No.</b>	<b>MATERIAL</b>	<b>APPROVED MAKE / BRAND</b>
1.	Cement (53 grade)	Ultratech, A.C.C., Birla shakti, Ambuja
2.	Cement (43 grade)	Ultratech, A.C.C., Birla shakti, Ambuja
<b>3.</b>	<b>PPC</b>	Ultratech, A.C.C., Birla shakti, Ambuja
4.	White cement	Birla, J.K.
5.	Putty	Birla White / JK White
6.	Cement and mixtures (Plasticizers hardness, retardant etc.)	Fosroc, Sikaqualcrete, MC Bauchemie, Krishna con chem, Pidilite
7.	High yield strength deformed bar	As specified, make Rajouri / Kalika / Rajlakshmi
8.	Steel Sections	Jindal, Hindustan & Tata.
9.	Anti termite treatment	Dursban (TC) (Chlorpyifos 20% EC)
10.	Glazed tiles	1 <sup>st</sup> quality Nitco / Kajaria / Johnson / Euro or equivalent.
11.	Ceramic Tiles	Kajaria / Nitco/ Euro / Johnson
12.	Kotah / Granite / Rough Shahabad flooring stone	Export Quality / As approved.
13.	Katni Marble	Export Quality / As approved.
14.	Flush Doors	Anchor, National, Tower, Classic
15.	Commercial Plywood	Anchor, Euro, National, Century, Greenply.
16.	Marine Plywood	Anchor, Euro, National, Century, Greenply.
17.	PVC Doors	Eureka / Sintex / Rajashree
18.	Laminates	Formica, Royal Touch, Marino, Greenlam

E-TENDER FOR STRUCTURAL REPAIR, STRENGTHENING & ROOF REPLACEMENT FOR AUDITORIUM BUILDING,  
AT SNTD JUHU CAMPUS MUMBAI.

19.	Aluminium Sections	Jindal, Hindalco
20.	Glazing (Float Glass)	Modi Float, Triveni, Asahi, Saint Gobain
21.	SPIDER FITTINGS	Delco, Dorma, or equivalent.
22.	Floor springs/ Lock patch	Enox, Hardwyl,
23.	Silicon	dowcorning, Ge make
24.	Waterproofing Compounds	Dr.Fixit.,Pedilite, Impermo.
25.	Paints	Asian / Berger / Nerolac / Dulux
26.	Waterproof cement paint	Snowcem
27.	Asbestos Roof Sheets	Everest, Charminar
28.	Expansion bolts	Fischer / Hilti
29.	Acp work (elevation treatment )-fittings	Euro bond, Timex, Aluco bond
30.	Vitrified tiles	Kajaria / Nitco/ Euro / Johnson
31.	Light Weight Bricks	Ecolite, U-crete, Ultratech, Flyo-crete.
32.	Gypsum –finished item	Gypsum india,
33.	Aluminum Roofing	Kalzip, Kingspan, Saflock or Equivalent

Any material other than list should need to get approved from University engineer and architect. Material sent for approval must be good standard and quality.

**STANDARDS OF CEMENT CONSUMPTION**

<b>Sr. No.</b>	<b>Item</b>	<b>Unit</b>	<b>Requirement in bags</b>
	<b>PLAIN CEMENT CONCRETE</b>		
1.	Cement concrete (1:2:4)	Cum.	5.84
2.	Cement Concrete (1:3:6)	Cum.	4.05
3.	Cement Concrete (1:4:8)	Cum.	3.20
4.	Cement concrete (1:5:10)	Cum.	2.52
	<b>REINFORCED CEMENT CONCRETE (as per mixed design)</b>		
5.	Cement concrete M-15	Cum	Minimum As per IS Code / Design Mix
6.	Cement concrete M-20	Cum	Minimum As per IS Code / Design Mix
7.	Cement concrete M-25	Cum	Minimum As per IS Code / Design Mix
8.	Cement concrete M-30	Cum	Minimum As per IS Code / Design Mix
9.	Cement concrete M-35	Cum	Minimum As per IS Code / Design Mix
	<b>BRICK WORK</b>		
10.	B.B. Masonry in C.M. 1:6	cum.	1.44
11.	B.B. Masonry in C.M. 1:8 proportion	Cum.	1.13
12.	Half brick masonry in C.M. 1:3 proportion	Sqm.	0.17
13.	150 mm thick brick masonry	Sqm.	0.22
	MASONRY		
14.	U.C.R.S. Masonry in C.M.1:6 proportion	Cum	1.77
15.	C.R.S. Masonry in C.M. 1:5 proportion	Cum	1.80
16.	C.R.S. masonry in C.M. 1:6 proportion	Cum	1.50
	<b>DAMP PROOF COURSE</b>		
17.	Providing & laying damp proof course 50 mm thick in (1:2:4)	Sqm.	0.35
18.	Finishing the terrace slab 20 mm thick in C.M. thick in 1:3 proportion	Sqm.	0.20
19.	Providing water proofing to W.C. and bath	Sqm.	0.276
20.	Providing water proofing in W.C. and bath including brick bat coba.	Cum.	4.00
21.	Box Type Water proofing	Sqm.	0.50
	<b>PLASTERING</b>		
22.	Providing internal cement plaster 6 mm thick single coat in C.M. 1:4	Sqm.	0.045
23.	Providing internal cement plaster 6 mm thick single coat in C.M. 1:3	Sqm.	0.07
24.	Providing cement plaster 12 mm thick in single coat in C.M. 1:5	Sqm.	0.08
25.	Providing cement plaster 12 mm thick in single coat in C.M. 1:4	Sqm.	0.10
26.	Providing cement plaster 12 mm thick in single coat in C.M. 1:3	Sqm.	0.12
27.	Providing cement plaster 20 mm thick in	Sqm.	0.19

E-TENDER FOR STRUCTURAL REPAIR, STRENGTHENING & ROOF REPLACEMENT FOR AUDITORIUM BUILDING,  
AT SNDT JUHU CAMPUS MUMBAI.

	single coat in C.M. 1:3		
28.	Providing cement plaster 20 mm thick in single coat in C.M. 1:5	Sqm.	0.13
29.	Providing cement plaster 20 mm thick in single coat in C.M. 1:5 proportion	Sqm.	0.13
30.	Providing cement plaster 20 mm thick in single coat in C.M. 1:4 proportion	Sqm.	0.15
31.	Providing cement plaster 20 mm thick in single coat in C.M. 1:3 proportion	Sqm.	0.19
32.	Providing cement plaster 25 mm thick in two coat in C.M. 1:4 proportion	Sqm.	0.22
33.	Sand faced plaster in two coats	Sqm.	0.22
34.	Rough cast plaster in two coats in C.M. 1:4 proportion	Sqm.	0.22
35.	Providing flush groove pointing in C.M. 1:3 for brick work	Sqm.	0.03
36.	Providing flush groove pointing in to stone masonry in C.M. 1:3 proportion	Sqm.	0.025
37.	Providing tuck pointing with C.M. 1:3 prop	Sqm.	0.05
38.	Providing vee pointing for stone masonry in CM 1:3	Sqm.	0.03
39.	Providing fine finish 1.5 mm, thick over green surface	Sqm.	0.044
<b>PAVING, FLOORING FINISHING AND DADO</b>			
40.	Providing and laying R.S.H. flooring 25mm to 30mm on bed of 1:6 C.M. and pointing C.M. 1:3	Sqm	0.135
41.	Providing and laying R.S.H. flooring 40mm to 50mm on bed of 1:6 C.M. and pointing C.M. 1:3	Sqm	0.14
42.	Providing and laying R.S.H. flooring 50mm to 60mm on bed of 1:6 C.M. and pointing C.M. 1:3	Sqm	0.150
43.	Providing and laying polished Shahabad stone flooring 25mm to 30 mm thick on bed 1:6 proportion	Sqm.	0.13
44.	Providing and laying polished Tandur stone flooring 25mm to 30 mm thick on bed 1:6 proportion	Sqm.	0.130
45.	Providing and laying polished Kotah stone flooring 25mm to 30 mm thick on bed 1:6 proportion	sqm.	0.130
46.	Providing and laying skirting and dado of polished Shahabad stone 25mm to 30 mm with 1:4 C.M.	Sqm	0.18
47.	Providing and laying skirting of polished Tandur stone 25mm to 30 mm with 1:4 C.M.	Sqm.	0.18
48.	Providing & laying C.C. flooring 40 mm thick with C.C. 1:1½:3	Sqm.	0.36
49.	Providing & laying C.C. flooring 50 mm thick with C.C. 1:1½:4	Sqm.	0.44
50.	Providing and laying flooring of plain cement tiles of 25 x 25 mm on bed for flooring	Sqm.	0.15
51.	Providing and laying plain cement tiles for	Sqm.	0.18



E-TENDER FOR STRUCTURAL REPAIR, STRENGTHENING & ROOF REPLACEMENT FOR AUDITORIUM BUILDING,  
AT SNTD JUHU CAMPUS MUMBAI.

	dado and skirting 1:4 proportion		
52.	Providing and laying coloured tiles 25 x 25 mm size	Sqm.	0.15
53.	Providing and laying for coloured tiles for dado skirting	Sqm.	0.18
54.	Providing and laying white glazed tiles for flooring	Sqm.	0.22
55.	Providing and laying glazed tiles for dado and skirting	Sqm.	0.21
56.	Providing and laying gray cement base mosaic tiles for flooring 25 x 25 cm	Sqm.	0.15
57.	Providing and laying for dado and skirting cement base mosaic tiles 25 x 25 cm	Sqm.	0.18
58.	Providing and laying machine cut white Makrana flooring	Sqm.	0.17
59.	Providing and laying is situ marble mosaic tiles 10 mm thick		
	Gray Cement	Sqm.	00.200
	White Cement	Sqm.	0.130
60.	Providing and laying is situ dado tiles 10 mm thick		
	Gray Cement	Sqm	0.20
	White Cement	Sqm	0.08
61.	Providing & laying required position flooring of broken china	Sqm.	0.30
62.	Providing and laying polished shahabad stone 25 mm to 30 mm thick for tread and riser	Sqm.	0.18

**i. TECHNICAL SPECIFICATIONS FOR THE PLUMBING & SANITATION**

**1.1 COMPLETENESS OF CONTRACT:**

- 1.1.1 If there is any description between specification BOQ, drawings, more straight would be allow.
- 1.1.2 Contractor shall be deemed to have carefully examined the specifications, general conditions and tender drawings, etc. and to have fully assessed and have satisfied himself as to the nature and character of the work to be executed, site conditions and other relevant matters and details.
- 1.1.3 Contractor shall provide all item whether specifically mentioned or not but which are usual or require to make a complete working system and ensure safe and satisfactory operation, apparatus, appliances, with the intent or purpose of these specifications. In case of doubt or doubts, the tenderer shall clearly point out his understanding of the specifications, before award of contract.
- 1.1.4 Contractor shall study the site conditions before tendering and shall satisfy himself before submitting his Tender as to the nature of the ground and subsoil, form and nature of the site, the hydrological, climatic and physical conditions at the site the quantities and nature of the work and the materials necessary for the completion of the work, the means of access to the site, the proneness of site to floods as found in the past also the accommodation required by him, and in general, shall himself obtain all necessary information as to the risks, contingencies, and other circumstances, which may influence of affect his Tender. The contractor has to include for all requirements such as scaffolding, making opening, grouting, welding jointing materials, gaskets, nuts & bolts, screws, paintings, including making good the opening and chases in walls, slabs, etc. in the price quoted.
- 1.1.5 Unless otherwise agreed in writing, the specifications, drawings and general conditions etc. form the contract documents and all clauses and conditions specified by the contractor stands null and void.
- 1.1.6 The quantities mentioned hereinafter are approximate and subject to variation without violating the contract.
- 1.1.7 Contractor has to provide special fittings like safety valves, pressure gauges etc, as necessary and should specify the Brand names and rating offered as part of the prices quoted.

**1.2 REFERENCES:**

- 1.2.1 References to standards, codes, specifications, recommendations shall mean the latest edition of such publications adopted and published at date of invitation to submit proposals.

**1.3 DRAWINGS AND LITERATURE :**

- 1.3.1 Before proceeding with the work, the Contractor shall submit for approval general layout and working drawings as are necessary to demonstrate fully that all parts of the materials to be furnished will conform to the specifications.
- 1.3.2 Within 15 days of acceptance of the Tender, the Contractor shall furnish three (3) prints of layout, assembly and erection drawings for approval. If any modifications are proposed by the Owner/Consultant, three further prints of the modified drawings shall be submitted. No modifications shall be made in a drawing after it has been approved by the Consultant / Owner, without prior consent.
- 1.3.3 Approval by the Owner / Consultant of the drawings shall not relieve the Contractor of any part of his obligation to meet all the requirements of the Contract or the responsibility for and pay for all alterations to the works due to discrepancies or omissions in the drawings or other particulars supplied by him, whether such drawings have been approved or not.
- 1.3.4 After execution of works, contractors shall furnish a set of original tracings of as-built drawings incorporating the modifications if any during execution.

#### **1.4 INSPECTION & TESTING – AT CONTRACTOR’S PREMISES :**

- 1.4.1 Owner or its authorized representatives shall have full power to inspect drawings of any portion of the work or examine the materials and workmanship of the plant at the Contractor’s works or at any place from which the material is obtained. Acceptance of any material proves satisfactory but shall have to be paid by the Contractor in case the material or work is found defective or of inferior quality.

#### **1.5 MATERIAL AVAILABILITY:**

- 1.5.1 In case of non-availability of any particular material the Contractor shall procure next best available material and install the same at no extra cost to the owner, after written approval of the Owner through the consultant. Final decision on same would be taken by owner.
- 1.5.2 Materials & Samples- The materials / products used on the works shall be one of the approved make / brands out of list of manufacturers / brands / makes given in the tender document. The contractor shall submit sample / specimens out of approved makes of materials / products to the project manager for prior approval. In exceptional circumstances, project manager may allow alternate makes / brands of products / materials at his sole discretion. The final choice of brand / make shall remain with the project manager whose decision shall be final & binding and nothing extra on this account shall be payable to the contractor.

#### **2.0 BASIS OF TENDERING:**

- 2.1 The tender shall be complete covering the entire work of system and ancillary services including all building system and outside utilities as shown and specified.
- 2.2 The contractor shall consult specification, drawings and the schedule of quantities which gives an idea of these systems.

### **3.0 DRAWING:**

- 3.1 The drawing accompanying these specifications are design drawings and generally are schematic. They do not show every offset, To cross Y's junction coupling/Flanges/ disconnection arrangements/ etc. which are required for installation in the space provided. The Contractor shall follow the drawings, as closely as is practicable and install additional bend, elbows or junctions, etc, where required to suit local site conditions, from actual site measurement taken, subject to approval and without additional cost to the Owner. The Consultant reserves the right to make any reasonable change in outlet location prior to roughing in. All connection and appurtenances, shown in the various diagrams, shall be included in the finished job
- 3.2 It shall be the Contractor's responsibility to co-ordinate with all other agencies at site, for proper and adequate installation clearance.

### **4.0 ORDINANCE, CODE & REGULATIONS**

- 4.1 It shall be the Contractor's responsibility to provide complete system, as indicated as and as required by applicable code. All clarifications and modifications, which have to be cleared with the appropriate, shall be carried out without additional cost, to Owner. Unless otherwise approved, the product shall bear the mark of approval of Indian standards, as required, the government bodies, code and ordinances of local authorities whose permissions are required for occupation of the building on completion.

### **5.0 UPVC PIPES FOR SEWAGE SYSTEM**

#### **5.1 SOIL, WASTE, VENT AND ANTI SIPHONAGE PIPES & FITTING:**

All soil, waste, rain water pipes vent & anti siphon pipes or within plumbing shafts, vertical run shall be SWR UPVC of class B type conforming to IS No 13592. All UPVC pipes & fittings shall be of best approved make. The pipes should be of uniform thickness and they shall not be brittle but withstand for weather conditions. The fittings shall be of standard thickness. The pipes shall be installed and fixed securely to the wall with UPVC saddles away from wall and also should have threaded door cap for inspection incase of removal of chocked waste matter. The jointing of pipes & fittings should be with rubber rings for vertical and solvent cement for horizontal.

The support brackets and hangers and other supports, their spacing shall be as described under point no 8.

Also pipelines and fixtures in sunken portion should be properly encased at the locations and intervals as per requirements and as directed by Engineer in Charge / Project Manager.

All soil pipes shall be extended at least 900 mm above parapet top.

## 5.2 MATERIAL AND FIXING

All soil, waste and anti-siphon pipes and fittings used within sunken floor areas or within plumbing shafts vertical run, shall be of the best approved Indian make of quality truly cylindrical and of uniform thickness. They shall not be brittle but shall allow for heavy cutting, and drilling, and shall not be less than diameter, mentioned in the schedule of quantities and shall be fixed away from the wall on special saddles. It will protect the brick wall from any leakage from vertical pipes.

## 5.3 JOINTS:

Jointing shall be carried out with rubber rings or solvent cement. The spigot of the pipe must be forced well home into socket and must be entered so that the joint may be of even thickness all rounding.

5.4 Supports, pedestals, and base for inspection chambers, gully traps and pipes shall be in 1:3:6 cement mix.

5.5 Pipe sleeves and insert, etc. through RCC walls either external or internal shall be of G.I or M.S., provided with water bar flange or as per the details given in drawing.

5.6 During installation opening of pipe shall be plugged with wood cut into required shape and wrapped with gunny bags and maintained free from dirt getting in.

5.7 The size of branch waste for difference fittings shall be as follows:

Lavatory Basin	40 mm (1 ½)"
Urinal	40 mm (1 ½)"
Sink	40 mm (1 ½)"
Nahani trap	80 mm (3")
Special floor trap	80 or 100 mm as required with Grating as specified.

5.8 Rainwater flushing shall be made as per details with rectangular shape grating and extension piece as specified.

5.9 All roof drain pipes and fittings shall be SWR UPVC of class A type conforming to I.S. **13592**. This shall apply to pipes outside building or within the building or inside separate shafts.

5.10 The floor traps for toilet blocks shall be PVC with stainless steel grating, and traps shall have ISI stamping.

5.11 Bathroom C.P. grating shall be of boiled down design out of heavy cast brass with the chromium plating of the best approved standard.

5.12 The connection between the main pipe and branch pipes shall be made by using branches and bends with access doors for cleaning.

- 5.13 Floor traps shall be provided with 75 mm dia. Puff pipe where the length of the waste is more than 1.80 meter or the floor trap is connected to waste stack through bends. These Puff pipe connections shall not be measured separately and shall be deemed to have been allowed for, while quoting.
- 5.14 The waste from lavatories kitchen, basins, sinks, baths and other floor traps shall be separately connected to respective waste stack of upper floors. The waste stack of lavatories will be connected directly to manhole while the waste stack of others shall be separately discharged over gully trap.
- 5.15 The cost of fittings is to be covered under rate of pipe and hence payment will be made considering linear measurement of pipe only in Meter.
- 5.16 Hydrostatic Test
- 1 The purpose of this test is to locate any leaks at the joints and correct them prior to putting system into operation It is important to Visually inspect the joints.
  - 2 To isolate each floor or section being tested, test plugs are inserted through test fittings in the stack. All other opening should be plugged or capped with test caps. Fill the system to be tested with water at the highest point. All entrapped air in the system should be expelled.
  - 3 Hydrostatic pressure of  $0.5\text{kg/cm}^2$  (5M) should be applied. Fifteen minutes is suitable time for the test.
  - 4 Once the stack is filled to desired level of water column, a visual inspection of the section being tested should be made to check the leaks.
  - 5 If the leak is found, it should be removed and section retested.

#### **6.0 C.P.V.C & U.P.V.C. PIPES & FITTINGS:**

- 6.1 All supply pipes shall be of approved make of I.S. quality or equivalent to the requirements of the local authorities or as specified in the schedule and conforming to IS.
- The support brackets and hangers and other supports, their spacing shall be as described under point no 8.
- 6.2 The joints shall be distributed in strict conformity with regulations. They shall be away from of the wall surface by at least 50 mm by means of support stand/saddles. All control valves, stop cocks, ball valves; bib-cocks shall be of the best approved quality procurable of heavy cast drawn brass. All branches shall have individual control arrangements with full way valves, to enable regulations and cut off as required. They shall be of best Indian manufacture specified in the Schedule of quantities and of stampings and bear I.S.I. markings. All fittings shall be of approved quality make.
- 6.2.1 The water tightness of joints shall be assured by approved methods of jointing material
- 6.2.2 Approved Solvent Cement shall be used to make water tight joints.

### 6.3 INTERNAL WORK

For internal work C.P.V.C.(SDR – 11) pipes and fittings outside the walls shall be fixed either visible by means of approved pattern holder-bat clamps, keeping the pipe clear off the plastered wall by 15 mm for cold water and 15 mm for hot water. Wherever indicated on the drawings or as directed by the Consultants, chasing of walls shall be done to embed pipes. Regulation and National Building Code. All embedded hot water pipes are to be painted and coated and wrapped as above and then wrapped with three ply asbestos twine wrapped tightly around the pipe.

### 6.4 Alternative Materials:

In case the CPVC pipes are changed to G.I. / Kitec pipes if desired by the owner / employer the work is to be executed all as per manufacturer's specifications and in workmanlike manner.

### 6.5 TESTING:

All CPVC / G.I. Pipes and fittings are to be tested to a pressure of 125% of its designed working pressure one hour to ensure that pipes have proper joint and that proper materials have been used in jointing. All leaky joints must be made leak proof by redoing at Contractors expense.

6.6 All water fittings shall be of approved make and shall in all respects comply with the latest Indian Standard Specification I.S. The brass fittings shall be fixed in the pipe line in a workman like manner. Care shall be taken to see that joints shall sustain the above Hydraulic Test. The defective fittings and the joints shall be repaired, redone or replaced at Contractors expense.

6.7 Whenever a CPVC pipe crosses a floor, then a CPVC sleeve with the floor should be provided .On no account should lime or lime concrete come in direct contact with CPVC pipe and fittings. This important condition shall not be waived under any circumstances.

6.8 The cost of fittings, Brass fittings for connection of Valves, and other CP fittings is to be covered under rate of pipe and hence payment will be made considering linear measurement of pipe only in Meter.

No extra payment for any type of fitting will be made.

## **7.00 SANITARY FITTINGS:**

All sanitary fittings shall be specified in Schedule of Quantities and approved by the Consultants / Owner. The same may also be procured by the Owner and issued for fixing, if so desired.

### 7.1 GENERAL

All setting and bedding of sanitary fittings shall be done carefully to suit the required levels. Mortar drops, paint slashes etc. shall be removed from fittings, walls and floor immediately before these get dry.

### 7.2 WOODEN PLUGS

The plugs shall be of hard wood and of size 50 mm x 38 mm at top and of length 50mm. These shall be fixed on wall in cement mortar 1:3 (1 cement: 3 sand), after the plugs are fixed in the wall the mortar shall be cured till it is set

7.3 WALL HUNG WATER CLOSETS :

Wall hung Box Rim Closets having back inlet and 'P' trap outlet shall be fixed on appropriate C.I. or M.S. brackets of suitable design to suit the thickness of toilet walls and ensure that the chair is self supporting and Independent of the wall.

7.4 PLASTIC SEAT AND COVER:

The seat shall be fixed to the pan by means of two 8 mm dia. corrosion resistant C.P. hinge bolts with a minimum length of shank of 65 mm and threaded to within 15 mm of the head. Each bolt shall be provided with two suitably shaped washers of rubber or other similar material for adjusting the level of the seat while fixing it to the closet. In addition one 8 mm non-ferrous metal of the washer shall be provided with each bolt. The maximum external diameter of the washers fixed on the underside of the pan shall not be greater than 25 mm. One arm of the hinge shall be fixed to the underside of the cover flush with the surface by means of 3 nos. 10 mm long C.P. screws.

7.5 BOWL PATTERN LIP URINALS:

Urinals shall be fixed in position by using screws, and shall be at a height of 65 cm from the floor level to the lip of urinal, unless otherwise directed. The wooden plugs shall be fixed in the wall in cement mortar 1:3

(1 cement: 3 fine sand). Each urinal shall be connected to waste pipe which shall discharge into the channel or floor trap. The connection between the urinal and flush or waste pipe shall be made by means of heavy type PVC trap which will not be affected by Uric Acid.

7.5.1 All urinal pans will have flushing system of approved type and make as approved by the Client / consultants.

7.5.2 All connections shall be made leak proof.

14.6. 7.5.3 At specific instances semistall, full stall or squatting slab urinals may be specified in the schedule and / or drawings.

Semistall urinal pans should have approved type concealed chair brackets and accessories as demanded. The bottle traps should be made of PVC/HDPE extruded section to be free from action of acid etc. The fixing of the units shall be as per manufacturer's instruction.

7.5.4 Spreaders, inlet, outlet connection shall be prepared to actual site measurements, to ensure proper verticality and elegance. These shall be full bore and shall not form any dents.

7.6 WASH BASIN

The basin shall be supported on a part of concealed C.I. brackets fixed in cement mortar, 1:3 (1 cement: coarse sand). The C.I. brackets shall conform to I.S.775. The wall plaster on the rear shall be cut to rest over the top edge of the basin. After fixing the basin, plaster shall be made good and surface finished matching with the existing one. The C.P. brass trap and union shall be connected to 40 mm dia. waste pipe which shall be suitably bent towards the wall and shall discharge direct into the floor trap. The height of the front edge of the wash basin from the floor level shall be 80 cm.



## 7.7 PANTRY SINK

C.P. brass trap and union shall be connected to 40 mm nominal bore waste pipe instead of 32 mm nominal bore which shall suitably bend towards the wall.

- 7.8 The description in the bill of quantities is an indication of the style of plumbing unit required. The specialist plumber shall provide all the necessary plumbing hardware required for the specific type of unit and the quoted will provide for all contingent accessories, if not detailed, but are required for the functioning of the units.

Positioning of the units shall be planned with reference to the lines as a grid pattern so that all fixtures shall be tiles junctions and not in the tile surface. Connecting pipe shall be suitably ordered. The owners reserve right to procure the Sanitary pottery ware directly from approve source and the cost incurred will be recovered from the quoted while making payment. The material will be in the custody of the contractor, thereafter till commissioning.

- 7.9 All chromium plated pipe section, shall be of extruded heavily plated, and shall not peel off or fade out due to use.

- 7.10 Defects noticed in the fittings during the extended maintenance period due to latent/ patent shortcomings in quality manufacture or workmanship shall be replaced free of charge.

- 7.11 The short length of pipe connections to sanitary pottery ware exposed on wall shall be of full bore C.P brass pipe made actual measurement taken at site to suit locations as per detailed instructions and interior drawings.

Pipe with dents / deformation made to standard fittings available in the market shall not be placed on works.

- 7.12 Material used on urinal waste connection shall not form a discoloration

- 7.13 Disconnecting please, nipples etc, required for C.P connections, inlet / outlet caps to unit etc, shall be inclusive the rate quoted and shall not be considered for extra payment.

- 7.14 The test to guarantee the quality of fixtures and their connections to the system shall be performed by the contractor after installation.

## 8.0 HANGERS AND SUPPORTS

### 8.1 GENERAL:

Provide proper solid angle iron / channel section, supports for all pipes complete with clamps, provide wooden guide to support pipe on the angle iron/hanger supports, in general where a bunch / slabs to facilitate welding of angle iron supports. For attachment in concrete, use "Dash" fasteners or Anchor plug type inserts or equivalent. Provide hangers within 1 meter of all change in direction of mains and a minimum of three hangers per expansion bend. Provide all additional structural steel angles, channels or other members not specifically shown but are required for proper support.

- 8.2 Where necessary additional hangers to be provided to arrest hammers or hydraulic with proper rubber.
- 8.3 Space hangers as noted below except of all soil pipe which shall have a hanger of multiple fittings, sufficient hangers shall be provided maintain proper slope without sagging, in cast of angle. Suspended line, the following is suggested.

A)

**PIPE MATERIAL SPACING AND SUPPORTS**

<b>MATERIAL</b>	<b>NOMINAL PIPE SIZE</b>	<b>HORIZONTAL (M)</b>	<b>VERTICAL (M)</b>
<b>P.V.C.</b>	15	0.6	2.4
	20	0.6	3.0
	25	0.6	3.0
	32	1.2	3.0
	40	1.2	3.0
	50	1.2	3.0
	65	1.2	3.0
	80	1.2	3.0
	100	1.2	3.0
	150	1.4	3.0
<b>C.P.V.C.</b>	15	0.5	1.0
	20	0.5	1.0
	25	0.5	1.0
	32	0.8	1.4
	40	0.8	2.0
	50	1.2	2.2
	65	1.5	2.2
	80	1.5	2.4
	100	1.8	2.4
	150	1.8	2.4

\* **Note:** This is as referred in uniform Plumbing code .But in case the manufacturer recommends less spacing than above, the same will be applicable.

- 8.4 Provide floor stands, wall brackets of masonry piers, etc. for all lines running near the floor or near walls so that those lines, near concrete or masonry walls may hung also by hangers carried from wall brackets at a higher level than pipe. Hanging of lone pipe from another is prohibited.

**9.0 VALVES AND PRESSURE GAUGES:**

- 9.1 Pressure gauges shall have not less than 115 mm dia 10 mm gas threads, brass body; siphon and gauge cock of 10 mm size, Dial ranges shall be adequate for the pressure encountered and as specified.
- 9.2 Provide valve on branch pipe connection to equipment where indicated. Valves are to be located for easy access and are to be full bore of pipe connected together. Support all valves wherever necessary. The Valves should be tested and approved by local authorities as per Byelaws in force.

- 9.3 Valves shall be tagged with permanent label under hand wheel indicating type and duty.
- 9.4 Where indicated and specified, angle pattern stopcocks, at each hot and cold water inlet be provided. They should be Anti-scaling pattern same as faucets of approved manufacture.
- 9.5 Strainers: C.I. pot strainer with G.M. mesh screen in perforated brass strainer body of approved manufacture with a cock for blowing down. Screening area of strainer shall be minimum of 5 times more than pipe area, with 1 mm maximum size holes.
- 9.6 All tapping from distributors from main feeder shall have isolation valves in shafts, to ensure proper facility for maintenance and minimize the area of cut off during repairs.

#### **10.0 CUTTING, PATCHING, REPAIRING AND MAKING GOOD**

- 10.1 Cutting, Patching and repairing required for the proper installation and completion of the work, specified in each division, including chasing plastering, masonry work, concrete work etc. and making good shall be carried out by the contractor wherever required. Holes which are oversize shall be refilled, so that a tight fit is obtained around the pipe or other object passing through.

Any damage to water proofed location should not be patched up without rectification by the water proofing agency (specialist contractor) to ensure his guarantee.

Indiscriminate cutting and patching work should be avoided by proper coordinate planning the sleeves etc. while works of other agencies are in progress.

#### **11.0 EQUIPMENT PROTECTION**

- 11.1 All pipe and conduit openings shall be kept closed by means of plugs or caps to prevent the entrance of foreign matter. All piping conduit, fixtures, equipment or apparatus shall be protected from damages. Any item damaged prior to final completion of work shall be restored to its original conditions or replaced at no expense to the Employer.
- 11.2 Accessibility: The installation of Valves, thermometers, clean out fittings another indicating equipment or specialties requiring frequent reading, adjustment, inspections, repairs, removal or replacement, shall be conveniently and accessibly located. Thermometers and gauges shall be installed so as to be easily read from the floor.

#### **11.3 Inserts and Sleeves**

##### **A) GENERAL**

In advance of placing of concrete slabs or construction of walls, furnish location of Inserts and sleeves necessary as a result of this operation shall be at no expense to the Owner. Opening shall be made as per Structural Consultant's approval.

##### **B) PIPE SLEEVES:**

##### **1) WALL SLEEVES:**

C.I or M.S. black pipe wall sleeves in cold store and pipe for cable, conduits, gas pipes, etc are to be inside flush with wall on both sides. Sleeves shall be large

enough in diameter to provide 15 mm clearance around pipe for insulation  
Exterior wall sleeves for cable entry / pipe / earthing strips, etc. shall be flush with wall on both sides. Sleeves shall be large enough to allow caulking from outside using lead wool.

2) FLOOR SLEEVES:

Interior floor sleeves shall be of C.I. extending 50 mm more above finished floor. All pipes passing through sleeves shall be caulked with asbestos rope and finished with cement mortar, insulation butted to floor sleeves and sealed with insulating cement on both sides.

Interior floor sleeves for pantry areas shall be G.I. steel pipe extending 50 mm above finished floor. Caulking shall be the same for general areas.

Note: floor on grade sleeves shall be the same as exterior wall sleeves, caulked and made water tight.

**12.0 EQUIPMENT, MATERIAL AND WORKMANSHIP:**

12.1 Each piece of equipment shall meet the detailed requirements of the contract documents and suitable for the installation shown. Equipment not meeting all requirements will not be provided, even though specified along with other manufactures, in the list of approved makes.

12.2 Where two or more units of the same class are furnished, product of the same manufacture has similarity and easy replacement of spares. Furnish all materials and equipment, new and free from defects and of size, make, type, and quality here in specified or approved by the Consultant. All shall be installed in a neat and workmanlike manner.

**13.0 CLEANING OPERATION AND TESTS:**

13.1 Plumbing Equipment fixtures, piping etc. shall be free of stamping, marking (except those required by codes). Iron cuttings and other foreign material.

13.2 Water systems shall be cleaned thoroughly filled and flushed with water.

13.3 The entire mechanical apparatus shall operate at full capacity without objectionable noise or vibration.

13.4 The system has to be periodically given the tests specified in the presence of site Engineer and the client's representatives as herein specified.

All test equipment, accessories, materials and labour necessary for conducting the test and for inspection and repair work shall be arranged well in advance of the test date.

After shortcomings are repaired or defective items replaced the tests will be repeated until the entire system is found satisfactory. If the local regulations insist on similar tests in the presence of approving authorities, the same shall be complied with and acceptance from the authorities lodged with the Consultants / Employers.

13.5 The entire system of soil, waste and vent piping to be tested with water after the roughing -in is completed and before the fixtures are set. After setting the fixtures, provide smoke tests, after sealing all traps.

13.6 Water Tests:

Test entire system or sections, of system by closing all opening in piping except the highest opening and filling system with water to the point of overflow, if the system is tested in sections, plug each opening except the highest opening of the section filled with water. Keeps the water in system or in the specific section under test for at least 45 minutes before inspection starts with test pressure/head lasting for two hours. The system must be free from leakage and defect at all joints.

13.7 Test all down spouts or rain headers and their branches within the building by water as described for the above soil, waste and vent system.

13.8 All Water Piping: Hydro –static test at 125% of its designed working pressure for a minimum of one hour without drop in pressure as required.

13.10 All systems shall be tested in sections as required to expedite the work of other trades and meet construction schedules and final test on completion.

13.11 On completion of the works, the following tests shall be performed to the satisfaction of the consultants/clients representatives to enable them issue of Virtual Completion.

- a)           a.     Hydraulic test
- b.     Tests for anti-siphon system
- d)           c.     Pump rating and output.
- e)           d.     Inspection of all units and fixtures

13.12 The Contractor shall arrange on his own initiative for similar tests during the progress of works to ensure that there are non defects in material/workmanship in portions of work to be concealed or embedded under the floor in felling.

a) HYDRAULIC TEST:

1. Suitable section as directed by the Engineer-in-charge shall be taken for such testing from time to time during progress of the work and satisfactory test given for that section. All testing apparatus, gauges, connections etc. and water required for testing shall be arranged by the Contractor at his cost. Owner does not undertake any responsibility to supply water for testing, which the Contractor has to arrange from the Municipality / M.I.D.C. or otherwise by paying the required charges directly. The owner shall have the right to recover such charges from his bills if complaint are received that Contractor has not paid the charges thereof.
2. Satisfactory hydraulic test shall be regarded when the section under test shall withstand the pressure as specified by the Engineer-in-charge for about ONE Hour without operating the test pump, the test pressure being maintained at the specified figures during that ONE Hour interval.
3. The entire pipe line, specials and all joints in that section appear to be dry. During testing if any joints are found leaky they shall be repaired and/or redone by the Contractor at his cost till the test is found satisfactory.

Similarly, any pipes, collars, specials, show hair cracks, leaks, etc. during testing, the Contractor shall replace them with sound pipes and specials together with new joints, entirely at his own cost, till a satisfactory test is given. The pipe specials, etc. which crack during testing will, however, be supplied by the Contractor for replacement free for cost. The hydraulic test shall be given in presence of the Engineer-in-Charge.

#### **14.0 EQUIPMENT & PIPING IDENTIFICATION;**

14.1 Pipe Markers: Each piping systems shall be provided with a nameplate properly clamped or stenciled. Letters are to be 10 mm if 3 meter above the floor and 50 mm minimum if below that height. Nameplates on parallel group's pipes etc. shall be neatly lined up. Wording of lettering shall correspond to the equipment designation used in piping legend and shall be as approved. Name plated to be of GI. Sheets (gauge 20 SWG on 25 x 25 angle) secured on to sheet metal and angle iron to be welded on main pipe. In case of insulated pipe the 25 x 25 mm angle bracket should be projecting beyond insulation thickness.

#### **14.2 VALVE REGISTER:**

To be submitted in triplicate along with location and identification number in final drawing to be furnished by contractor.

#### **15.0 MODE OF MEASUREMENT:**

15.1 All work shall be measured net in decimal system, as fixed in its place, subject to the tolerance given below, unless otherwise stated:-

- a) Dimensions shall be measured to the nearest 0.01 meter.
- b) Areas shall be worked out to the nearest 0.01 Sq. meter.

All measurements of cutting shall, unless otherwise stated, be held to the consequent waste.

15.2 All PVC pipes, such as soil, waste, vent and CPVC, UPVC & G.I. Pipes shall be measured in linear lengths along the center line, as completed. The rates shall include all joints and clamps etc. as specified in the respective items.

15.3 All full way valves, ball valves, non-return valves, sluice valves etc. shall be measured in number after excluding them from liner measurement.

15.4 The diameters of pipes and fittings mentioned in the specifications are the inside diameter in all cases unless otherwise stated.(as in case of P.V.C. pipes)

#### **16.0 TOOLS AND MATERIAL AND STORAGE:**

- a) The Contractor at his own cost and charge shall provide all materials, tools, tackles, measure, scaffolding, labour and water necessary for the completion of the whole work in all respects.
- b) The Contractor shall pay the fees for testing the material to local authorities, or other statutory authorities.
- c) The Contractor will obtain from time to time various permissions, and the completion certificates as per rules of all local and statutory authorities.

- d) The Contractor shall arrange for the material and storage facility with the Building Contractor.
- e) Any material, brought at site, shall not be removed without the written authority of the Consultants and owner when the contractors shall have received payment in respect of any certificate in which it is stated that the value of any unfixed materials on the work has been taken into account; such materials shall become the property of owner and the Contractor shall be liable for any loss or damage there to.
- f) The Contractor shall insure the work against damages, for such sum as the owner may direct from time to time. All Insurance Policies are to be taken out in the joint name of owner and the Contractor in an office selected by the owner and all policies and receipts shall be deposited with the owner.
- g) All the brackets and hangers for pipe shall be fixed to the wall or RCC slab using 'Dash' fasteners, wherever necessary. Exposing reinforcement bars for hooking will not be permitted.
- h) Surplus material from the site shall be carted away by the Contractor without any cost to the owner and the storage space provided to the Contractor shall be handed over to the owner clean and ready for occupation, free from all encumbrances.

**17.0 GENERAL SERVICES:**

The Contractor shall pay the fees for testing the materials by the Municipal Corporation.

The Contractor will process and arrange from time to time various permissions and obtain the drainage completion certificate and adequate water supply Certificate under the rules of the local authorities.

**18.0 BUREAU OF STANDARDS, COLOUR CODE:**

In industrial and multidisciplinary installation like Hotels and Hospitals, additional item may be added for other systems.

To indicate the class of its contents, each pipe and appurtenances connected therewith shall be marked as under.

1	Water Drinking	-	Sea Green
2	Non Potable Water	-	Orange
3	Treated Effluent	-	Admiralty Blue

Charts showing the colors for primary identifications should be displayed at points where they are likely to be needed for references.

**LIST OF APPROVED MAKES - PLUMBING**

1	R.C.NP2Pipes	Local Make
2	Eco Drain (PVC Pipe) for External Drainage	Supreme/D-rex/Astral
3	G.I. Pipes Heavy Grade as per IS 1239	Tata, Zenith, Siddharth
4	CPVC / UPVC pipe	Astral / Prince / Supreme
5	Gun Metal valve & fittings	Leader, Audco, TBS, Sant
6	PVC Valve	Astral / Prince / Supreme
7	Float / Equilibrium Valves	Prayag
8	Pressure Gauges	Flgt, H Guru, pricol
9	SMP pipe	NIECO
10	RCC Manhole cover	Make-nico , Pratibha
11	SWR PVC Pipe	Prince / Supreme
12	Pumps	CRI / Kirloskar / LaxmiLada /
13	Butterfly Valves, Check Valves	Audco, Intervalve
14	Brass & Gun metal, gate valve, Strainers.	Leader, Audco, Sant
15	Pressure Reducing Valve	OR - TBS, ZOLOTO, VARTSILA
16	Ball Valves	ZOLOTO / RB / Giacomini
17	HDPE Pipes	Reliance, Godavari Polymers
18	Water supply fancy fitting like pillar taps, showers, sink mixers etc.	Metro / Johnson / As approved.
19	Flush valves	Metro / Johnson / as approved
20	SS Sinks	Nirali, Equivalent approved
21	Flush Valve	Slimiline
22	Sanitary Ware	Parryware / Hindware
23	PVC Pipes & Fitting	Supreme / Finolex.
24	Non Return Valve	ZIP, Advance
25	Air Release Valve	Giacomini / RB
26	Water Meters	Capstan, Keycee
27	Anchor Fasteners	Hilti, Fischer



ii. **TECHNICAL SPECIFICATIONS - ELECTRICAL**

**CONTENTS**

1	MV Switchgear Panel (PCC)
2	1.1KV Power & Control Cables
3	Cable Laying
4	Wiring
5	Cable trays and Structural Steel
6	Indoor & Outdoor light fixtures
7	Earthing
8	Earthing Connections
9	Recommended Makes

**1 MV SWITCHGEAR PANEL (PCC)**

- Unless otherwise specified elsewhere in this specification, the rating performance and testing of the Boards shall conform to the latest revision of all the relevant standards.
- A list of some of the applicable standards is enclosed at ANNEXURE I.
- **GENERAL TECHNICAL REQUIREMENT**
- SHEET METAL WORK
  - The switchgear frame shall be fabricated using suitable mild steel structural sections or pressed and shaped cold rolled sheet steel of thickness not less than 2.5 mm.
  - Frames shall be enclosed by sheet steel of thickness not less than 2 mm cold rolled or 2.5 mm hot rolled, smoothly finished, levelled and free from flaws. Doors and covers shall be made of sheet steel of thickness not less than 1.6 mm cold rolled or 2 mm hot rolled. Stiffeners shall be provided wherever necessary.
  - All panel edges and door edges shall be reinforced against distortion by rolling, bending or by the addition of welded reinforcement members.
  - Cut-outs shall be true in shape and devoid of sharp edges.
  - The complete structures shall be rigid, self-supporting, free from vibration, twists and bends.
- PAINTING
  - All sheet steel work shall be phosphate in accordance with the following procedure and in accordance with relevant standards.
  - Oil, grease, dirt and warp shall be thoroughly removed by emulsion cleaning.

E-TENDER FOR STRUCTURAL REPAIR, STRENGTHENING & ROOF REPLACEMENT FOR AUDITORIUM BUILDING,  
AT SNTD JUHU CAMPUS MUMBAI.

- Rust and scale shall be removed by pickling with dilute acid followed by washing with running water, rinsing with slightly alkaline hot water and drying.
- After phosphating, through rinsing shall be carried out with clean water, followed by final rinsing with dilute dichromate solution and oven drying.
- The phosphate coating shall be sealed by the application of two coats of ready mixed, stoving type zinc chromate primer. The first coat may be 'flash dried' while the second coat shall be stoved.
- The panels shall then be painted with power coating having Siemens grey colour shade as per IS - 5
- The final finished thickness of paint film on steel shall not be less than 60 microns, and shall not be more than 80 microns.
- Finished painted appearance of equipment shall present an aesthetically pleasing appearance, free from dents and uneven surfaces.
- Alternatively, powder coated panels are also acceptable.
- CONSTRUCTIONAL FEATURES
- Switchgear shall be :
  - of the metal enclosed, indoor, floor mounted modular type
  - made up of the requisite vertical sections
  - of dust and vermin proof construction
  - provided with a degree of protection of IP 52, unless otherwise specified.
- easily extendable on both sides by the addition of vertical sections after removing the end covers.
  - provided with a metal base frame made of structural steel channel section properly drilled for mounting the Switchgear along with necessary mounting hardware. Hardware shall be zinc plated and passivated.
  - provided with labels on the front and rear indicating the switchgear designation.
  - provided with cable entry facilities at top / bottom as specified with 3 mm thick removable gland plates.
  - Of uniform height of not more than 2150 mm.
  - Of single front execution .
  - provided with gaskets all round the perimeter of adjacent panels, and base frame, removable covers and doors.
  - provided with bus bars running at the top, all along the length of the switchgear in a separate sheet steel enclosure.

- Operating devices shall be incorporated only in the front of the switchgear.
- The switchgear shall be divided into distinct vertical sections each comprising :
  - A completely metal enclosed busbar compartment running horizontally.
  - Individual feeder modules arranged in multitier formation. It is essential that the modules are integral multiples of the basic unit size to provide for flexibility in changes, if any, at site.
  - Enclosed vertical bus bars serving all modules in the vertical sections. For safety isolation of the vertical bus bars, insulating barrier with cut-outs shall be provided to allow the power stab contacts to engage with vertical bus bars.
  - A vertical cable alley covering the entire height. The cable alley shall be minimum 200 mm wide for Switch control modules and 500 mm wide for circuit breaker controlled modules.
  - A horizontal separate enclosure for all auxiliary power & control buses, as required , shall be located so as to enable easy identification, maintenance and segregation from the main power buses. Tap-off connections from these buses shall be arranged separately for each vertical section.
- Each vertical section shall be equipped with space heaters which may be located in the cable alley.
- One metal sheet shall be provided between two adjacent vertical sections running to the full height of the switchgear except for the horizontal bus bar compartment. However, each shipping section shall have metal sheets at both ends.
- All equipment associated with a single circuit shall be housed in a separate module compartment of the vertical section. The compartment shall be sheet steel enclosed on all sides and the rear, with the withdraw able units in position or removed, except on the cable alleyside. A plate cover with a slot to permit wiring connections shall be provided on the side corresponding to the cable alley. The front of the compartment shall be provided with a hinged door.
- For draw-out type modules, only the handles of control and selector switches, push buttons, knobs & cut-outs for lamps and meters shall be arranged on the front doors of the respective compartments to permit operation without opening the door. On circuit breaker controlled circuits, protective relays shall be mounted on the front door of the compartment. All other equipment pertaining to a circuit shall be mounted on the withdraw able chassis. All cut-outs shall be provided with gaskets for the purpose of dust-proofing.
- Current transformers shall not be directly mounted on the buses. Current Transformers on circuit breaker controlled circuits shall be mounted on the fixed portion of the compartment.
- In breaker compartments, suitable barriers shall be placed between circuit breaker and all control, protective and indication circuit equipment including

instrument transformers. External cable connections shall be carried out in separate cable compartments for power and control cables.

- After isolation of the power and control connections of a circuit, it shall be possible to safely carry out maintenance in a compartment with the bus bars and adjacent circuits live.
- The with drawler chassis shall move on suitable guides and on suitably plated steel or stainless steel rollers or balls to facilitate easy withdrawal.
- Cable alleys shall be provided with suitable hinged doors. It shall be possible to safely carry out maintenance work on cable connections to any one circuit with the bus bars and adjacent circuits live. Adequate number of slotted cable support arms shall be provided for clearing the cables.
- Rear of single front switchgear shall be provided with removable panels. It shall be possible for one person to remove and fix the removable panel.
- All doors shall be provided with concealed type hinges and captive screws.
- Interchange ability
- Components and equipment that are not fully interchangeable are liable for rejection. VENDOR shall replace all such equipment by fully interchangeable equipment at his cost.
- The draw-out contacts shall be only between copper / copper alloy / aluminum faces, which are silver or tinplated. The contact design shall be such that there should be no arcing / deformation under the associated peak short-circuit current.
- Switchgear shall be designed in such a way that all component equipment and bus-bars operate satisfactorily without exceeding their respective maximum permissible rise in temperature under ambient temperature conditions prevailing within the switchgear cubicle, with reference ambient temperature outside the switchgear cubicles.
- Provision of ventilating louvers is considered undesirable. If ventilating louvers are considered essential by the VENDOR, these may be provided. However, all ventilating covers shall be provided with fine-screened brass or GI meshes to prevent entry of vermin and dust.
- All dummy cubicles necessary to meet the requirement shall be included in the VENDOR's scope.
- MAIN BUS BARS AND TAPS
- Switchgear shall be provided with three phase and neutral bus bars as specified.
- Bus bars shall be of uniform cross section throughout the length of the switchgear, and up to the incoming terminals of feeder circuit breaker / switch.
- The bus bars shall be made of high conductivity copper or aluminium alloy of E91E grade as specified.

- Bus bars shall be provided with at least the minimum clearances in air as per applicable standards for a 500 V, 3 phase system.
- All bus-bars, bus-taps shall be insulated with close fitting sleeve of hard, smooth, dust and dirt free plastic insulation of high dielectric strength (450 V / min.) to provide a permanent high dielectric non-ageing and non-tracking protection; impervious to water, tropical conditions and fungi. The insulation shall be non-inflammable and self-extinguishing and in fast colours to indicate phases. The joints shall be insulated in such a way as to provide for accessibility of contact bolts for maintenance. The dielectric strength and properties shall hold good for the temperature range of 0<sup>0</sup> C to 90<sup>0</sup> C. If the insulating sleeve is not coloured but black, busbars shall be colour coded with coloured bands at suitable intervals.
- Bus bars shall be adequately supported and braced to withstand the stresses due to the specified short circuit currents for the associated switchgear. Bus bar supports shall be made of Hylam sheets, glass reinforced moulded plastic material, Permali wood or cast resin.
- Separate supports shall be provided for each phase of the bus bars. If a common support is provided for all three phase, antitracking barriers shall be incorporated.
- Bus bar joints shall be complete with high tensile steel bolts and Belleville washers and nuts. Bus bars shall be thoroughly cleaned at the
- joint locations and a suitable contact grease shall be applied just before making a joint.

- **CIRCUIT BREAKERS**

Circuit breakers shall be -

- of the air break draw out type, mounted along with its operating mechanism on a wheeled carriage moving on guides, designed to align correctly and allow easy movements.
- of the shunt trip type as specified associated with the O/L, S/C protection releases.
- provided with an operating mechanism of the type specified in Data Sheet .
- provided with mechanically operated targets to show 'Open' 'Closed' 'Service' and 'Test' positions of the circuit breaker.
- provided with locking facilities in the 'Service' 'Test' and 'Isolated' positions. In test position the breaker will be tested without energising the power circuits. The breaker shall remain fully housed inside the compartment in the test position.
- provided with 6 NO & 6 NC potential free auxiliary contacts, rated 10 A at 240 V A.C. and 1 A (inductive breaking) at 220 V D.C.
- provided with 'red', 'green' and 'amber' indicating lamps to show 'Closed' 'Open' and 'Auto-trip' conditions of the circuit breaker when breaker operating is controlled by a control switch.

- Circuit breakers shall be provided with the following interlocks :
  - It shall not be possible to plug-in a closed circuit breaker, or to draw out a circuit breaker in the closed position.
  - It shall not be possible to operate a circuit breaker unless it is in the fully plugged-in, test, or fully isolated position.
  - Closing and trip coil shall operate satisfactorily under the following conditions of supply voltage variation :
    - Closing coils - 85% to 110 % of rated voltage
    - Trip coils-50 % to 110 % of rated voltage
  - When shunt trip circuit breakers are specified the following series trip releases with adjustable settings shall be provided
    - a) Overload
    - b) Short circuit and
    - c) Under voltage
  - In addition to the adjustable current setting range specified in the, short circuit releases shall be provided with at least four adjustable time delay settings. If it is not possible to provide the specified adjustable current setting range for the short circuit releases, shunt trip circuit breakers together with necessary protective relays shall be offered.
  - Facilities shall be provided for blocking the under voltage release, if so required at Site.
  - Each of the foregoing releases shall be provided with a single pole, double throw, potential free alarm contact rated for 0.5 A, 220 V DC.
  - Operating Mechanism
    - Circuit breaker shall be provided with a manual operating mechanism.
    - Manually operated mechanism shall be of the spring charging stored energy type, unless otherwise specified.
    - The closing action of the circuit breaker shall charge the tripping spring ready for tripping.
    - Speed of closing of contacts shall be independent of the speed with which the handle is operated.
    - Circuit breakers provided with stored energy operating mechanism shall be provided with the following interlocks.
      - The circuit breaker shall not close unless the spring is fully charged.
      - Shocks, vibrations, or failure of springs shall not operate the breaker or prevent intended tripping.
- MINIATURE CIRCUIT BREAKERS

E-TENDER FOR STRUCTURAL REPAIR, STRENGTHENING & ROOF REPLACEMENT FOR AUDITORIUM BUILDING,  
AT SNTD JUHU CAMPUS MUMBAI.

- Miniature circuit breakers for use on Lighting Panels & DBs shall comply with the requirements of applicable standards.
- CURRENT TRANSFORMERS
  - Current transformers shall be of the dry type.
  - Current transformers shall have a short time withstand rating equal to the short time withstand rating of the associated switchgear for one second.
  - Unless otherwise specified, the minimum performance requirement of current transformers are as follows :
  - Measuring CT's - 10VA, accuracy class 1.0 and an instrument safety factor of 5.
  - Protective CT's - 15 VA, accuracy class 5 P and an accuracy limit factor of 10.
  - Notwithstanding the above clause 4.11.3, it shall be the VENDOR'S responsibility to co-ordinate the current transformer burden with the requirements of relays, instruments and leads associated with that particular current transformer.
  - All current transformers shall be earthed through a separate earth link on the terminal block to permit easy measurement of the current transformers insulation resistance. (CTS built-in with the thermal relays of the contactors are excluded.)
- INDICATING INSTRUMENTS AND METERS
  - Electrical indicating instruments shall be minimum 96 mm square size, suitable for flush mounting.
  - Indicating instruments shall have provision for zero adjustment outside the cover.
  - Instrument dials shall be parallex free with black numerals on a white dial.
  - Ammeters provided on motor circuits shall be provided with a suppressed extended scale to indicate motor starting current.
  - Watt hour meters shall be of the direct reading electro-dynamometer type complete with cyclometer type dials and reverse running stops.
- MULTI FUNCTION ELECTRICITY METER (MFE METER)
  - Multifunction electricity meter shall be provided on the panel for indicating the instantaneous parameters like voltage, current, frequency, power factor, apparent power, reactive power, active power, etc. and the integrated parameters like kwh, kvarh, etc.
  - A single meter capable of recording energy and the various system parameters like, voltage, current frequency, power factor, active power, reactive power etc. shall be preferred.

E-TENDER FOR STRUCTURAL REPAIR, STRENGTHENING & ROOF REPLACEMENT FOR AUDITORIUM BUILDING,  
AT SNTD JUHU CAMPUS MUMBAI.

- Multi function meter shall be microprocessor based compact unit having serial-port(s) for interface with local computer / Data Acquisition system.
- The meter shall have digital display unit. The digits shall be clear and bright. The unit shall have digits not less than 6. The design shall be such that the digits (counter) shall not reset for at least 5 years.
- All readings on the meter shall be direct reading type, that is, without involving any external multiplying factor. It shall be possible to programme the meter, at site, to suit the actual CT & PT ratios.
- M.F.E. meter shall be flush mounting type having all connections from therear. Provision shall be available for testing / calibration of the meter.
- Meter shall be suitable for 50 Hz AC system with 5A CT secondary and 230V PT secondary rating and shall be 4-wire 3 element type capable of reading correctly even when used for unbalanced loads.
- Feather-touch push buttons shall be provided on the meters for enabling selection of various system parameters to be read. The parameters being displayed shall be identified on the displayed unit. MFE meter shall preferably be self-powered type. It shall have non-volatile memory so as to retain the recorded parameters during power failure / storage. In case the meter is having built-in self chargeable type battery back-up to support the retention of energy recording during storage / aux. supply failure, the same shall have a life not less than 7 years.
- The meters shall be of proven design and having been in satisfactory service in any similar (CT/PT operated) system for more than 12 months.
- INDICATING LAMPS
- Indicating lamps shall be :
  - Of the LED type and of low watt consumption
  - Provided with translucent lamp covers of colours `Red', `Green' and `Amber' as required in the control wiring diagrams.
- Bulbs and lenses shall be easily replaceable from the front.
- PUSH BUTTONS
- Push buttons shall be :
  - of the momentary contact, push to actuate type rated to carry 10A at 240V AC and 1A (inductive breaking) at 220V DC.
  - fitted with self reset, 2 NO and 2 NC contacts
  - provided with integral escutcheon plates marked with its function.
- `Start' `Open' `Close' push buttons shall be green in colour.
- `Stop' push buttons shall be red in colour.
- All other push buttons shall be black in colour.



E-TENDER FOR STRUCTURAL REPAIR, STRENGTHENING & ROOF REPLACEMENT FOR AUDITORIUM BUILDING,  
AT SNDT JUHU CAMPUS MUMBAI.

- 'Emergency Stop' push buttons shall be of the lockable in the pushed position type and shall be shrouded to prevent accidental operation. Key shall not be required for the operation of the push button.
- SPACE HEATERS
  - Space heaters for switchgear panels shall be suitable for operation on the specified supply system.
    - provided with single pole MCB with overload and short circuit release.
    - provided with thermostat to cut off the heaters at 45 Deg. C.
- INTERNAL WIRING
  - Wiring inside the switchgear shall be carried out with 1100 / 650 V grade, PVC insulated, stranded conductor wires. Minimum size of conductor for power circuits is 4 sq.mm copper or equivalent size aluminium conductor. Control circuits shall be wired with copper conductor of at least 2.5 sq.mm for CT circuits & 1.5 sq.mm for other circuits, the number and size of strands shall be 7 of 0.67 mm and 0.5 mm diameter respectively.
  - Engraved identification ferrules, marked to correspond with the wiring diagrams shall be fitted to each wire. Ferrules shall be of yellow colour with black lettering.
  - Spare auxiliary contacts of all equipment forming part of the switchgear shall be wired upto the terminal blocks.
  - Wiring for equipment if supplied by the PURCHASER for which the VENDOR has to provide cut-outs (where indicated in the data sheets) shall be provided upto the terminal blocks.
  - Spare and unassigned modules shall be complete with internal wiring.
  - Wiring shall be terminated on preferably stud type terminal blocks such that the wires are connected by cable-lugs with nuts & washers / lock - nuts.
  - Not more than two connections shall be made on any one terminal.
- TERMINAL BLOCKS
  - Terminal blocks ( both for power and control circuits) shall be of reputed make specially for CT and VT circuits. It shall comprise finely threaded pairs of brass studs of at least 6 mm diameter, links between each pair of studs, washers, nuts and locknuts. The studs, shall be accurately locked within the mounting base to prevent their turning. Insulated barriers shall be provided between adjacent terminals.
  - Terminals for circuits with voltage exceeding 125 V shall be shrouded. Terminal blocks shall be grouped depending on circuit voltage. Different voltage groups of terminal blocks shall be segregated.
  - Terminal blocks shall be adequately rated to carry the current of the associated circuit. Minimum rating of the terminal block is 10 A.

- Terminals shall be numbered for identification as per enclosed drawings. Engraved white-on-black labels shall be provided on the terminal blocks, describing the function of the circuit.
- **LABELS**
  - All labels shall comprise white letters on a black background.
  - Labels shall be made of non-rusting metal or 3-ply lamicaid, or engraved PVC.
  - Labels shall be properly fixed, with provision to prevent distortion due to expansion.
  - Size of lettering shall be 6 mm, unless otherwise specified.
- **EARTHING**
  - Each Panel shall be provided with an earth bus bar running along the entire length of the board. Material and size of the earth bus bar shall be as specified in data sheets. At either end of the earth bus, one (1) clamp type terminal with nuts, bolts and earthing conductor of size and material indicated in data sheets. In case the earth bus is provided near top of the switchgear, one down comer at either end shall be provided for connection to the purchaser's earthing conductor.
  - Earth bus bars shall be supported at suitable intervals.
  - Positive connection between all the frames of equipment mounted in the switchboard and earth bus bar shall be provided by using insulated copper wires / bare bus bars of cross section equal to that of the bus bar, or equal to half the size of circuit load current carrying conductor, whichever is smaller.
  - All instrument and relay cases shall be connected to the earth bus bar using 1100 / 650 V grade, 2.5 sq.mm stranded, copper earthing conductor.
- **TESTS**
  - Switchgear shall be subjected to following tests :
    - Temperature rise test on power circuits.
    - Mechanical operation test.
    - High voltage test
    - Electrical control, interlock and sequential operation tests.
    - Verification of wiring as per approved schematic.
  - Routine tests shall be carried out on all associated equipment as per relevant standards.
- **INSPECTION**
  - The boards shall be inspected by purchaser's representative at following stages.
    - a) After fabrication of the boards but before painting

- b) Completely painted& assembled Board for final inspection.
- A tentative schedule of the inspection programme shall be conveyed to the purchaser at least a week in advance to arrange for inspection. A copy of the internal test report shall be forwarded along with the inspection call.

### ANNEXURE - I

#### LIST OF STANDARDS

Sr. No.	Specification No.	Title
1.	IS 2516	Circuit Breakers
2.	IS 4237	Metal Enclosed Switchgear
3.	IS 2705	Current Transformers
4.	IS 3156	Potential Transformers
5.	IS 375	Arrangement for Switchgear Bus bars Main connection and Auxiliary Wiring
6.	IS 2544	Bus bar support Insulator
7.	IS 2147	Degree of protection
8.	IS 3231	Electrical Relays for Power System protection
9.	IS 1248	Electrical Indicating Instruments
10.	IS 722	AC Electricity meters
11.	IS 5082	Aluminium bus bars
12.	IS 6005	Code of practice for phosphating Iron & Steel
13.	IS 2208	HRC Fuses

**ANNEXURE - II**

**SPECIFIC TECHNICAL REQUIREMENTS**

1.0	GENERAL CONSTRUCTION OF SWITCHGEAR	
	Applicable for	Power Distribution Board/ MLDB / LP
	Enclosure	Indoor, Metal clad, compartmentalised single front, floor mounted, front operated, self supporting, suitable for rear access.
	Module Construction	Draw out type ACB / Switch modules as specified
	Degree of Protection	IP 42
	Cable Entry	Top /Bottom
2.0	BUS BARS	
a)	Material - 3 Ph& N	High Conductivity Aluminium / Aluminium Alloy E 91E
	- Earth	Aluminium strip
b)	Voltage Rating	415 $\pm$ 10 %
c)	System Frequency	50 Hz, + 3 % to - 3 %
d)	HV Power frequency withstand test voltage	2500 V RMS, 50 Hz for one minute
e)	Rated Current	
	a) Continuous	As per SLD
	b) Short time	50 kA RMS for 1 Second
	c) Maximum temperature limit of	80 Deg. C
	d) Sleeving	Heat Shrink Sleeving, Red, Yellow, blue for phases and black for neutral
3.0	CIRCUIT BREAKER	
	a) Service	Indoor
	b) Type	As shown on Single Line

E-TENDER FOR STRUCTURAL REPAIR, STRENGTHENING & ROOF REPLACEMENT FOR AUDITORIUM BUILDING,  
AT SNTD JUHU CAMPUS MUMBAI.

			Diagram enclosed
	c)	Rated voltage	415 V $\pm$ 10 %
	d)	No. of Poles	3 pole
	e)	Frequency	50 Hz + 3 % to - 3 %
	f)	System earthing	solidly grounded
	g)	Insulation level (1 minute power frequency withstand voltage)	2.5 kV RMS
	h)	Operating mechanism	Spring charged
	i)	Protective Releases	With $\mu$ p based
4.0	CURRENT TRANSFORMERS		
	a)	Service	Indoor
	b)	Type	Resin Cast / Bar primary
	c)	Mounting	Inside Cubicle on stationary portion
5.0	PAINT SHADE		Siemens Grey as per IS 5
6.0	SELECTOR SWITCH		
	a)	Rated voltage of main contacts	415V, AC
	b)	Rated voltage of coils, auxiliary contacts	240V, AC
	c)	Rated duty	AC3
7.0	CONTROL WIRING		
	a)	Size	4.0 Sq. mm Cu for CT circuits 2.5 Sq. mm Cu for other circuits
	b)	Type	Stranded
	c)	Insulation	PVC
	d)	Voltage grade	650 V
	e)	Colour code	Grey / black
8.0	CONTROL TERMINALS		
	a)	Type	Clip on

E-TENDER FOR STRUCTURAL REPAIR, STRENGTHENING & ROOF REPLACEMENT FOR AUDITORIUM BUILDING,  
AT SNTD JUHU CAMPUS MUMBAI.

	b)	Voltage grade	1100 V
	c)	Current rating	10 Amp
	d)	10% spare terminal to be furnished	Yes
9.0	PUSH BUTTON		
	a)	Type	ON / OFF Momentary
	b)	Rating	10 Amp
10.0	INDICATING LAMP		
	a)	Type	Cluster LED Type
	b)	Lamp Wattage	0.25, 240 V
11.0	INDICATING METERS		
	a)	Type	Moving iron
	b)	Size	96 x 96 Sq.mm
	c)	Accuracy class	1.5

## 21.1KV POWER & CONTROL CABLES

- **SCOPE**

The scope of this specification covers design, manufacture, inspection, testing at works. packing and forwarding of 1100 V grade LT Power and control cables.

- **STANDARDS**

The cables offered shall conform to the latest revision of relevant Indian Standard Specifications. Some of these standards are listed below.

Sr. No.	Spec. No.	Title
1.	IS 1554	PVC insulated heavy duty electrical cables for working voltages up to 1100 V
2.	IS 8130	Conductors for insulated electric cables and flexible cords
3.	IS 5831	PVC insulation & sheath of electric cables
4.	IS 3975	Mild steel wires, strips and tapes for armouring of cables

5.	IS 2633	Methods of testing weight, uniformity of coating, thickness on hot drip galvanised articles.
6.	IS 209	Specification for zinc
7.	IS 3961	Recommended current ratings for cables - PVC insulated & PVC sheathed
8.	IS 1753	Aluminium conductors for insulators cables

• **PRINCIPAL PARAMETERS**

- The LT Power & Control cables shall be used indoors / outdoors, directly burried or in open racks in the plant premises.
- They shall meet the requirements of IS specifications listed above and the general technical requirement detailed below.

• **GENERAL TECHNICAL REQUIREMENT**

- The cables shall be brand new. They shall be suitable for laying on trays, in trenches, ducts, conduits & underground buried installation
- All the LT power & control cables shall be heavy duty type, 1100 V grade with aluminium / copper conductor, PVC insulated, inner sheathed, armoured & over all PVC sheathed.
- The construction of the conductors shall be stranded for aluminium cables and solid for copper cables. Conductors of nominal area of 25 Sq.mm shall be circular. Those above may be circular or oval shaped.
- The core insulation shall be with PVC compound applied over the conductor by extrusion only & shall conform to the type A compound of IS 5831. Control cables having 6 cores or above shall be identified with prominent and indelible white coloured arabic numerical on the outer surface of the insulation at every 500 mm.
- The inner sheath shall be applied over the laid up cores by extrusion and shall be of PVC conforming to the requirements of type ST1 PVC compound. The extruded inner sheath shall be of uniform thickness of 0.5 mm up to 16 Sq.mm 0.8 mm up to 120 Sq.mm & 1.0 mm above 120 Sq.mm conductor size.
- The armoring shall be by single round galvanised steel wires for cable diameter up to 13 mm and galvanised steel strips for cables diameters above 13 mm.
- The outer sheath of the cables shall be applied by extrusion and shall be of PVC compound. Suitable chemicals shall be added to the PVC compound of the outer sheath to protect the cable against rodent and termite attack.
- The dimensions of the insulation armour and outer sheath materials shall be governed by IS 1554.
- The Bill of Material for the various cables is enclosed at annexure I

- **TESTS**

All routine tests shall be conducted on the cables as specified in relevant IS. The test report shall be submitted to the purchase for approval.

- **INSPECTION**

The cables shall be offered for Inspection by the purchaser's representative at manufacturer's works.

- **PERFORMANCE GUARANTEE**

The cables shall be guarantee for satisfactory performance for a period of 18 months from the date of dispatch or 12 months from the date of commissioning whichever is earlier.

- **DOCUMENTATION**

The supplier shall submit the drum wise routine test report of the supplied cables in 4 sets.

- **PACKING & FORWARDING**

- The cables shall be packed in wooden drums of suitable barrel diameter and fully protected against mechanical damage.
- Necessary information such as manufacturer's name, type size, voltage grade, Length of cable, drum number etc. An arrow shall be printed on the drum to show the direction in which the cable should be unwound from the drum.

### **3 CABLE LAYING**

- **SCOPE**

The scope of this specification covers requirements for the installation, testing and commissioning of cabling system including supply and installation of cable accessories.

- **STANDARDS**

- The cabling system installation work shall comply with the latest applicable standards, regulation and safety codes and good engineering practices.
- The installation work shall conform to the latest applicable codes, Electricity rules, fire insurance regulations the applicable Indian standards specifications and the approved drawings.

- **PRINCIPAL PARAMETERS**

- The installation, testing & commissioning of cabling system shall be carried out in accordance with the general technical requirements furnished below and related specific project drawings.
- Supply of cabling accessories such as lugs, glands, termination kits, termination boxes, junction boxes, cable trays, conduits, pipes etc. shall be as per the technical specifications detailed herein.



- **GENERAL TECHNICAL REQUIREMENT**

- **General scope of cable installation**

- The cable installation work shall include unloading of cables (whether supplied by Bidder or Client) storing in Client's / Bidders stores, preparation of cutting schedules for each drum, cutting, transporting to location, laying, fixing, putting identification tag numbers, properly dressing, terminating, testing and commissioning and any other work necessary for completing the work.
- The above work shall include laying of HT / LT power, control, lighting & communication cables as specified which shall be laid in trenches, on cable trays, in conduits as specified and as detailed in relevant drawings and cable schedules.
- The Bidder shall provide all supervision, labour, tools, testing equipments as required. All incidental hardware & miscellaneous items such as saddles, spacers, bolts / nuts, anchor fasteners, cable route & cable joint markers, protective bricks for buried cables, cable identification tags & ferrules, nylon cord, G.I.Wire / aluminium clamp as required for cable installation shall be part of installation work
- Related civil works such as trenches, tray supports, embedded conduits etc. shall be done by a separate civil contractor. However minor civil works such as patching up any holes made in walls, embedment of short conduits in floors, walls etc. shall also be a part of cable installation work.
- The manufacturer's, Owner's or Consultant's drawings schedules, instructions, cable entry locations and recommendations shall be correctly followed by the Bidder in handling, laying & terminating the cables. In case of any doubts or misunderstanding as to correct interpretation of instructions or drawings, necessary clarification shall be obtained by the Bidder for the Client.
- Any changes in the cable route required to be made due to site conditions shall be carried out by the Bidder in consultation with the Consultant and Client & after their approval.
- The Client shall arrange to clear the areas, routes, trenches through respective Bidders. The cabling contractor shall clean the trench, remove the cable drums, and other surplus material after the installation work.
- The Bidder shall ensure good workmanship and shall assign qualified supervisors and skilled labour for this work.

- **Cable Laying**

- The Bidder shall install test & commission power & control cables which will be either furnished by the Owner or procured by the Bidder himself.
- The cables shall be laid as per the route shown on relevant drawings. The cable laying work shall include laying, pulling, dressing on cable trays, racks, vertical raceways & supply and installation of cable fixing saddles, spacers and nylon cords, G.I. Wires. Aluminium strip clamps as required for tying as necessary

- The quantities indicated in the cable schedule are approximate. All cable routes shall be carefully measured and cables cut to the required lengths leaving sufficient length for final connection of cable to the terminals in the equipment. Care shall be taken to minimise cable wastage. Drum wise cutting schedule shall be prepared before the cables are cut from the drums. An additional loop of 5 mtr. for main incomer cable at each panel & if proposed for other cables shall also be provided in the cable & cable length cut accordingly.
- Cables shall be laid in complete uncut Length from one terminal to another. No joints shall be allowed in the straight runs of the cables.
- Cable reels shall be utilised for cable pulling. After each cable is laid, identification cable tags shall be provided at each end of the cable. Cables shall be protected at all times from mechanical injury and from absorption of moisture through unprotected ends. Ends of cables shall be taped with PVC insulating Tape.
- Cables shall be neatly arranged in trenches and on trays in such a manner so that criss crossing is avoided and easy take off to equipment is facilitated.
- Sharp bending of cables shall be avoided. The bending radius of cables shall not be less than that recommended by the cable manufacturer.
- Where cables cross road, oil / water pipes, open gutters etc. they shall be run in hume pipes / steel pipes as directed by the consultant. The depth of burial of pipe shall not be less than 750 mm.
- Directly buried cables shall be laid underground in excavated cable trenches. The trenches shall be of sufficient depth & width for accommodating all the cables correctly spaced. Minimum depth of buried cable shall be 750 mm for LT cables & 900 mm for HT cables. Before cables are placed in the trench the trench bottom shall be covered with a layer of sand. The cables shall be laid over this levelled layer of sand. The cable shall be covered up to 150 mm over the largest diameter cable in the trench. A protective Layer of 75 mm thick second class red bricks shall be laid on this sand cover. The remainder of the trench shall be filled with soil, rammed & levelled. Insulation test shall be conducted on each cable before back filling. Cable markers as specified shall also be installed along the route of the directly buried cable for easy identification of the cable route. Excavation for the trench, supply and laying of sand and brick and back filling shall be the responsibility of the Bidder.
- All cables shall be identified close to their termination point by cable numbers as per cable schedule. Cable numbers shall be punched on 2 mm thick aluminium strip of adequate size securely fastened to the cable and wrapped around it. Identification tags shall also be provided at every 15 m along the straight run and at every change in direction.
- Cables in racks & trays shall be tied by 3 mm Nylon cord, or Aluminium clamp to the tray after carefully dressing the cables. Cables shall be clamped along with wall, column, ceiling, structures etc. on emerging out of trenches before they are connected to the equipment.

- Control & Power cables shall be clamped separately. When power cables are laid alongside communication cables, minimum separations distance shall be 300 mm. The power & communication cables, minimum separation distance shall be 300 mm. The power & communication cables shall as far as possible cross each other at right angles. Distance between adjacent clamps shall be 450 mm.
- Cables shall be carefully pulled through conduits, hume pipes and steel pipes to prevent damage to the cables. If required, approved cable lubricant shall be used where a cable enters conduit, the cable shall be bent in larger radius.

Following guide of the pipe fill shall be used for sizing pipe size.

1. One cable in pipe 50 percent
2. Two cables in pipe 45 percent
3. Three cables in pipe 43 percent
4. More than three cables 40 percent

After the cables are installed and all the testing is complete, conduit ends above grade shall be plugged with suitable weather proof plastic compound or PUTTI Alternatively, PVC or wooden bushes shall be used.

- Cables directly laid on supporting angles in cable trenches (HT cables & larger size LT cables) shall be suitably clamped by means of G.I. Saddles or clamps. The supporting angles shall be painted before laying the cables.
- **Cable Termination**
- All PVC cables up to 1.1 KV grade shall be terminated at the equipments by means of compression type cable glands. All cable entries shall be through bottom only. Top entry termination shall be made only after approval from Owner.
- The termination shall be made in a neat & work man like approved manner by men specialised in this work.
- Power cables where colour coding is not available shall be identified with Red, Yellow, blue & black PVC tapes. For control cables PVC ferrules duly numbered shall be used. For trip circuit identification, additional red ferrule shall be used only in those cores.
- All the cores of Control cables shall be identified at both ends by their terminal numbers by PVC ferrules. Wire numbers shall be as per schematic, wiring and interconnection diagrams made available to the Contractor. All unused spare cores of control cables shall be neatly bunched and ferruled at both ends.
- When control cable cores are to be fanned out & bunched together with cord the Contractor shall make connections to terminal blocks & test equipments for proper operation before cables are corded together. After correct connections are established through operating equipment, cable cores shall be cut to correct lengths, connected to terminal connectors in the specified manner & corded together.

- Most of the switchgear & control panels will be received with undrilled gland plates. Contractor shall drill the gland plate as required at no extra cost. Some extra holes shall be drilled & plugged for any future requirement. No. & size of extra holes shall be given by the Owner.
- Cable leads shall be terminated in the equipment terminals by means of crimped type solder less lugs of approved make. Cable cores up to 4 Sq.mm may be directly connected in to the terminals. All other cable sizes shall be crimped as specified. Crimping shall be done by hand crimping or by hydraulically operated crimping tool and conducting jelly shall be applied on the conductor.

- **Installation of Cables Accessories**

- Cable trays

The cable trays shall either run in concrete trenches or run overhead, along wall, column below slab etc. The trays shall be GI ladder type or perforated as specified. The trays shall be laid in single, two & multi tier formation.

Vertical raceways & risers shall be fixed such that it gives a clear appearance.

Change in the line or elevation or addition of an offset shall be done by cutting standard length of available tray. Care shall be taken to eliminate any sharp bends in tray work to avoid any damage to the cable while pulling the cables.

No cables shall be laid until all the route is cleared and all tray work is complete.

- Conduits and Pipes

The Bidder shall install conduits & pipes as specified & shown in the construction drawings. All accessories & fillings required for completing the installation. Such as inspection fees, elbows, check nuts, brass end caps, pull boxes, saddles spacers, shall be in Bidder's scope of supply conduit fittings shall be of same material as the conduit.

- **Supply of Cable accessories**

Various accessories required for completion of cable installation work shall be as per the specification's furnished below.

- Cable glands

a) The cable glands shall be made from solid drawn brass rods, machined for smooth finish, cadmium - Nickel plated and passivated to protect against corrosion. The gland shall be suitable for the specified cable sizes. The neoprene compression rings shall have wide range of compression to suit varying sizes & types of cables. Cable size shall be marked on the gland for easy identification.

b) Wherever specified in the schedule, the glands used shall be of following types.

- Double seal cone grip compression gland comprising of:  
Nipple with neoprene compression ring with groove for inner sheath of cable. Check nut with rubber washer to ensure dust tight joint between the enclosure and the gland. Cone and clamping ring for clamping the armour.
- The design of cone shall be suitable for any type of armouring i.e.wire or strip. gland body to accommodate various parts of gland with minimum clearance between walls. Neoprene compression ring with groove for the outer sheath of cable . Brass washer for proper positioning of the ring when compressed shall be provided. Compression nut to ensure perfect hold of cable by the gland.
- Single seal cone grip compression gland shall comprise of Nipple with neoprene compression ring with groove for inner sheath of cable. Check nut with rubber washer to ensure dust tight joint between the enclosure and the gland. Cone and clamping ring for clamping the armour. The design of cone shall be suitable for any type of armouring i.e. wire or strip. gland body to accommodate various parts of gland with minimum clearance between walls. Compression nut to ensure perfect hold of cable by the gland.
- Single seal compression gland for unarmoured cable shall comprise of :Nipple with neoprene compression ring with groove for inner sheath of cable. Check nut with rubber washer to ensure dust tight joint between the enclosure and the gland. Gland body to accommodate various parts of gland with minimum clearance between walls. Compression nut to ensure perfect hold of cable by the gland.
- Cable lugs  

Compression type cable lugs for Aluminium / Copper cables conductors shall be tinned copper to suit the specified conductor size. The current rating of the lugs shall be same as that of the cable conductor.
- Cable Tags  

Cable tags shall be fabricated from 2 mm thick 20 mm wide aluminium strap of required Length to contain cable number, cable size etc.
- Ferrules  

Ferrules shall be of approved type, size to suit core size mentioned and shall be employed to designate the various cores of control cables by terminal numbers to which the cores are connected.

- **TESTS**

The insulation resistance of every cable laid shall be measured between phases & phase to ground before termination is made.

- **INSPECTION**

- The cables shall be checked for any physical damage during laying.
- The terminations shall be checked for phase sequence & changed if required.
- The connections shall be cross - checked with the interconnection diagrams for their correctness.
- Cable tag no. shall be checked for its correctness as per the cable schedule.

#### **4 WIRING**

- Branch circuit conductor sizes shall be as shown in the schedule of quantities and or drawings.
- Final branch circuits shall preferably be kept in a separate conduit upto the Distribution Board. No other wiring shall be bunched in the same conduit except those belonging to the same DB.
- Looping system of wiring shall be used. Wires shall not be jointed. Where joints are unavoidable, they shall be made through approved mechanical connectors. No such joints shall be made unless the length of the sub circuit, sub main or main is more than the length of the standard coil.
- Power wiring shall be distinctly separate from lighting wiring.
- Every conductor shall be provided with identification ferrules at both ends matching the drawings.
- MAINS / SUB-MAINS WIRES

Conduit wiring from lighting distribution board up to switch board and looping the phase conductor from one switch board to other as mentioned in the single line diagram shall be treated as mains / sub-mains wiring respectively. This shall be run in a conduit separate from that of point wiring. The estimated length of the conduits for the circuit wiring has been given in the schedule of quantities. This includes the length of conduits with different number of wires viz. 2, 4, 6, 8, etc.

- POINT WIRING

Point wiring shall include all work necessary to complete wiring of any length from the tapping point of distribution circuit to the following via switch

- Junction box / ceiling rose for light / fan points
- Plug points
- The following shall be deemed to be include in the point wiring –
  - Switch and switch box (for switch, fan regulator, bell push etc.)
  - Conduit and accessories such as bends, inspection bends, tees, junction boxes etc.

E-TENDER FOR STRUCTURAL REPAIR, STRENGTHENING & ROOF REPLACEMENT FOR AUDITORIUM BUILDING,  
AT SNTD JUHU CAMPUS MUMBAI.

- All fixing accessories for conduits and conduit accessories such as clamps, spacers, rowel plugs, G.I. screws etc.
- Wiring between switch and junction box / ceiling rose / plug point and wiring necessary between switch boards other than mains wiring shown in the drawing.

- POINT WIRING

Where the one lighting fixture is controlled from one switch, wiring will be from switch to fixture in case of group control, No of points will be control by one switch, wiring from switch to all fixtures controlled by that specific switch and in case of group control no of points will be controlled by one MCB, wiring will be from MCB to all fixtures controlled by that specific MCB.

- CONDUIT WIRING

- The scope of work shall cover supply, installation, testing and commissioning of all conduit wiring.

- RIGID AND FLEXIBLE CONDUITS

- PVC conduits and accessories shall be heavy gauge with wall thickness not less than 2 mm and as per IS Specifications IS – 9537.
- Flexible conduits shall be formed from a continuous length of spirally wound interlocked strip steel with a fused zinc coating on both sides. The conduit shall be terminated in brass or PVC adopters.

- ACCESSORIES

- Conduit fittings such as bends, elbows, reducers, chase nipples, split couplings, plugs etc. shall be specifically designed and manufactured for their particular application. All conduit fittings shall conform to IS:2667-1964 and IS:3887-1966. Wherever galvanised conduits are specified in the schedule of work, the fittings also shall be galvanised.

- WIRES

- All wires shall be single core multi-strand copper or single strand Aluminium, PVC insulated to IS:694 and shall be 660 V grade.
- All wires shall be colour coded as follows:

Phase	Colour of wire
R	Red
Y	Yellow
B	Blue

E-TENDER FOR STRUCTURAL REPAIR, STRENGTHENING & ROOF REPLACEMENT FOR AUDITORIUM BUILDING,  
AT SNTD JUHU CAMPUS MUMBAI.

N Black  
 Earth Green (insulated)  
 Control (If any) Grey

• SWITCHES AND SOCKETS

- Switches shall be plate type of design with silver-plated contacts. Sockets shall be of 3 pin type. All switch and socket mounting on the modular plates and concealed PVC boxes. Combination of multiple switch units and sockets should be used in appropriate manner to minimise the switch boxes.
- Weather and waterproof switches/sockets of appropriate enclosure class shall be used as specified in the schedule of work.
- For heavy duty, metal clad sockets with M.C.B. isolator mounted in a galvanised steel box shall be provided.

• INSTALLATION

- The size of conduit shall be selected in accordance with the number of wires permitted under table given below. The minimum size of the conduit shall be 20 mmdia unless otherwise indicated or approved. Size of wires shall be not less than 1.5 sq.mm copper.

Nominal dia. Of wires (mm)	Nominal Cross sec area (mm)	20 mm		25 mm		32 mm		38 mm	
		S	B	S	B	S	B	S	B
1/2.40	1.50	4	3	8	6	15	9	-	-
1/1.80	2.50	4	2	6	4	10	8	-	-
1/2.24	4.00	2	2	4	3	8	6	-	-
1/2.80	6.00	1	-	4	3	6	6	-	-
1/3.55	10.00	1	-	3	2	5	4	6	5



E-TENDER FOR STRUCTURAL REPAIR, STRENGTHENING & ROOF REPLACEMENT FOR AUDITORIUM BUILDING,  
AT SNTD JUHU CAMPUS MUMBAI.

S - runs of conduits which have distance not exceeding 4.25 m between draw boxes and which do not deflect from the straight by an angle more than 15 degree.

B - runs of conduits which deflect from the straight by more than 15 degree.

- Conduits shall be kept at a minimum of 100 mm from the pipes of other non-electrical services.
- SEPERATE CONDUITS / RECEWAYS SHALL BE USED FOR
- Normal lights and 5A 3 pin sockets on lighting circuit.
- Power outlets - 15A 3 pin 20A/30A 2 pin + scraping earth metal clad sockets
- Emergency lighting
- Telephones
- Fire alarm system
- Public address system
- CC TV System for security
- Computer and data wiring
- UPS wiring.
- Wiring for short extensions to outlets in hung ceiling or to vibrating equipment's, motors etc., shall be installed in flexible conduits. No flexible extension shall exceed 1.25 m. Otherwise rigid conduits shall be used.
- Conduits embedded into the walls be fixed by means of staples at not more than 500 mm intervals. Chases in the walls shall be neatly made with brick cutter and refilled after laying the conduit and brought to the finish of the wall but final finish will be done by the building Bidder.
- Conduits buried in concrete structure shall be put in position and securely fastened to the reinforcement and got approved by the Engineer, before the concrete is poured. Proper care shall be taken to ensure that the conduits are neither dislocated nor choked at the time of pouring the concrete. Suitable fish wires shall be drawn in all conduits before they are embedded. Where conduit passes through expansion joints in the building, adequate expansion fittings shall be used to take care of any relative movement.
- Inspection boxes shall be provided for periodical inspection to facilitate withdrawal and removal of wires. Such inspection boxes shall be flush with the wall or ceiling in the case of concealed conduits. Inspection boxes shall be spaced at not more than 12 meters apart or two 90 degree solid bends or equal. All junction and switch boxes shall be covered by 6 mm clear Perspex plate truly cut and fixed with cadmium plated brass screws. These junction boxes shall form part of point wiring or conduit wiring as the case may be including the cost of removing the Perspex cover for painting and refixing. No separate charges shall be allowed except where specially mentioned.

E-TENDER FOR STRUCTURAL REPAIR, STRENGTHENING & ROOF REPLACEMENT FOR AUDITORIUM BUILDING,  
AT SNTD JUHU CAMPUS MUMBAI.

- Conduits shall be free from sharp edges and burrs and the threading free from grease or oil. The entire system of conduits must be completely installed and rendered electrically continuous before the conductors are pulled in. Conduits should terminate in junction boxes of not less than 32 mm deep. All metallic conduits shall be earthed.
- An insulated earth wire of not less than 1.6 sq.mm copper shall be run in each conduit.

- TELEPHONE DISTRIBUTION SYSTEM

- SCOPE

The scope of work shall cover supply, installation, testing and commissioning of the telephone distribution system.

- DISTRIBUTION SYSTEM

Telephone cabling shall be used 0.5mm. diameter electrolytic tinned copper conductors duly colour coded twisted pairs with rip cord.

Cabling shall be multipair, PVC insulated, sheathed and armoured and twin pair PVC insulated wires drawn in heavy gauge PVC conduits. Cables shall conform to I.T.D. specification.

- TAG BOX

Telephone tag box shall have two terminal blocks cross connect type and shall be suitable for multipair cables. All incoming and outgoing cables shall be terminated on separate terminal blocks and all terminations shall be silver soldered. The cross connecting jumpers shall be insulated wires of the same diameter and screw connected. Tag blocks shall be mounted inside fabricated sheet steel boxes with removable hinged covers and shall be fully accessible. The enclosure shall be painted with two coats of red oxide and stove enamelled.

- INSTALLATION

The installation of conduit shall be generally as specified under section "Conduit Wiring".

The connections at the tag blocks shall be silver soldered so as to achieve minimum contact resistance.

- INSPECTION AND TESTING

- The Bidder shall offer each part of work for inspection after completion of the job.
- The sample for materials, to be provided by the Bidder, shall be got inspected and approved from the Engineering in charge before procurement of these items.
- Any faulty or defective work shall be rectified by the Bidder without any extra cost.
- The Bidder shall provide required test certificates and other documents for obtaining power supply to individual unit.

## 5 CABLE TRAYS AND STRUCTURAL STEEL

- **Scope**

This specification covers manufacturing, supply and installation of G.I. perforated cable trays of various sizes required for laying of control and power cables in EHV substation.

- **Standards**

The recommended practice of hot dip galvanizing of iron and steel and method of testing and inspection shall confirm to the requirements of the latest Indian standards. Some of these standards are listed below:

Sr. No.	Standard No.	T I T L E
1	IS:2629	Recommended practice for hot dip galvanizing of iron and steel
2	IS:2633	Methods of testing uniformity of coating on zinc coated articles
3	IS:4759	Method of determining of mass of zinc coating on zinc coated articles

- **General Technical Requirement**

- The hot dip galvanized perforated metal trays shall be made out of 16 SWG (1.6MM ) M.S. sheet. The sheet shall be CRCA.
- Each tray section shall not be more than 2.5 M. and shall be provided with side coupler plate and associated hardware.
- Side coupler shall be fabricated out of 3 mm M. S. galvanized plate with four circular and four elliptical holes.
- The trays shall be hot dip galvanized after fabrication and punching. The coating of zinc shall not be less than 340 gm / sq. M.

- **Tests**

The cable trays shall be subjected to galvanizing test.

- **M. S. Painted steel structure**

Providing fabricating, installing M.S. Painted supports in trenches, on floor, on columns, etc as per requirement for fixing of trays, panels, marshalling boxes, including painting with two coats red oxide and two coats of paint of approved shade complete as per detail technical specification.

- **Technical Specification**

M. S. fabricated supporting structures shall be provided for supporting cable trays, panels, distribution boards, lighting panels etc. as well as rail poles to be provided on the transformer foundation for installing Power transformers.

- The fabricated supporting steel shall be painted with one coat of red oxide primer and two coats of paint of approved colour.

## 6 INDOOR AND OUT DOOR LIGHT FIXTURES

- SCOPE

This specification covers the requirement of lighting fixtures for lamps, Metal Halide lamps and the associated accessories.

- CODES & STANDARDS

- The design manufacture and performance of equipment shall comply with all currently applicable status, regulations and safety codes in the locality where the fittings will be installed. Nothing in this specification shall be construed to relieve vendor of this responsibility.
- Unless otherwise specified the fittings shall conform to the latest applicable Indian Standards, British Standards or IEC Standards. Some of which are listed below :

i)	IS : 1913	:	General and safety requirements for electric lighting fittings
ii)	IS : 3528	:	Waterproof electric lighting fittings
iii)	IS : 4012	:	Dustproof electric lighting fittings
iv)	IS : 2149	:	Luminaries for street lighting
v)	IS : 5077	:	Specification for decorative lighting outfits

- DESIGN REQUIREMENTS

- Fixtures (General)

Fixtures in general shall be designed for minimum glare. All light reflecting surfaces shall have optimum light rejecting co-efficient so as to ensure Q maximum overall light output. (They shall be designed for continuous operation under atmospheric conditions specified in enclosed Project information - General' without reduction in lamp life or without deterioration of materials & internal wiring. Fixtures shall be complete with all accessories like ballast power factor improvement capacitors etc. If control gear is to be provided separately details shall be furnished.

- Reflectors

Reflectors shall be POT shaped deep drawn made out of high purity aluminium which electrochemically brightened and anodised. High transparency cover made out of clear acrylic and in single piece construction is fixed on to the housing by means of toggle clips. They shall be readily removable from the housing for cleaning and maintenance without disturbing the lamps & without use of tools. They shall be securely fixed to the housing by means of positive fastening device of captive type.

- Lamp holders & Starter Holders

Lamp holders shall be of low contact resistance, resistant to wear and suitable for operation at the specified temperature without deterioration in insulation value, contact resistance or retention of the lamp.

Those shall hold the lamp in position under normal condition of vibration. Live parts of the lamp holder shall not be exposed during insertion or removal of the lamp or after the lamp has been taken out.

➤ Ballast

The ballasts shall be of inductive, heavy duty type, filled with thermosetting, insulating, moisture repellent compound filled under pressure or vacuum. Ballast shall be provided with tapings to set the voltage within the range specified for Metal Halide lamps. End connections and taps shall be brought out in a suitable terminal block, rigidly fixed to the ballast enclosure. Separate ballast for each lamp shall be provided in case of multi lamp fixtures.

➤ Starters

Starters shall have bimetal electrodes and high mechanical strength, starters shall be replaceable without disturbing the reflector or lamp and without the use of any tool. Starters shall have brass contacts and radio interference capacitors.

➤ Capacitors

The capacitors shall be hermetically sealed preferably in a metal enclosure to prevent seepage of impregnate and ingress of moisture.

➤ Mounting

The mounting arrangement shall be side entry on bracket arms of 50 mm OD

➤ Earthing

All metal or metal enclosed parts of the housing shall be banded and connected to the earthing terminal so as to ensure satisfactory earthing continuity throughout the fixture. 2 Nos. earthing terminations with 2 plain and one spring washers, shall be provided.

➤ Painting

All the surfaces shall be thoroughly cleaned and degreased. The fixture shall be free from scale, rust, sharp edges and burrs. The housing shall be single piece die-cast aluminium which is painted grey finish.

➤ SPARE PARTS

Whether included in the manufacturer's recommendation or not, unit prices of the following items shall be quoted together, with the suggested quantities and catalogue numbers.

➤ each type of lamp

➤ each type of control boxes.

➤ Each type of reflector

➤ Ballast for Metal Halide lamps

- Power factor improvement capacitors
- Starters
- Lamp Holders
- The unit prices shall not, however, be limited to the above items. Manufacturer may recommend additional spare items and quote the unit prices of the respective items.
- TESTS & TEST REPORTS
- Type tests, acceptance tests and routine tests for the lighting fixtures and accessories covered by this specification shall be carried out as per the relevant Standards for the respective fixtures and their accessories.
- Manufacturer's type and routine test certificates shall be submitted for tests conducted as per relevant IS / BS for the fixtures and accessories.
- DRAWINGS AND DATA
- As part of the proposal, the Bidder shall furnish relevant descriptive and illustrative literature on lighting fixtures and accessories and following drawings / data from the respective lighting fixtures :
  - Dimensional drawings
  - Mounting details, cable entry facility and weights
  - Light distribution diagrams (zonal & Isocandela)
  - Light absorption and utilization factors.
  - Lamp output Vs Temperature curve.
- GENERAL REQUIREMENTS
- Fixtures shall be installed at mounting heights as detailed on the drawings or instructed on site by the Architects/Consultants.
- Fixtures and/or fixture outlet boxes shall be provided with hangers to adequately support the complete weight of the fixture. Design of hangers
- and method of fastening other than shown on the drawings or herein specified shall be submitted to the Architect / Consultant's instructions.
- Flush mounted and recessed fixtures shall be installed so as to completely eliminate light leakage within the fixture and between the fixture and adjacent finished surface.
- Fixture mounted on outlet boxes shall be tightly secured to a fixture stud in the outlet box. Extension pieces shall be installed where required to facilitate proper installation.
- Fixture shall be completely wired and constructed to comply with the regulations and standards for Electric Lighting Fixtures, unless otherwise

specified. Fixtures shall bear manufacturer's name and the factory inspection label unless otherwise approved.

- Wire insulation shall suit the temperature conditions inside the fixture and wires bypassing the choke shall be heat protected with a heat resistant sleeve.

## **7 EARTHING**

The scope of work of present contract includes all the necessary materials required for carrying out the earthing as per statutory requirements without any extra cost.

### ➤ **3.0 M long G.I. Earthing**

- Earthing shall be provided at the locations shown on the enclosed earthing layout drawing.
  - Each earthing shall comprise of a 40 mm diameter (nominal) Gal. iron pipe of standard length of 3 meters. The G.I. Pipe shall be provided with clamping arrangement as shown in the enclosed indicative drawing.
  - Two Hot dip galvanised M.S. Strips 50 x 6 mm shall be bent into two half rings around the socket of the C.I. Pipe extending on either side for clamping & bolting to the earth grid.
  - The half rings shall be bolted rigidly to the C.I. Pipe at 4 locations with 16 mm bolts & nuts.
  - The two strips shall then be bolted together on either side of pipe with 16 mm dia bolts & nuts.
  - Two pairs of holes shall be provided on either side of the flats at 65 mm spacing for bolting the earth grid conductor with 12 mm dia bolts.
  - The MS half rings shall be hot dip galvanised after shaping, drilling is completed. All bolts & nuts shall be provided with spring washers. All the hardware shall be hot dip galvanised.
- Bore Type Earthing for hard soil and rocky terrain
- Bore type earthing shall be provided in the area where soil is not normal or with Hard Murum or Rocky.
  - To prepare the Earth pit in Hard Murum or Rocky area bore shall be drilled of dia 4.5" with the help of compressor and up to a minimum depth of 10 Mtrs.
  - A 65 MM dia GI pipe 10 mtr long shall be in the base with a clamp as shown in the drawing. It should be connected to the pipe with the help of GI Nut & Bolts.
  - The bentonite compound should be filled in the bore after lowering of GI pipe electrode.
- The BB masonry chamber with plastering shall be constructed for each earthing. A 600 x 300 mm CI cover with frame shall be fixed on the chamber.

- The earthing station shall be generally as per IS 3034 and enclosed drawings.

## **8 EARTHING CONNECTION**

- On equipment to a main earthing ring. The earthing ring will be connected via links to several earth electrodes. The cable armour will be earthed through the cable glands.
- The following shall be earthed.
  - a) Transformer neutrals
  - b) Transformer Housing
  - c) All Switchgear and their earth buses
  - d) All fences/enclosures housing Electrical Equipment.
- System shall be earthed by two distinct conductors directly connected to independent earth electrodes which in turn, shall be connected to the earth loop. The earth connection shall be properly made. A small flexible aluminum cable loops to bridge the top cover of the transformer and the tank shall be provided to avoid earth fault current passing through fastening bolts when there is a lightning surge, high voltage surge or failure of the bushings.
- All hardware used for earthing installation shall be hot dip galvanised or zinc passivated. Spring washers shall be used for all earthing connections of equipment having moving parts and for all the connections subject to vibrations etc.



<b>Material Specifications</b>	
1	415 V LT Cables
	: 1.1 KV grade Copper armoured PVC sheathed as per IS : 1554.
2	Household Wires
	: 650/1100 V grade, Copper conductor, multistrand, FR type as per IS : 694
3	PVC Conduit
	: Rigid, HMS/MMS, 20/25 mm Dia as per IS: 9537, 2 KV dielectric strength with
	R > 100 MW
4	Conduit Accessories
	: Same as above as per IS: 2667 & 3887. Only deep JB to be used in slab &
	regular JB in wall work.
5	Switches & Accessories
	: Switches shall be plate type of design with silver-plated contacts. Sockets
	shall be of 5pin type. All switch and socket mounting on the modular plates and
	concealed metal boxes.
6	Tel / TV Sockets
	: Same as above but switch type.
7	Fan Regulators
	: Electronic type, 5 step, 200 w with compensating R.
8	DB's
	: Double/Single door, Powder coated, Front door lockable, IP40 degree, Earth
	terminals, concealed mounting, suitable for SPN /TPN with neutral link.
9	MCB's / ELCB's
	: MCB shall be of 3/6/10 KA rating, IP20, Thermo set DMC material, flame
	retardant, 25 sq. mm. Terminal capacity, insulated shutters, DIN rail mounting.
	ELCB shall be 30/100/300 mA, as per IS:8828 / 13947.

**APPROVED MAKES OF MATERIALS - ELECTRICAL**

<b>Sr. No.</b>	<b>Materials</b>	<b>Manufacturers</b>
1	Rigid PVC conduit with accessories	Precision, Presto Plast
2	Multistrand FR copper conductor house wires of 650v grade	Polycab, Finolex
3	Switches/Sockets/Lan, Tel Sockets/Fan Regulator/Modular Plates and Boxes	Anchor Roma, Legrand Mylink
4	Double/ Single Door IP40 Distribution Boards	Legrand, Hager
5	1.1 kV grade Power and Control Cables	Vishal, Polycab
6	3/6/10KA MCB's and 30/100/300mA ELCB's/RCBO	Legrand, Hager
7	Multipair and coaxial Tel and TV Cable	Brimson, Polycab

**LETTER OF OFFER**

To,

**The Registrar**

SNTD Women's University  
1, NathibaiThackersey Road,  
Churchgate,  
Mumbai 400 020

**Subject:** E-TENDER FOR STRUCTURAL REPAIR, STRENGTHENING & ROOF REPLACEMENT FOR AUDITORIUM BUILDING, AT SNTD JUHU CAMPUS MUMBAI

**Dear Sir,**

With reference to the tender invited by you for the above mentioned work, I/we do hereby offer to perform, provide, execute, complete and maintain the work/s in conformity with the drawings, Conditions of Tender, Articles of Agreement, Conditions of Contract, Specifications and Bill of Quantities for the sum of Rs. \_\_\_\_\_ (Rupees \_\_\_\_\_ only) at the rates quoted in the Bill of Quantities.

I/We have satisfied myself/ourselves as to the location of site, examined the drawings and read the Articles of Agreement, Conditions of Tender, Conditions of Contract and the Specifications etc. **I/We agree to finish the whole of the work/s within ---- months from the date of commencement** of ht work, fully understanding that time will be the essence of the Contract and we will pay the agreed liquidated damages in case of any delay on our part. We also agree to carry out the work with the best of workmanship and maintain a very high degree of accuracy and quality, using the best of specified construction materials. In the event of any defects occurring within one year from the date of actual completion, we agree to repair and rectify the same to the complete satisfaction of the Owner, in lieu of which, we agree to keep with the Owner the amount of Security Deposit and Retention Item, as per Conditions of Contract.

I/We further agree to abide with all requirements of the Owner in respect of any other agency involved in any other aspect of the present proposed construction work and to extend our complete cooperation to any such agency in the interest of the timely and successful completion of the project.

I/We understand that you are not bound to accept the lowest or any tender you may receive.

Yours faithfully,

**Signature of the Contractor**

Date:

Address:

Note: \* Insertion to be made by the Tenderer

**NAME OF WORK:** STRUCTURAL REPAIR, STRENGTHENING & ROOF REPLACEMENT FOR AUDITORIUM BUILDING, AT SNTD JUHU CAMPUS

ITEM NO	DESCRIPTION OF ITEM	QTY	UNIT	ESTIMATED COST		OFFERED COST	
				RATE	AMOUNT	RATE	AMOUNT
	<b>Notes :</b>						
	<b>The rate shall include the followings. No separate payment shall be made on account of these works.</b>						
1	Disposal of excavated surplus material including Transportation, obtaining required permissions for the disposal, obtaining Royalty permissions from the Government departments.						
2	Cleaning of surrounding area by removing all unwanted materials, shrubs, grass etc of existing Building & disposal of the same.						
3	Required scaffolding for Internal works of all items. No extra payment shall be made on this account.						
4	Barricating the entire periphery area to be covered with steel framing & sheets upto 3 mtr height.						
5	Dust pollution control by using Nylon net to be covered & sprinkling of water to prevent dust.						
6	Wherever required Nylon net & Safety net to be provided.						
7	Necessary Testing of various materialsto be carried out as per relevant latest IS Codes. Manufacturers test reports to be submitted. Testing of concrete to be carried out as per PWD Norms.						
8	Removal of BAT cololy & obtaining permission from						

E-TENDER FOR STRUCTURAL REPAIR, STRENGTHENING & ROOF REPLACEMENT FOR AUDITORIUM BUILDING,  
AT SNDDT JUHU CAMPUS MUMBAI.

ITEM NO	DESCRIPTION OF ITEM	QTY	UNIT	ESTIMATED COST		OFFERED COST	
				RATE	AMOUNT	RATE	AMOUNT
	the wild life department.						
9	Cement Grade - a) For all RCC works 53 Grade OPC should be used. B) For all other works 43 Grade OPC should be used.						
10	Steel props, shuttering, centering, supports required for the works.						
	<b>CLEANING</b>						
1	<b>Cleaning &amp; Removal</b> of existing shrubs, debris, lying any type of material around the periphery of building etc. including all required labours etc. complete.	Job	Lums um		50,000.00		
	<b>DEMOLITION</b>						
2	Dismantling brick masonry in lime or cement mortar and stacking the materials as directed with all leads, lifts etc	150	Cum	199.1	29,865.00		
	<b>Refer PWD SSR 2017-18, BDW 8 ITEM NO. 46.09</b>						
3	Removing the existing cement plaster of any thickness without causing dust nuisance and stacking the debris upto a distance of 50 metres or spreading in the compound and cleaning the site etc. complete. Note : Following items to be executed after prior approval of Superintending Engineer.	8790	Sqm	28.86	253,679.40		
	<b>Refer PWD SSR 2017-18, BDL 8 ITEM NO. 32.33.</b>						
4	Dismantling the R.C.C. Work 1:2:4 and sorting out the materials such as steel etc. as directed and stacking them within the specified lead as directed etc. complete.	10	Cum	862.4	8,624.00		
	<b>Refer PWD SSR 2017-18, BDW 8 ITEM NO. 46.29</b>						

E-TENDER FOR STRUCTURAL REPAIR, STRENGTHENING & ROOF REPLACEMENT FOR AUDITORIUM BUILDING,  
AT SNTD JUHU CAMPUS MUMBAI.

ITEM NO	DESCRIPTION OF ITEM	QTY	UNIT	ESTIMATED COST		OFFERED COST	
				RATE	AMOUNT	RATE	AMOUNT
5	Removing rich mix cement concrete including stacking the spoils as directed with all leads, lifts etc, complete.	10	Cum	552.2	5,522.00		
	<b>Refer PWD SSR 2017-18, BDW 8 ITEM NO. 46.13</b>						
6	Removing planking from roof or ceiling and stacking them as directed with all leads and lifts etc. complete	830	Sqm	29.97	24,875.10		
	<b>Refer PWD SSR 2017-18, BDW 8-4 ITEM NO. 46.02</b>						
7	Dismantling flat wooden or A.C. Sheet ceiling with frame work including stacking the materials as directed with all leads, lifts etc. complete.	1450	Sqm	35.52	51,504.00		
	<b>Refer PWD SSR 2017-18, BDW 8-8 ITEM NO. 46.06</b>						
8	Cutting of existing slab to make elevator shaft at required location by using diamond cutting machine including necessary tools, tackels & scaffolding including disposal of debris etc complete. Thickness upto 150mm to 200mm. (Size of slab 2.9 m x 2.4 m at First floor Lvl.)	1	Lums um		50,000.00		
9	Excavation for foundation in -----, including removing the excavated material up to a distance of 50 m. beyond the building area and stacking and spreading as directed, dewatering, preparing the bed for the foundation and necessary back filling, ramming, watering including shoring and strutting etc. complete. (Lift upto 1.5 m.)						
a	earth, soil of all types, sand, gravel and soft murum	960	Cum	137.5	132,000.00		
	<b>Refer PWD SSR 2017-18, BDA 1 ITEM NO. 21.02</b>						
b	Hard Murum	200	Cum	145.2	29,040.00		
	<b>Refer PWD SSR 2017-18, BDA 2 ITEM NO. 21.06</b>						

E-TENDER FOR STRUCTURAL REPAIR, STRENGTHENING & ROOF REPLACEMENT FOR AUDITORIUM BUILDING,  
AT SNTD JUHU CAMPUS MUMBAI.

ITEM NO	DESCRIPTION OF ITEM	QTY	UNIT	ESTIMATED COST		OFFERED COST	
				RATE	AMOUNT	RATE	AMOUNT
10	Excavation for foundation in earth, soils of all types, sand, gravel and soft murum, including removing the excavated material upto a distance of 50 metres beyond the building area and stacking and spreading as directed, dewatering, preparing the bed for the foundation and necessary back filling, ramming, watering including shoring and strutting etc. complete. (Lift from 1.5m to 3.0m)						
a	earth, soil of all types, sand, gravel and soft murum	500	Cum	149.6	74,800.00		
	<b>Refer PWD SSR 2017-18, BDA 1 ITEM NO. 21.04</b>						
b	Hard Murum	200	Cum	185.9	37,180.00		
	<b>Refer PWD SSR 2017-18, BDA 2 ITEM NO. 21.08</b>						
11	Excavation for foundation in Soft rock and old cement or lime masonry foundations including removing the excavated material upto a distance of 50 metres beyond the building area and stacking as directed, including dewatering, preparing the bed for the foundation and necessary back filling with available earth /murum, ramming, watering including shoring and strutting etc. complete (lift upto 1.5m)	25	Cum	250.8	6,270.00		
	<b>Refer PWD SSR 2017-18, BDA 4 ITEM NO. 21.14</b>						
12	Excavation for foundation in Soft rock and old cement or lime masonry foundations including removing the excavated material upto a distance of 50 metres beyond the building area and stacking as directed, including dewatering, preparing the bed for the foundation and necessary back filling with available earth/murum, ramming ,watering including shoring	30	Cum	302.5	9,075.00		

E-TENDER FOR STRUCTURAL REPAIR, STRENGTHENING & ROOF REPLACEMENT FOR AUDITORIUM BUILDING,  
AT SNTD JUHU CAMPUS MUMBAI.

ITEM NO	DESCRIPTION OF ITEM	QTY	UNIT	ESTIMATED COST		OFFERED COST	
				RATE	AMOUNT	RATE	AMOUNT
	and strutting etc. complete. (Lift from 1.5m To 3.0 m.)						
	<b>Refer PWD SSR 2017-18, BDA 4 ITEM NO. 21.16</b>						
13	Excavation for foundation in Hard rock by chiselling, wedging, line drilling, etc. including trimming and levelling the bed, removing the excavated material upto a distance of 50 metres beyond the building area stacking as directed, dewatering and back filling with available earth/murum watering, ramming etc. complete. (Lift upto 1.5 m).	5	Cum	1203.4	6,017.00		
	<b>Refer PWD SSR 2017-18, BDA 6 ITEM NO. 21.20</b>						
14	Providing dry/ trap/ granite/ quartzite/ gneiss rubble stone soling 15 cm to 20 cm thick including hand packing and compacting etc. complete.	285	Cum	1440.21	410,460.42		
	<b>Refer PWD SSR 2017-18, BDA 12 ITEM NO. 21.38</b>						
15	Providing and laying Cast in situ/Ready Mix <b>cement concrete in M15</b> of trap/ granite/quartzite/gneiss metal for bed blocks, foundation blocks and such other items including bailing out water, plywood/steel formwork, laying/ pumping, compacting, roughening them if special finish is to be provided, finishing uneven and honeycombed surface and curing etc. complete. The Cement Mortar 1:3 plaster is considered for rendering uneven and honeycombed surface only. Newly laid concrete shall be covered by gunny bag, plastic, tarpaulin etc. (Wooden centering will not be allowed.), with fully automatic micro processor based PLC with SCADA enabled reversible Drum Type mixer/ concrete Batch mix plant (Pan mixer) etc. complete. With natural						



E-TENDER FOR STRUCTURAL REPAIR, STRENGTHENING & ROOF REPLACEMENT FOR AUDITORIUM BUILDING,  
AT SNTD JUHU CAMPUS MUMBAI.

ITEM NO	DESCRIPTION OF ITEM	QTY	UNIT	ESTIMATED COST		OFFERED COST	
				RATE	AMOUNT	RATE	AMOUNT
	sand/V.S.I. quality Artificial Sand						
d	<b>Refer PWD SSR 2017-18, BDE 4 ITEM NO. 24.08</b>	167	Cum	5625.75	939,500.25		
	OPC - 53 Grade cement shall be used for all concrete & RCC works.						
	Minimum cement content for M-25 Grade (380Kg per Cum of concrete), & for M-30 Grade (400 Kg per Cum of concrete)						
16	Providing and laying Cast in situ/Ready Mix cement concrete ----- of trap / granite /quartzite/ gneiss metal for <b>R.C.C. work in foundations like raft, strip foundations, grillage and footings</b> of R.C.C. columns and steel stanchions etc. including bailing out water, formwork ,cover blocks, laying/pumping, compaction and curing roughening the surface if special finish is to be provided (Excluding reinforcement and structural steel) etc. complete, with fully automatic micro processor based PLC with SCADA enabled reversible Drum Type mixer/ concrete Batch mix plant (Pan mixer) etc. complete. With natural sand/V.S.I. quality Artificial Sand						
b	M25	9	Cum	7098.87	63,889.83		
c	M30	45	Cum	7193.465	323,705.93		
	<b>(Refer PWD SSR 2017-18, BDF 3 ITEM NO. 25.13 &amp; 25.15)</b>						
17	Providing and laying Cast in situ/Ready Mix cement concrete M-25 of trap / granite /quartzite/ gneiss metal for <b>R.C.C. columns</b> as per detailed designs and drawings or as directed including centering, formwork, cover blocks compacting and roughening						

E-TENDER FOR STRUCTURAL REPAIR, STRENGTHENING & ROOF REPLACEMENT FOR AUDITORIUM BUILDING,  
AT SNTD JUHU CAMPUS MUMBAI.

ITEM NO	DESCRIPTION OF ITEM	QTY	UNIT	ESTIMATED COST		OFFERED COST	
				RATE	AMOUNT	RATE	AMOUNT
	if special finish is to be provided and curing etc. complete. (Excluding reinforcement and structural steel).with fully automatic micro processor based PLC with SCADA enabled reversible Drum Type mixer/ concrete Batch mix plant (Pan mixer) etc. complete. With natural sand/V.S.I. quality Artificial Sand						
b	M25	13	Cum	10085.37	131,109.81		
18	Providing and laying Cast in situ/Ready Mix cement concrete in M-25 of trap/ granite/ quartzite/ gneiss metal for <b>R.C.C. beams and lintels</b> as per detailed designs and drawings or as directed including centering, formwork, cover blocks, laying/pumping, compactionand roughening the surface if special finish is to be provided and curing etc. complete. (Excluding reinforcement and structural steel).with fully automatic micro processor based PLC with SCADA enabled reversible Drum Type mixer/ concrete Batch mix plant (Pan mixer) etc. complete. With natural sand/V.S.I. quality Artificial Sand						
b	M25	43	Cum	9116.27	391,999.61		
	<b>(Refer PWD SSR 2017-18, BDF 6 ITEM NO. 25.52)</b>						
19	Providing and laying Cast in situ/Ready Mix cement concrete ----- of trap/ granite / quartzite/ gneiss metal for <b>R.C.C. slabs and landings</b> as per detailed designs and drawings including centering, formwork, cover blocks, compaction, finishing the formed surfaces with cement mortar 1:3 of sufficient minimum thickness to give a smooth and even surface or						

E-TENDER FOR STRUCTURAL REPAIR, STRENGTHENING & ROOF REPLACEMENT FOR AUDITORIUM BUILDING,  
AT SNTD JUHU CAMPUS MUMBAI.

ITEM NO	DESCRIPTION OF ITEM	QTY	UNIT	ESTIMATED COST		OFFERED COST	
				RATE	AMOUNT	RATE	AMOUNT
	roughening if special finish is to be provided and curing etc. complete.(Excluding reinforcement and structural steel).with fully automatic micro processor based PLC with SCADA enabled reversible Drum Type mixer/ concrete Batch mix plant (Pan mixer) etc. complete. With natural sand/V.S.I. quality Artificial Sand						
b	M25	32	Cum	11068.77	354,200.64		
c	M30	13	Cum	11163.37	145,123.81		
	<b>(Refer PWD SSR 2017-18, BDF 8 ITEM NO. 25.72 &amp; 25.74)</b>						
20	Providing and laying Cast in situ/Ready Mix cement concrete in ----- of trap/ granite/ quartzite/ gneiss metal for <b>R.C.C. pardi</b> of required thickness including centering, formwork, cover blocks, laying/pumping, compacting and roughening them if special finish is to be provided and curing complete.(Excluding reinforcement and structural steel).with fully automatic micro processor based PLC with SCADA enabled reversible Drum Type mixer/ concrete Batch mix plant (Pan mixer) etc. complete. With natural sand/V.S.I. quality Artificial Sand						
b	M - 25	22	Cum	12194.07	268,269.54		
	<b>(Refer PWD SSR 2017-18, BDF 11 ITEM NO. 26.19)</b>						
c	M-30	65	Cum	9051	588,315.00		
	Refer Unified Schedule of Rate 2013 Item No. CS-CW-7-b & CS-CW-17 (8550+501 = 9051/- Per Cum)						
21	Providing and fixing in position TMT - FE - 500 bar						

E-TENDER FOR STRUCTURAL REPAIR, STRENGTHENING & ROOF REPLACEMENT FOR AUDITORIUM BUILDING,  
AT SNTD JUHU CAMPUS MUMBAI.

ITEM NO	DESCRIPTION OF ITEM	QTY	UNIT	ESTIMATED COST		OFFERED COST	
				RATE	AMOUNT	RATE	AMOUNT
	reinforcement of various diameters for R.C.C. pile caps, footings, foundations, slabs, beams columns, canopies, staircase, newels, chajjas, lintels pardis, copings, fins, arches etc. as per detailed designs, drawings and schedules. including cutting, bending, hooking the bars, binding with wires or tack welding and supporting as required complete.						
b	<b>(Refer PWD SSR 2017-18, BDF 17 ITEM NO. 26.33)</b>	21	M.T.	53828.74	1,130,403.54		
22	Providing second class Burnt Brick masonry with conventional/ I.S. type bricks in cement mortar 1:6 in superstructure including striking joints, raking out joints, watering and scaffolding etc. Complete	70	Cum	6686.66	468,066.20		
	<b>(Refer PWD SSR 2017-18, BDG 5 ITEM NO. 27.05)</b>						
23	Providing and constructing masonry in Autoclaved Areaclaved (Celluar) Concrete Block of aproved manufacturer confirming to IS 2185 Part III 1984 of size (625x 240x100)mm in extra fine jointing mortar of fixoblock of Ultra Tech or equivalent in half brick thick wall including 2 hoop iron strips 25mm x 1.6mm at every third course,properly bend and bonded at ends scaffolding racking out joints and watering compete						
a	100 mm thick	25	Sqm	684.78	17,119.50		
	<b>(Refer PWD SSR 2017-18, BDI ITEM NO. 29.06)</b>						
b	Providing Autoclaved Aerated Concrete Block masonry of Ecolite or equivalent make conforming to IS:2185 (Part 3) - 1984 in extra fine jointing mortar of fixoblock of UltraTech or equivalent	150	Cum	5866.96	880,044.00		

E-TENDER FOR STRUCTURAL REPAIR, STRENGTHENING & ROOF REPLACEMENT FOR AUDITORIUM BUILDING,  
AT SNTD JUHU CAMPUS MUMBAI.

ITEM NO	DESCRIPTION OF ITEM	QTY	UNIT	ESTIMATED COST		OFFERED COST	
				RATE	AMOUNT	RATE	AMOUNT
	in superstructure including striking joints, raking out joints and scaffolding etc. Complete. (The test shall be carried out conforming to IS:6441 (Part I) - 1972)						
	<b>(Refer PWD SSR 2017-18, BDG ITEM NO. 27.15)</b>						
c	Providing Autoclaved Aerated Concrete Block masonry of Ecolite or equivalent make conforming to IS:2185 (Part 3) - 1984 in extra fine jointing mortar of fixoblock of UltraTech or equivalent in superstructure including striking joints, raking out joints and scaffolding etc. Complete. (The test shall be carried out conforming to IS:6441 (Part I) - 1972)	3	Cum	5866.96	17,600.88		
	<b>(Refer PWD SSR 2017-18, BDG ITEM NO. 27.15)</b>						
24	Providing internal cement plaster 12mm thick in single coat in cement mortar 1:4 without neeru finish to concrete or brick surfaces, in all positions including scaffolding and curing etc. complete.						
b	cement mortar 1:4	1060	Sqm	225.2	238,712.00		
	<b>(Refer PWD SSR 2017-18, BDL 2A ITEM NO. 32.04)</b>						
25	Providing internal cement plaster 20mm thick in two coats in cement mortar 1:4 without neeru finish, to concrete, brick surface, in all positions including scaffolding and curing etc. complete.	4150	Sqm	410.73	1,704,529.50		
	<b>(Refer PWD SSR 2017-18, BDL 4A ITEM NO. 32.07)</b>						
26	Providing internal cement plaster 6 mm thick in a single coat in cement mortar 1:4 without neeru finish to concrete surface in all positions including scaffolding and curing etc. complete.	3114	Sqm	156.83	488,368.62		

E-TENDER FOR STRUCTURAL REPAIR, STRENGTHENING & ROOF REPLACEMENT FOR AUDITORIUM BUILDING,  
AT SNTD JUHU CAMPUS MUMBAI.

ITEM NO	DESCRIPTION OF ITEM	QTY	UNIT	ESTIMATED COST		OFFERED COST	
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	<b>Note:- For the area where plaster have been removed, the entire masonry work shall be treated with level coat of C.M. plaster 1:4 with chemical bond coat, racking of loose masonry joints with C.M. 1:4 curing, material, labour,scaffolding etc complete.</b>						
	<b>(Refer PWD SSR 2017-18, BDL 1 ITEM NO. 32.01)</b>						
27	Providing sand faced plaster externally in cement mortar using approved screened sand, in all positions including base coat of 15 mm thick in cement mortar 1:4 using waterproofing compound at 1 kg per cement bag curing the same for not less than 2 days and keeping the surface of the base coat rough to receive the sand faced treatment 6 to 8 mm thick in cement mortar 1:4 finishing the surface by taking out grains and curing for fourteen days scaffolding etc.complete.	3635	Sqm	628.09	2,283,107.15		
	<b>(Refer PWD SSR 2017-18, BDL 7 ITEM NO. 32.11)</b>						
28	Providing and fixing chicken mesh of 22 gauge, with about 30 cm. width at the junction of R.C.C members and brick work, of approved quality including fixing mesh in position by necessary drilling in concrete /B.B.masonry and or tying by binding wire etc. complete.	13357.143	RM	89.1	1,190,121.43		
	<b>(Refer PWD SSR 2017-18, BDL ITEM NO. 32.26)</b>						
29	Providing and applying gypsum plaster ( with Gypsum material of Gypsum India / Mega Sign or equivalent make ) with finishing with gypsum material in 10 to 13	10417	Sqm	598.4	6,233,532.80		

E-TENDER FOR STRUCTURAL REPAIR, STRENGTHENING & ROOF REPLACEMENT FOR AUDITORIUM BUILDING,  
AT SNTD JUHU CAMPUS MUMBAI.

ITEM NO	DESCRIPTION OF ITEM	QTY	UNIT	ESTIMATED COST		OFFERED COST	
				RATE	AMOUNT	RATE	AMOUNT
	millimeter thickness to previously plastered surface / or on newly brick surface ( Excluding rough cast plaster ) in all position including preparing and Finishing the surface scaffolding etc.complete.						
	<b>(Refer PWD SSR 2017-18, BDL ITEM NO. 32.31)</b>						
30	Providing and applying <b>Textured Acrylic Exterior Paint</b> Including cleaning the existing surface dustfree, System in four coats as per manufacturers specifications and technical manual including required washing, cleaning and surface preparation, primer coat, 2mm thick polymer based Texture plaster finish, 1 coat acrylic Base Coat and Top Metallic Coat as manufactured by <b>RENOVA, Nitco, ASIAN, ICI DULUX</b> (or equivalent). Item shall include curing, required Scaffolding/ staging/ temporary hoisting etc. complete as required. The surface and finish acceptable to the Architect must be achieved by the contractor and any additional coats, if required, shall be at the cost of the contractor.	7270	Sqm	525	3,816,750.00		
31	Providing sills of required material 20mm to 25mm thick, on a bed of cement mortar 1:4 including cement float, filling joints with neat cement slurry, curing, polishing, rounding edges, cleaning complete. b) Granite	84	Sqm	3069.83	257,865.72		
	<b>(Refer PWD SSR 2017-18, ITEM NO. 33.22)</b>						
32	Removing brick bat coba including stacking the spoils as directed with all leads, lifts etc, complete.	180	Cum	376.2	67,716.00		
	<b>(Refer PWD SSR 2017-18, BDW 8 ITEM NO. 46.14)</b>						

E-TENDER FOR STRUCTURAL REPAIR, STRENGTHENING & ROOF REPLACEMENT FOR AUDITORIUM BUILDING,  
AT SNTD JUHU CAMPUS MUMBAI.

ITEM NO	DESCRIPTION OF ITEM	QTY	UNIT	ESTIMATED COST		OFFERED COST	
				RATE	AMOUNT	RATE	AMOUNT
33	Providing water proofing treatment to Bath and W.C. sunk by applying first coat of polymer modified semi-viscous paste prepared by applying grouting with cement slurry admixed with non shrink grout additives as per manufacturers specifications, mixing polymer of approved make (such as Master Seal 550 / SUNANDA POLYALK WP or equivalent brush bond / Roff Supercrete / Webercrete / Monobond / Perma Shield/ Hypercrate Master Crete M 81) and cement in 1:2 proportion (1 litre polymer : 2 Kg cement) or Rohnex water proofing system in two coats (1 Kg powder, 700 ml water and polymer jelly for first coat and 1 Kg powder, 500 ml water and polymer jelly for second coat) to a neatly cleaned and dust free concrete surface prepared by removing loose and deposited material with brush and water, laying glass fibre mesh of 10 x 10 specification of approved make over tacky surface of first coat of polymer followed by second coat in transverse direction, sprinkling coarse sand over it followed by protective mechanical cover of 15 to 20 mm thick polymer modified plaster to coated surface of sunk @ 2 litre per bag of cement and filling joints with non shrink compound and covering 10 years guarantee against leakage/seepage on court fee stamp paper of Rs. 500/- (excluding Brick Bat Coba and plaster below flooring) Work shall be executed by certified applicator only.	25	Sqm	1368	34,200.00		
	Refer PWD DSR 2015-16, BD/J ITEM NO.18 PAGE NO. 40						
34	Providing waterproof plaster	135	Sqm	442.08			



E-TENDER FOR STRUCTURAL REPAIR, STRENGTHENING & ROOF REPLACEMENT FOR AUDITORIUM BUILDING,  
AT SNTD JUHU CAMPUS MUMBAI.

ITEM NO	DESCRIPTION OF ITEM	QTY	UNIT	ESTIMATED COST		OFFERED COST	
				RATE	AMOUNT	RATE	AMOUNT
	in W.C. and bath 20 mm thick for dado in cement mortar 1:3 with neat finishing, floating using waterproofing compound at the rate of 1 kg. per bag of cement of approved make and manufacturer and curing (and filling joints of Nahani trap and any outlet by properly) etc. complete.				59,680.80		
	<b>(Refer PWD SSR 2017-18, BDJ ITEM NO. 31.07)</b>						
35	Providing & Laying Waterproofing Treatment to existing Terrace by Using Polymeric cementious membrane POLYALK WP by checking the existing waterproofing treatment for ascertaining damaged portion. Opening the damaged portion to expose the bar of slab and filled the same with concrete in proportion 1:2:4 with 10 mm aggregates or below and adding shrinkage compensating admixture (SUNPLEX - SUNANDA MAKE) and finish it properly to match with the surface around the patch. Clean the entire surface thoroughly and over this prepared surface, apply three coats of polymeric waterproofing coating having a breathable non toxic acrylic polymer liquid (POLYALK WP - SUNANDA MAKE), as stated above and after air curing period of 24 hours. Over this waterproofing treatment, provide 10-15 mm thick (slope 1:70) IPS as a protecting layer and finish it properly preparing bell mouth . When IPS is still wet lines shall be marked to get 300 X 300 mm pattern, to avoid shrinkage cracks, work shall be got executed through certified applicator of the product manufacturing company only and work shall be guaranteed for 5 years by	1200	Sqm	1012	1,214,400.00		

E-TENDER FOR STRUCTURAL REPAIR, STRENGTHENING & ROOF REPLACEMENT FOR AUDITORIUM BUILDING,  
AT SNTD JUHU CAMPUS MUMBAI.

ITEM NO	DESCRIPTION OF ITEM	QTY	UNIT	ESTIMATED COST		OFFERED COST	
				RATE	AMOUNT	RATE	AMOUNT
	the contractor on Rs. 500/- stamp paper including submitting written guarantee from said certified applicator.						
	<b>Refer PWD DSR 2015-16, BD/J ITEM NO.17 PAGE NO. 39</b>						
36	Providing Waterproofing of Water tanks with Dr.Fixit Pidifin2k and Dr.Fixit Safeguard and fixing of Dr Fixit Waterbar SW2020 (or equivalent BASF / FOSROC / STP) on all construction joints like slab and wall, lift joints etc. during concreting work is on. Mechanically clean the RCC slab and wall with wire brush / coir brush to free from all loose materials like dust, dirt etc. Seal all honeycombs, pin holes, joints with Polymer Modified Mortar attain SSD condition. Apply first coat of Dr Fixit Pifin2k(or equivalent BASF / FOSROC / STP) rapid chloride permeability reduction in chloride ion penetration, is 90% as per ASTM C 1202: ]on properly rendered, cleaned RCC slab and wall with brush and allow it to dry for 6-8 hrs. After drying of first coat apply second coat and sprinkled coarse sand on vertical surface. Allow 24 hrs for full cure.						
	Apply waterproof screed concrete 30-40 mm on floor and 12-15 mm waterproof plaster on vertical surface before admixed with Dr Fixit Pidiproof LW+(or equivalent BASF / FOSROC / STP) IS : 2645 : as per standard)@ 200ml per bag of cement. Cure the surface with water. Clean the surface with wire brush to remove all loose dust, dirt etc. Saturate the surface with water to reach SSD condition. Apply two coats of Dr Fixit Safeguard(or equivalent BASF / FOSROC / STP) ((pot life at30C, hrs is 60-75, Surface drying	420	Sqm	707	296,940.00		

E-TENDER FOR STRUCTURAL REPAIR, STRENGTHENING & ROOF REPLACEMENT FOR AUDITORIUM BUILDING,  
AT SNTD JUHU CAMPUS MUMBAI.

ITEM NO	DESCRIPTION OF ITEM	QTY	UNIT	ESTIMATED COST		OFFERED COST	
				RATE	AMOUNT	RATE	AMOUNT
	time at 30C as per ASTM D-1649 6-8, Water absorption as per ASTM C 870:90 – NIL, Food Grade certification PASSES-Ref-USFDA-175-300, Antifungal Activity as per EN 15458-06 ) by brush on SSD floor and wall by brush on an interval of 6-8 hrs in between 2 coats. Allow the surface for full cure of 24 hours before use. Work shall be executed by certified applicator only and shall be guaranteed for 5 years on Rs. 500/- stamp paper.						
	Refer PWD DSR 2015-16, BD/J ITEM NO.28 PAGE NO. 49						
37	Providing waterproofing treatment from outside to basement lift-pits and other under ground structures during construction. The treatment shall be started after the P.C.C. bedding for the base slab or raft slab is laid. On the P.C.C. bedding a waterproofing layer based on cement with rough shahabad stones of 20 to 25 mm thick well pointed in the joints with 1:3 C.S. 40 mm thick for floors and 20 mm thick for sides with cement float and water proofing compound as per specifications shall be laid. Then the surface shall be superimposed by regular R.C.C. raft or base slab as per design. After completion of the raft / base slab and side walls the treatment of waterproofing layer shall be continued along the outer surface of the walls upto a height of 30 cm above the adjacent ground level. (The excavation of the side around the walls shall be filled with soft earth by the contractor ). The total thickness of the treatment shall be 65 mm to 75 mm for floors and 32 mm to 38 mm for walls.	151	Sqm	1048	158,248.00		

E-TENDER FOR STRUCTURAL REPAIR, STRENGTHENING & ROOF REPLACEMENT FOR AUDITORIUM BUILDING,  
AT SNTD JUHU CAMPUS MUMBAI.

ITEM NO	DESCRIPTION OF ITEM	QTY	UNIT	ESTIMATED COST		OFFERED COST	
				RATE	AMOUNT	RATE	AMOUNT
	Refer BMC USOR 2013 CS-WP-33						
	Note: (a) Where no space is available on the outer side of the walls, the following procedure shall be adopted :- Brick masonry walls of adequate strength shall be provided by the contractors at the outside level of the walls of basement. The treatment shall then be done as described above for flooring and on the inner face of the brick masonry upto a height of 30 cm above adjoining ground level. The surface shall then be superimposed by regular R.C.C.raft slab and walls. The thickness of the treatment for floor and walls shall be same as stated above.						
	(b) As regards pile caps , footings, The treatment shall be done by providing plain cement concrete bedding in the bottom by the contractor. Over this, brick masonry of adequate thickness shall be provided by the contractor around pile caps, footings, columns and plinth beams upto the top level of the P.C.C. bedding of the main floor. The waterproofing treatment shall then be provided over the P.C.C. bedding of the floor and the inner faces of the brick masonry walls. The treatment shall be turned over the top of brick masonry wall and continued over the P.C.C. of the main basement floor. Other details shall remain as before.						
	(c) The payment for brick masonry, concrete walls and their foundation constructed to receive the waterproofing treatment will be made separately under the respective items of the tender.						
	(d) The payment for waterproofing treatment shall be on the basis of the actual area of the						

E-TENDER FOR STRUCTURAL REPAIR, STRENGTHENING & ROOF REPLACEMENT FOR AUDITORIUM BUILDING,  
AT SNTD JUHU CAMPUS MUMBAI.

ITEM NO	DESCRIPTION OF ITEM	QTY	UNIT	ESTIMATED COST		OFFERED COST	
				RATE	AMOUNT	RATE	AMOUNT
	treatment.						
	<b>IRON WORK</b>						
38	Providing and fixing mild steel grill work for windows, ventilators, etc. 15 kg/sqm as per drawing including fixtures necessary welding and painting with one coat of anticorrosive paint and two coats of oil painting complete.	180	Sqm	1065.9	191,862.00		
	<b>(Refer PWD SSR 2017-18, BDU 1A ITEM NO. 40.02)</b>						
39	Providing and fabricating structural steel work in rolled sections like joists, channels, angles, tees etc. as per detailed design and drawings or as directed including cutting, fabricating, hoisting, erecting, fixing in position making riveted / bolted /welded connections without connecting plates, braces etc. and including one coat of anticorrosive paint and over it two coats of oil painting of approved quality and shade etc. complete.	9	M.T.	57880.08	520,920.72		
	<b>(Refer PWD SSR 2017-18, BDC 2 ITEM NO. 23.01)</b>						
40	Providing & Applying paint to existing structural steel Truss members for various areas at roof including scraping,cleaning and one coat of epoxy primer & 2 coats of epoxy paint including cost of material with taxes,transportation,approved type Vertical/Hanging steel scaffolding ,labour charges for painting etc with all necessary tools & tackles,helmets,safety belts. Safety of painters and other staff along with quality of paint material & workmanship is the most essential portion of the work. The scope of work		L.S		512,000.00		

E-TENDER FOR STRUCTURAL REPAIR, STRENGTHENING & ROOF REPLACEMENT FOR AUDITORIUM BUILDING,  
AT SNTD JUHU CAMPUS MUMBAI.

ITEM NO	DESCRIPTION OF ITEM	QTY	UNIT	ESTIMATED COST		OFFERED COST	
				RATE	AMOUNT	RATE	AMOUNT
	also to be executed as per 1 Surface Preparation:- 1.1 In order to achieve the maximum durability, one or more of following methods of surface Preparation shall be followed, depending on condition of steel surface. Adhesion of the paint film to surface depends largely on the degree of cleanliness of the metal surface. Proper surface preparation contributes more to the success of the paint protective system. Manual or hand tool cleaning. 1.2 Hand tool cleaning normally consists of the following : a. Hand de-scaling and/or hammering b. Hand scraping c. Hand wire brushing						
	<b>DOORS &amp; WINDOWS</b>						
41	Providing and fixing frame with / without ventilator of size as specified with <b>Country cut teak wood for doors and windows</b> including chamfering, rounding, rebating, iron holdfast of size 300mm x 40mm x 5mm with oil painting, etc. complete						
a	<b>(Refer PWD SSR 2017-18, BDT ITEM NO. 39.01)</b>	5	Cum	142905.5	714,527.25		
42	Providing and fixing rolling shutter fabricated from steel laths of minimum thickness 0.9 mm with lock plate of 3.15 mm thickness reinforced with 35 x 35 x 5 mm angle section fitted with sliding bolts and handles for both sides, deep M.S. channel section of depth and thickness not less than 65 mm and 3.15 mm respectively with hold fast arrangements, M.S. Bracket plate 300 x 300 x 3.15 mm minimum size and shape with square bar, suspension shaft of minimum 32 mm diameter,						

E-TENDER FOR STRUCTURAL REPAIR, STRENGTHENING & ROOF REPLACEMENT FOR AUDITORIUM BUILDING,  
AT SNTD JUHU CAMPUS MUMBAI.

ITEM NO	DESCRIPTION OF ITEM	QTY	UNIT	ESTIMATED COST		OFFERED COST	
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	hood cover of M.S. sheet not less than 0.9 mm thickness and of any size at top and safety devices including mechanical gear operation arrangement consisting of worm gear wheels and worms of high grade cast iron or mild steel and one coat of red lead primer etc. complete. (I.S. 62481979) (With mechanical gear)						
a	<b>(Refer PWD SSR 2017-18, BDT 55 ITEM NO. 39.25)</b>	20	Sqm	3011.8	60,236.00		
43	Providing and fixing collapsible steel gate in one / two leaves with hot rolled vertical channels of 18 x 9 x 3 mm minimum size, crossings of M.S. flats of size 18 x 5 mm T or E section for runner of minimum 40 x 6 mm size for flange, M.S. flat for top runner of minimum size 40 x 12 mm with roller wheels confirming to grade F.G. 150 fitted with snap headed rivets of minimum size 6 mm max. spacing of vertical channels be 100 mm enclosed gate position and clear space of 150 mm between two sets of crossings with hold fasts, stoppers, spaces, handles, locking arrangement and one coat of red lead primer and oil painting etc. complete. (I.S. 105211983).	10	Sqm	2435.4	24,354.00		
	<b>(Refer PWD SSR 2017-18, BDT 57 ITEM NO. 39.26)</b>						
44	Providing antitermite treatment to the sides of flooring of the existing building as per I.S. 6313 (Part-III) by punching holes 6mm dia. drilled at a distance of 30cm. centre to centre and injecting one percent of chlorodane emulsion concentrate at the rate of 50 ml per hole and sealing by filling putty etc. complete covering 2 years	4143	Per Hole	14.3	59,244.90		

E-TENDER FOR STRUCTURAL REPAIR, STRENGTHENING & ROOF REPLACEMENT FOR AUDITORIUM BUILDING,  
AT SNTD JUHU CAMPUS MUMBAI.

ITEM NO	DESCRIPTION OF ITEM	QTY	UNIT	ESTIMATED COST		OFFERED COST	
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	guarantee on bond paper.						
	<b>(Refer PWD SSR 2017-18, BDW ITEM NO. 21.28)</b>						
45	Providing antitermite treatment around the periphery of the existing building as per I.S. 6313 (Part-III) by excavating trenches of 20cm width and exposing the sides of columns and plinth beams upto a depth of 300mm and injecting one percent of chlorodane emulsion concentrate at the rate of 2.25 litres per Rmt and refilling the trenches etc. complete covering 2 years guarantee on bond paper.	340	Rmt	38.50	13,090.00		
	<b>(Refer PWD SSR 2017-18, BDW ITEM NO. 21.29)</b>						
					-		
46	Providing general pest control services to the building to control the nuisance of cockroaches, lizards, pin bores and other insects etc. with 4 operations in a year and monthly check up.	5400	Sqm	14.30	77,220.00		
	<b>(Refer PWD SSR 2017-18, BDW ITEM NO. 21.30)</b>						
47	Providing & Fixing REBAR anchoring including drilling, cleaning, scaffolding, Labours, tools & tackles etc complete. Required chemicals grout to be used as per recommendation of manufacturers like HILTI/ as directed by structural engineer.(FOR ADDITION/ALTERATION works.)						
a	8mm dia.	10	Nos	600.00	6,000.00		
b	10mm dia.	10	Nos	750.00	7,500.00		
c	12mm dia.	10	Nos	900.00	9,000.00		
d	16mm dia.	10	Nos	1250.00	12,500.00		
e	20mm dia.	10	Nos	1500.00			



E-TENDER FOR STRUCTURAL REPAIR, STRENGTHENING & ROOF REPLACEMENT FOR AUDITORIUM BUILDING,  
AT SNTD JUHU CAMPUS MUMBAI.

ITEM NO	DESCRIPTION OF ITEM	QTY	UNIT	ESTIMATED COST		OFFERED COST	
				RATE	AMOUNT	RATE	AMOUNT
					15,000.00		
48	Providing and fixing P.V.C. Rain water pipes of ----- outer diameter and having wall thickness of 2.2 to 2.7 mm confirming to I.S. 13592-1992 including proper rainwater receiving recess with P.V.C. plug, bend, necessary fittings, such as, offsets, shoes, including fixing the pipe on wall using approved wooden cleats projecting 25mm to 40mm from face of wall a fixing with clips of approved quality and number ,filing the joint using rubber gasket with solvent cement and properly resting the shoe of pipes on C.C. or masonry blocks, including necessary scaffolding and maintenance for 3 yrs for any leakages or dislocations of pipes. All the P.V.C. fittings and additional 2 piece socket clips shall be got approved from engineer in charge etc. complete. (The contractor shall give 3 yrs guarantee bond for payment)						
a	75 MM DIA.	20	Rmt	458	9,160.00		
b	110 MM DIA. <b>(Refer PWD SSR 2017-18, BDV ITEM NO. 42.87)</b>	60	Rmt	447.33	26,839.80		
49	Kalzip or equivalent Standing Seam Double Skin Roofing System with insulation and Galvalume Liner						
	Supply and fixing of KALZIP 65/400 - Self SUPPORTED" SECRET FIX STANDING ROOFING SYSTEM IN 0.9mm THICK AA 3004 ALUMINIUM ALLOY, comprising of the following layers: i. Exterior Layer – Top layer –Kalzip 65/400 Straight profiled sheeting manufactured from Aluminum Alloy Almn1mg1- as specified in BS EN 1396						

E-TENDER FOR STRUCTURAL REPAIR, STRENGTHENING & ROOF REPLACEMENT FOR AUDITORIUM BUILDING,  
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ITEM NO	DESCRIPTION OF ITEM	QTY	UNIT	ESTIMATED COST		OFFERED COST	
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	(comparable AA 3004), minimum material thickness of 0.9 mm and STUCCO EMBOSSSED finish. The material properties are as follows:- Ultimate tensile strength: minimum 200 N/mm <sup>2</sup> 0.2% Proof Stress: minimum 185 N/mm <sup>2</sup> Modulus of elasticity:70,000 N/mm <sup>2</sup> Accessories, Aluminum ST clips – in grade 6061- T6 , of suitable height, with spacing as required for the wind loads. Detailed structural calculations shall be provided by the manufacturer for the Clip Pull out force. Each aluminum clip shall come with a 5mm height black polyamide thermal barrier pad. Other relevant accessories like, Ridge closures, gable end channels, tolerance clips, gable end clips, foam fillers etc to be included as appropriate and wherever necessary. Corrugation cavities shall be closed off from the outside and inside of the building to ensure a tight fit leaving no gaps.						
	ii. Insulation layer – Rockwool Insulation of overall thickness 100 mm and density 64 kg/m <sup>3</sup> . K-value 0.038 W/mK as per standard ASTM C-518. Fire classification as per BS 476: Part 6&7 / EN-1350-1 / UL-273. iii Vapour Barrier : 1 layer of vapor control barrier up to 150 microns thickness double sided aluminium foil iv. Galvalume Liner: 0.5 mm thick pre-coated Galvalume Liner in 35/200 Trapezoidal profile. The liner shall be with galvalume 550MPA colour coated.						
	All fasteners connecting Clips to purlins, shall be of austenitic stainless steel 304 series or higher in order to prevent corrosion / galvanic action with the components fastened.	1400	Sqm	6160	8,624,000.00		

E-TENDER FOR STRUCTURAL REPAIR, STRENGTHENING & ROOF REPLACEMENT FOR AUDITORIUM BUILDING,  
AT SNTD JUHU CAMPUS MUMBAI.

ITEM NO	DESCRIPTION OF ITEM	QTY	UNIT	ESTIMATED COST		OFFERED COST	
				RATE	AMOUNT	RATE	AMOUNT
	Item includes Designing, Supplying, installation and fixing of profiled aluminium sheeting including Clips, stainless steel fasteners, thermal barrier pads, inner closure at ridge and eaves with rivets and also providing all machineries (Straight profile machine) required for the project. Note: Purlin spacing should be 1200-1400mm.						
50	Aluminium Flashings: Supply & Fixing of 0.90 mm thick Aluminium Flashing in the same STUCCO EMBOSSSED finish as of Roof panels up to 578mm Girth	630	Rmt	1574	991,620.00		
51	Aluminium Gutter: Supply and fixing of 2 mm thick Aluminium gutters along with Aluminium Expansion joints fixed at every 12 mtrs and aluminium spouts at every Grid location. All joints in gutters shall have aluminium welding including required flashing at down take pipes. ( Minimum size of Gutter is 300 x 600 mm depth )	180	Rmt	6160	1,108,800.00		
	<b>STRUCTURAL REPAIR BOQ</b>						
52	Chipping the R.C.C. surface and cleaning the rusted reinforcement and exposed surface by wire brush mechanical device or any other established method and applying rust removing solution of approved make and quality with cotton waste swab to reinforcement and allowing to dry the same for 24 hours, brushing of loose particle and applying 1st coat of rust preventive coating of polymer and cement slurry in 1:1.5 proportion with soft brush without adding water including applying another coat of rust preventing after 4 hours allowing Air Curing for 48 hours etc. including scaffolding etc. complete.	2340	Sqm	102.8	240,552.00		

E-TENDER FOR STRUCTURAL REPAIR, STRENGTHENING & ROOF REPLACEMENT FOR AUDITORIUM BUILDING,  
AT SNDDT JUHU CAMPUS MUMBAI.

ITEM NO	DESCRIPTION OF ITEM	QTY	UNIT	ESTIMATED COST		OFFERED COST	
				RATE	AMOUNT	RATE	AMOUNT
	Spec: (As directed by Engineer in Charge)						
	<b>Refer PWD DSR 2015-16, Bd/SS ITEM NO.2 PAGE NO. 165</b>						
53	Providing and applying priming cum bonding coat of polymer of approved make and quality as approved by Engineer-in-charge and cement slurry in 1:1 proportionate by weight to concrete area by brush or any other established method etc. complete.	2520	Sqm	97.3	245,196.00		
	Spec: (As directed by Engineer in Charge)						
	<b>Refer PWD DSR 2015-16, Bd/SS ITEM NO.3 PAGE NO. 165</b>						
54	Providing and applying 15 mm thick polymer mortar to load carrying R.C.C member in two layers in proportion of 1:5:15 by weight Polymer of approved quality and make, cement and wash quartz sand with required W.C. ratio for desired consistency and applying and finishing by floating, curing after initial setting time etc. as per manufactures specification etc. complete.	1260	Sqm	865	1,089,900.00		
	Spec: (As directed by Engineer in Charge)						
	<b>Refer PWD DSR 2015-16, Bd/SS ITEM NO.4 PAGE NO. 165</b>						
55	Providing and applying 30 mm thick polymer mortar to load carrying R.C.C member in two layers in proportion of 1:5:15 by weight Polymer of approved quality and make, cement and wash quartz sand with required water cement ratio for desired consistency and applying and finishing by floating, curing after curing initial setting time etc. as per manufactures specification etc. complete.	1260	Sqm	1283.5	1,617,210.00		
	Spec: (As directed by Engineer in Charge)						

E-TENDER FOR STRUCTURAL REPAIR, STRENGTHENING & ROOF REPLACEMENT FOR AUDITORIUM BUILDING,  
AT SNTD JUHU CAMPUS MUMBAI.

ITEM NO	DESCRIPTION OF ITEM	QTY	UNIT	ESTIMATED COST		OFFERED COST	
				RATE	AMOUNT	RATE	AMOUNT
	<b>Refer PWD DSR 2015-16, Bd/SS ITEM NO.5 PAGE NO. 166</b>						
56	Providing encasement to columns/beams/pardi etc. with free flow high strength non shrink micro concrete M-35 using single component cement micro concrete shrinkage components and added with 100% by weight saturated dry stone aggregate water cement ratio shall be maintained properly as per manufactures specifications to achieve dense solid mass prepared micro concrete shall be poured properly as per in prefixed holding boards slurry tight form work properly aligned to required size and shape and well oiled air bubbles if any shall be removed by tapping the boards removing the boards after 24 hours and curing the micro concrete thoroughly for 14 days cost inclusive of shuttering, curing etc. complete. (Excluding reinforcement and preparation of damaged surface)	45000	Kg	45	2,025,000.00		
	Spec: (As directed by Engineer in Charge)						
	<b>Refer PWD DSR 2015-16, Bd/SS ITEM NO.11 PAGE NO. 168</b>						
57	Providing and injecting high performance non shrink, free from high strength antiwash Polymer Cement Grout of Krishna Conchem or equivalent by addition of water as per manufacturers specification into honeycombing area/porous concrete including drilling of holes minimum 50 mm in concrete, fixing nipples, injecting grout by suitable pump at pressure of 2.0 Kg./Cm2 and subsequently cutting/ removal of nipples and sealing of holes with epoxy putty EPW1010 etc. complete as directed by	270	Kg	338	91,260.00		

E-TENDER FOR STRUCTURAL REPAIR, STRENGTHENING & ROOF REPLACEMENT FOR AUDITORIUM BUILDING,  
AT SNTD JUHU CAMPUS MUMBAI.

ITEM NO	DESCRIPTION OF ITEM	QTY	UNIT	ESTIMATED COST		OFFERED COST	
				RATE	AMOUNT	RATE	AMOUNT
	Engineer incharge.						
	Spec: (As directed by Engineer in Charge)						
	<b>Refer PWD DSR 2015-16, Bd/SS ITEM NO.15 PAGE NO. 170</b>						
58	Providing and erecting at site self supported steel H-Frame Scaffolding only for structural repairs of column with micro concrete or columns jacketing with cross bracings of good quality without dents and corrosion to reach place of work including approaches, extensuion, working platform ladders, lifting tackle necessary wall anchores for men and materials till completion of all structural repair items of work and curring period etc. complete. The work should be caried out with all the safty measures like helmet, safety belt and adequate labour insurance under the supervision of qualifed supervisor this item should be used only for structural repair work for entire period of building. (Payment should be only once irrespective of duration of scaffolding.) etc....complete	585	Sqm	239	139,815.00		
	Spec: (As directed by Engineer in Charge)						
	<b>Refer PWD DSR 2015-16, Bd/SS ITEM NO.20 PAGE NO. 173</b>						
59	Injecting low viscosity grade epoxy grout by pressure by epoxy or grouting pump and compressor. Mixing :- Material components DR BECK 505C + EH 411 HARDNER + SOLVENT 100:50:50 weight batching. Grouting:- fill the grouting gun with resinmix, maintain desired pressure at exit (7 to 10kg/Cm2) by monitoring presure gauge at exit. Grout the material through prefixed nozzles in the structural elements till	45	Kg	1137.3	51,178.50		

E-TENDER FOR STRUCTURAL REPAIR, STRENGTHENING & ROOF REPLACEMENT FOR AUDITORIUM BUILDING,  
AT SNTD JUHU CAMPUS MUMBAI.

ITEM NO	DESCRIPTION OF ITEM	QTY	UNIT	ESTIMATED COST		OFFERED COST	
				RATE	AMOUNT	RATE	AMOUNT
	its refusal. Seal the nozzle with epoxy sealent (EPCO 1010) after the refusal. Monitor lakages through other nozzles while grouting and seal them as per the requirement. Repeat the process all the nozzles. Complete the poeration at pot life of material , grouting is continued to all the nozzles from bottom to top and not from top to bottom. Cleaning the gun and accessories:- Clean the gun ans accessories (Valves, pipes and other fixtures) with T-60 thinner / or equivelent of dr.fixit, krishna chemical, sunanda etc. after the operation to avoid jamming of gun. The work should be carried out with all the safety measures like helmet, safety belt and adequate labour insurance under the supervision of qualified supervisor etc. complete						
	Spec: (As directed by Engineer in Char						
	<b>Refer PWD DSR 2015-16, Bd/SS ITEM NO.24 PAGE NO. 175</b>						
60	Replishment / making up of lost area of reinforcement due to corrosion providing additional steel reinforcement. The steel shall confirm to IS 1786 grade Fe 415/ Fe500. Anchor the steel rebar in sound concrete body up to desired depth by structural GRADE ashenional sive Anchoer fastness Fixing of rebars is to be welded or Binded by binding wires to existing steel at regural grid as in compatibility to original design. Any additional space bars are welded to keep main reinforcement in perfect vertical position to keep the bar equidistant from center of gravity and center of mass, minimum diameter of stirrups should be 8mm dia	4500	Kg	170	765,000.00		

E-TENDER FOR STRUCTURAL REPAIR, STRENGTHENING & ROOF REPLACEMENT FOR AUDITORIUM BUILDING,  
AT SNTD JUHU CAMPUS MUMBAI.

ITEM NO	DESCRIPTION OF ITEM	QTY	UNIT	ESTIMATED COST		OFFERED COST	
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	for columns and 10mm dia for beams and maximum spacing should by 0.15m C/C of directed by the structural Engineer and designrd results, Minimum tensile strength should be 430 N/mm2 aligning be carried out with all the safety measures like like helmet, safety belt and adequate labour insurance under the supervision of qualifed supervisor. etc...complete						
	Spec: (As directed by Engineer in Charge)						
	<b>Refer PWD DSR 2015-16, Bd/SS ITEM NO.25 PAGE NO. 176</b>						
61	Providing and applying DR Becks DOBEKOT 505c resin + EH 411 Hardner as bond coat between old and new system OR GY 257 + 408 Ciba Gyegy or equivalent in prop 100:50 by mixing by grinder drill of and bit and applied by brush in two coats one after another between the tack free time period of 15 min on hard clean as old and new bond coat to take further treatment, thickness of effective surface film should be 350 microns. Further treatment of polymer mortar / micro concrete / RBR plaster should be done at lack free time of 20 mm from application at room temperature of 28 degree 33 degree C. cleaning the area, tools etc. complete,. as per the manufacturars specification The work should be be carried out with all the safety measures like like helmet, safety belt and adequate labour insurance under the supervision of qualifed supervisor etc. complete.	1800	Sqm	590.6	1,063,080.00		
	Spec: (As directed by Engineer in Charge)						
	<b>Refer PWD DSR 2015-16, Bd/SS ITEM NO.29 PAGE NO. 177</b>						



E-TENDER FOR STRUCTURAL REPAIR, STRENGTHENING & ROOF REPLACEMENT FOR AUDITORIUM BUILDING,  
AT SNTD JUHU CAMPUS MUMBAI.

ITEM NO	DESCRIPTION OF ITEM	QTY	UNIT	ESTIMATED COST		OFFERED COST	
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62	Drilling and fixing Teflon Perforated nozzles in RCC members, including Drilling 14 mm dia. 50 to 100 mm deep holes in structural members at the intervals of 600 mm in staggered manner of as directed by the consultants in RCC structural elements. Clean the holes by air blower prior to fixing nozzles. fixing of nozzles in cleaned holes. external end of nozzles to be machined to receive outlet of grouting gun. nozzle is fixed by means of epoxy by means of epoxy sealent to ensure complete sealing. Cure the system for min.12 hours. The work should be carried out with all the safety measures like like helmet, safety belt and adequate labour insurance under the supervision of qualified supervisor. etc....complete	270	Nos	56	15,120.00		
	Spec: (As directed by Engineer in Charge)						
	<b>Refer PWD DSR 2015-16, Bd/SS ITEM NO.32 PAGE NO. 179</b>						
63	Providing and erecting two legged mild steel tubular scaffolding, of width 1200 to 1500 mm largely free standing, using H frames or mild steel tubular pipes of minimum 40 mm diameter, with base plates, fixed or adjustable with necessary clamps, couplers, brackets for projections, joints pins, pullies and other accessories, including steel angle or tubular pipe bracings at adequate intervals, access platforms of metal or timber planks of span not exceeding 2.5 meters, including access ladders with intermediate platforms. The scaffolding is to be suitably braced and anchored to the building using support systems created temporarily at the openings in the walls using vertical and horizontal	7500	Sqm	194	1,455,000.00		

E-TENDER FOR STRUCTURAL REPAIR, STRENGTHENING & ROOF REPLACEMENT FOR AUDITORIUM BUILDING,  
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ITEM NO	DESCRIPTION OF ITEM	QTY	UNIT	ESTIMATED COST		OFFERED COST	
				RATE	AMOUNT	RATE	AMOUNT
	details on the entire building face, required, and safety platforms at ground level covering the entrances to the building. Item includes Providing and erecting Nylon Net covering fixed to the exterior face of scaffolding including duct tape with safety signage 'work in progress' and 'caution' boards at the ground level and demarcation of entrances to the building. The measurements will be calculated by multiplying the length of the two legged units at the center line of the 1200-1500 mm scaffold unit width x heights of the individual rows. The rates will include for the cross bracing between the rows of the scaffold units.						
	Spec: (As directed by Engineer in Charge)						
	<b>Refer PWD DSR 2015-16, Bd/SS ITEM NO.59 PAGE NO. 187</b>						
	<b>TOTAL ESTIMATED COST OF PROJECT</b>				<b>46,724,618.64</b>		
	<b>BIDDER TO OFFER REBATE FOR SALVAGEABLE MATERIALS OBTAINED FROM THE SITE.</b>						
64	Salvage / Rebate for the items like doors, windows, false ceiling framing, roofing sheets, any unwanted material having salvage value.				- <b>153,000.00</b>		
	<b>TOTAL AMOUNT AFTER REBATE OF SALVAGE MATERIALS</b>				<b>46,571,618.64</b>		

**NOTE: UNIVERSITY WILL DECIDE ABOUT SALVAGE MATERIAL OBTAINED FROM THE SITE. IF IN CASE UNIVERSITY DECIDE TO SALE SALVAGE SAPARATELY THEN CONTRACTOR HAS TO STACK THE SALVAGE MATERIAL AS AND WHERE AUTHORITY DIRECTED.**