

Surat Municipal Corporation
TRAFFIC BRTS PROJECT CELL



**NAME OF WORK: CONSTRUCTION OF CONVENTIONAL TYPE BRTS BUS SHELTER AT RATNAMALA
JUNCTION, UNDER FLYOVER BRIDGE IN NORTH (KATARGAM) ZONE, SURAT (WORK NO.1)
(2nd Attempt)**

**e-TENDER NOTICE NO. : ACE & I/C C.E./Traffic BRTS Pro. Cell/02/2026-27 (Work No.1)
VOLUME-I : TECHNICAL BID**

DOWNLOAD OF TENDER DOCUMENTS FROM website smc.nprocure.com	:	From 19/06/2026 to 09/07/2026 up to 17:00 hrs
ON LINE QUERY SUBMISSION	:	Bidder shall have to post their queries only on E-mail address brts@suratmunicipal.org on or before 01/07/2026 upto 18.00hrs.
LAST DATE OF ONLINE SUBMISSION OF TENDER	:	On or before 09/07/2026 up to 18:00 hrs.
LAST DATE OF PHYSICAL SUBMISSION OF TENDER FEES, EMD AND OTHER SUPPORTING DOCUMENTS MENTIONED IN THE TENDER (SUBMISSION IN HARD COPY)	:	On or before 17/07/2026 upto 17:00 Hrs. at the office of "Chief Accountant, Surat Municipal Corporation, Muglisara, by Speed Post/RPAD only." In sealed cover duly superscribed with name of work and tender notice no.
PROBABLE DATE OF ONLINE OPENING TECHNICAL BID	:	10/07/2026 at 10:00 hrs. onwards.
ESTIMATED AMOUNT	:	RS. 57,55,943.30 (Excluding GST)
E.M.D.	:	Rs. 58,000.00
TENDER DOCUMENT FEES	:	Rs. 2,400 + Rs.432.00(18 %GST) = Rs. 2,832.00
CLASS	:	"D"

**TENDER TO BE SUBMITTED TO:
THE CHIEF ACCOUNTANT,
SURAT MUNICIPAL CORPORATION, MUGLISARA
SURAT – 395 003.**

SURAT MUNICIPAL CORPORATION

NAME OF WORK:-CONSTRUCTION OF CONVENTIONAL TYPE BRTS BUS SHELTER AT RATNAMALA JUNCTION,UNDER FLYOVER BRIDGE IN NORTH (KATARGAM) ZONE, SURAT (WORK NO.1) (2nd Attempt)

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SURAT MUNICIPAL CORPORATION

1.0 NOTICE INVITING TENDER

(A) RECEIPT AND OPENING OF TENDER :

Online Tenders will be received from the established and reliable contractors on or before **18.00** hours on **From 19/06/2026 to 09/07/2026** on website smc.nprocure.com. The tender received after due time and date specified will not be accepted.

(B) **NAME OF WORK:-CONSTRUCTION OF CONVENTIONAL TYPE BRTS BUS SHELTER AT RATNAMALA JUNCTION, UNDER FLYOVER BRIDGE IN NORTH (KATARGAM) ZONE, SURAT (WORK NO.1) (2nd Attempt)**

- 1) Estimated Cost : RS. 57,55,943.30 (Excluding GST)
- 2) Earnest Money Deposit : RS. Rs. 58,000.00
- 3) Time Limit : 06 (Six) months(Including Monsoon)
- 4) Document Fee : Rs. 2,832.00(Including 18 % GST)
- 5) Registration required : "D" Class

(1) " Following Documents shall be submitted in HARD COPY to Surat Municipal Corporation

- . All necessary documents mentioned in Technical bid (If any).
- . Earnest Money Deposit as mentioned in the Tender.
- . Tender Fees
- . Addenda Corrigendum(if any) duly signed by Contractor

Technical Bid and Price Bid are not to be submitted in Physical Form, Please note that Non submission of Technical Bid as well as price bid does not absolve the bidders from any liability created from the bid condition and bidding process. Technical-Bid & Price Bid in Hard copy shall be submitted by Successful Bidders upon intimation from SMC."

(C) OPENING OF TENDERS :

The tenders will be opened online in presence of bidders and opening authority subject to receipt of **Tender Fees & EMD in hard copy** in account department (Main Office). But tenderer has to upload relevant documents as required /mentioned in the technical bid in **Soft Copy (By Scanning)**. The tenders will be opened in two stages i.e. Technical Bid and Commercial Bid.

(D) PURCHASE OF TENDER DOCUMENTS :

Tender Documents can be downloaded from smc.nprocure.com upto **From 19/06/2026 to 09/07/2026 upto 17.00 hrs.** Tender documents fees of **Rs. 2,832.00 (Rs. Two Thousand Eight Hundred Thirty Two)** per set which is required for submission of tender towards the cost of tender documents in cash, pay order or by demand draft of any nationalized bank, in favour of "The Commissioner, Surat Municipal Corporation" payable at Surat and shall be submitted alongwith EMD and other documents. The cost of the Tender Documents will not be refunded in any circumstances. The Surat Municipal Corporation shall not be liable for any postal delay in any case.

Demand draft for E.M.D & Tender Fee shall be submitted in electronic format only through online(by scanning) while uploading the bid. this submission shall mean that E.M.D and tender fee are received for purpose of opening the bid. Accordingly offer of those shall be opened

whose E.M.D and tender fee is received electronically. However for the purpose of realization of D.D. bidder shall send the D.D. in original through RPAD/Speed post so as to reach to Account Department (Main office) within stipulated date as mentioned in tender notice for the submission of tender FEE & E.M.D.

As per City Engineer, Note No.61, dated.05/02/2025, The EMD for the tender (EMD) and the demand draft of tender fee shall be scanned online and the tender shall be uploaded in electronic format. The details submitted in this manner shall be deemed to have received the EMD and tender fee. And accordingly the tender will be opened only for those who have received the EMD and tender Fee in electronic format. For actual payment, the tenderer has to submit the demand draft in original form through the Register Post Add./Speed Post to the Accounts Department (Main Office) within 07 (seven) days from the last date of uploading. In the first instance of non-arrival of demand draft in original at the Chief Accounts Office of Surat Municipal Corporation within the stipulated time, penaltative action shall be taken as per the table mentioned below.

Sr.No.	Tender Amount Rs. Ps.	The Penalty Amount Rs. Ps.
1	up to 1.00 cr	10,000/-
2	above Rs.1.00 cr and Rs. Up to 10.00 cr	20,000/-
3	above 10.00 cr and up to Rs.50.00 cr	30,000/-
4	above 50.00 cr more and Rs. 100.00 cr	70,000/-
5	More than 100.00 cr	1,00,000/-

If the tenderer does not deposit the penalty amount to the Municipal Corporation within 10 days and/or if the tenderer commits this type of lapse/mistake for the second time, in case of non-Submission of the demand draft in the second time, punitive action against the tenderer (in case the Penalty based actions for not submitting D.D. in original to Account Department (Main Office) by bidder shall be initiated and action shall be taken for abeyance of registration and cancellation of E-Tendering code for 6 month) Will be taken. Any documents in support of the tender bid required shall be scanned and sent online in electronic format and separate hard copies will not be accepted.

All documents in supporting of bid shall be in electronic format only through online (by Scanning) during the bidding period & hard copy will not be accepted separately.

All document must be colour scanned to be seen as original.

All the documents must be notarised with clearly displaying stamp, number and name of the notary.

- (E) **CONTRACT PERIOD :**
The total contract period is hereby fixed as **06 (Six) months (Including Monsoon)** from the **15th Day** of issuance of work order.
- (F) Tenderer must comply with and agree to all instructions & requirements in the Notice and in the Instructions to Tenderers, including requirements in the Contract Documents.
- All tenders must be submitted in the prescribed Tender form.
 - Each Tender must be accompanied by the completion Schedule.
 - Each tender must be accompanied by the Tender Security (Earnest Money Deposit) **58,000.00** as specified in the **IT-07**.
 - The successful tenderer shall execute the Contract Agreement within fiftendays after the date of Notice of award.

- (e) The successful Tenderer will be required to furnish a performance bond (Security Deposit) of an amount equal to (2 or 4%) Two or Four percent of the tendered amount. As per clause no. **IT-27**.
- (f) The successful Tenderer shall furnish insurance in accordance with the contract documents.
- (g) The Surat Municipal Corporation may withhold issuance of the Notice of proceed for a period not exceeding fifteen days after the date of execution of the contract agreement.
- (h) The tender and tender guarantee bond (Earnest Money Deposit) shall be submitted by the Agency in whose name tender has been issued. Transfer of tender documents to any other party is prohibited.
- (i) All intending tenderers will have to purchase digital signatures in order to participate in the online bidding process.
- (j) **All the applicant contractors are required to have their own employers code number under EPF Act, 1952 and are required to comply the applicable provisions of said statute regularly and totally.**
Further the contractors for services are required to produce the certified copies of paid challans in respect of employees/workers employed by said contractor in respect of work allotted by Surat Municipal Corporation, along with copies of Pay Roll and Muster Roll. If the same are not produced, the bills will not be released.

(G) **RECEIPT OF TENDER DOCUMENTS:**

The following details are to be submitted **online on** smc.nprocure.com :

- a. Document fees and EMD Details
- b. Commercial Bid
- c. Statement A to B along with all necessary supporting documents
- d. Bank solvency
- e. Pan Card
- f. GST Registration
- g. Power of attorney
- h. Partnership deed in case of Partnership firm.
- i. Affidavit of Annexure A on Non Judicial Stamp Paper of Rs.300/-
- j. Anti-Blacklist Certificate on Non Judicial Stamp Paper of Rs.300/-
- k. Undertaking on Non-Judicial Stamp paper of Rs 300

The following details shall be submitted in **hard copy** at prescribed address :

- a. Tender fees in prescribed format
- b. Earnest Money Deposit in prescribed format
- c. Affidavit of Annexure A on Non Judicial Stamp Paper of Rs.300/-
- d. Anti-Blacklist Certificate on Non Judicial Stamp Paper of Rs.300/-
- e. Other necessary documents mentioned in Technical Bid (if any)
- f. Declaration Form.
- g. Undertaking on Non-Judicial Stamp paper of Rs 300.
- h. Addenda Corrigendum if any.

Please note that commercial bid shall not be submitted in hard copy under any circumstances. This will hold the tender liable for rejection.

(H) **Tender Validity Period :**

The validity period of the tender submitted for this work shall be of one hundred twenty (120) calendar days from opening date of price bid of the work and the Tenderer shall not be allowed to withdraw or modify the tender offer on his own during the validity period.

(I) **Rights Reserved :**

Without assigning any reason, The Surat Municipal Corporation reserves the right to reject the lowest or any other or all tenders or part of its. To waive any informality or irregularity in any

tender, which in the opinion of the Surat Municipal Corporation does not appear to be in its best interest and the tenderer shall have no cause of action or claim against the Surat Municipal Corporation or its officers, employee, successors or assignees for rejection of this tender.

The Surat Municipal Corporation further reserves the right to withhold issuance of the notice to proceed, after execution of the contract agreement by the successful Tenderer. The Surat Municipal Corporation is not obliged to give reasons for any such action.

During Tender validity period, if any Tenderer withdraws or makes any modifications or additions in the terms and conditions on his own in this tender, then The Surat Municipal Corporation shall without prejudice to any right or remedy be at liberty to reject the tender and forfeit the Earnest Money Deposit in full. Such Tenderer may be disqualified from tendering for further works under the jurisdiction of The Surat Municipal Corporation.

The Surat Municipal Corporation reserves the right to increase or decrease the scope of work and split the tender in two or more parts without assigning any reason even after the award of contract.

SIGNATURE OF THE CONTRACTOR WITH SEAL.

DATE:

NAME AND ADDRESS :-

EXECUTIVE ENGINEER

BRTS PROJECT

SURAT MUNICIPAL CORPORATION

SURAT MUNICIPAL CORPORATION
TRAFFIC- BRTS PROJECT CELL

2.0 CONTRACTOR TO PLEASE READ THIS CAREFULLY

- (1) If the tender is taken in favour of the company, a power of attorney in favour of the person who may have signed the tender for the company, must accompany the tender.
- (2) Current Solvency certificate of Bank or a Revenue Officer of an amount upto 20% of the tender cost plus works on the hand still to be executed will have to be produced by the contractor.
- (3) Tenderer may pay earnest money in form of a crossed demand draft of a local Bank drawn in favour of the Municipal Commissioner. Earnest Money by cheque shall not be accepted.
- (4) In view of the latest circular of IT Department IT clearance certificate is not required. However the contractor shall give photo copy of the PAN card. Also provide GST Number and necessary documents as per Govt-resolution.
- (5) Copies of certificate as regards previous experience of **similar type of completed works of Govt. or Semi Govt. Dept., if any must accompany the tender. Also an attested copy of registration with MES, Various department of State Govt., Surat Municipal Corporation, CPWD etc.**
- (6) Declaration showing all works on hand with the contractor and the value of works that remains to be executed in each case must accompany the tender.
- (7) All pages of Schedule: 'A & B' & specification should be initialled by the contractor.
- (8) All corrections, erasures & over writing should be initialled by the contractor.
- (9) Discrepancies and adjustment of errors:- Any error in quantity or amount in Schedule-'B' showing item of words to be carried out shall be adjusted in accordance with the following rules:-
 - (a) In the event of a discrepancy between description in works and figures quoted by a tenderer in the 'rates' column, the descriptions in words shall prevail.
 - (b) In the event of an error occurring in the amount column of the Schedule- 'B' showing items of works as a result of wrong multiplication of the unit rate and quantity, the units rate shall be regarded as firm and multiplication shall be amended on the basis of the rate.
 - (c) All the errors in totalling in amount column and in carrying forwarded total shall be corrected.
 - (d) Any rounding of amounts against item 'or in totals' shall be ignored.The tendered sum so altered shall, for the purpose of the tenders, be substituted for the sum originally tendered and considered for acceptance.
- (10) (i) It may please be noted that the tender shall be considered as invalid specially, if the requirements as per instruction No.1 to 9 above are not completed before submitting the tender. Also please read carefully the face sheet and "General Rules and Direction for the guidance of contractor" of his form.
(ii) Right is reserved to reject any or all tender (s) without assigning any person (s) thereof.
- (11) In addition to the above the tender will also be liable to rejected outright if :-
 - (i) The tenderer proposes any alteration in the works specified or in the time allowed for carrying out the work or any conditions or correction made in any code or made of Schedule-'B' or specifications.
 - (ii) Any of the page or pages of the tender is removed or replaced.
 - (iii) All corrections, additions or pasted slips are not initialled by the tenderer.
 - (iv) Any erasures is made by him in the tender AND

- (v) The tenderer or in the case of a firm, each partner or person holding the power of attorney thereof does not signed or the signature/s is/are not attested by a witness on page-9 of the tender in the space for the purpose.
- (12) (1) The several documents forming the contract are the essential part of the contract and requirement occurring in one is as binding as through occurring in all, they are intended to be mutually explanatory and complementary and to described and provide for a complete work.
- (2) In the event of any discrepancy, the several documents forming the contract or in any the document, the following order or precedence shall apply:-
- (a) Dimension & quantities :-
- (i) Drawings.
 - (ii) Schedule-B of the tender form.
 - (iii) Specification.
- On drawings, figures, dimensions, unless obviously incorrect will be followed in preference to sealed dimensions.
- (b) Description :
- (i) Schedule-B of the tender form.
 - (ii) Drawings.
 - (iii) Specifications.
- In case of defective description or ambiguity, the Engineer- in-charge should issue further instructions direction in what meaner the work is to be carried out it being understood that the best modern practice is to followed. The contractor should forthwith comply with such instructions.
- (3) The contractor should take no advantage of any apparent error or omission in drawings or specification and the Engineer in charge shall make such corrections and interpretation as necessary to fulfil the intent of the Plans and specifications.
- (4) No withstanding that all proper precautions may have been taken by contractor at all the times during the progress of the work, the contract shall be held responsible for all damages whether to the work under execution or to any other property or to lives of persons during the progress of the work and the period of maintenance.
- (5) Plans are for rough guidance only when detailed plans are received from the Architect/Consultant of corporation during the course of execution the same will supersede previous plans
- (13) The contractor should appoint a qualified engineer and he must remain present on site during working hours.
- (14) The Quantity mentioned in the scheduled "B" is Tentative (indicative) for each item. Tender shall have to execute the concerned work/item as per the site condition and payment shall be made accordingly as per the actual measurement of the particular item.

TRAFFIC BRTS PROJECT CELL

E- Tender Notice (online) No. ACE & I/C C.E./Traffic BRTS Pro. Cell/02/2026-27

3.0 CHECK LIST

Sr. No.	Particulars	To be Submitted		Please O Mark as for Submission
		file to be attached Online	Hardcopy Submission	
(1)	Forwarding Letter	No	Yes	
(2)	Tender Fee	Yes	DD / PO	
(3)	EMD	Yes	DD / PO	
(4)	GST Registrationcertificates	Yes	No	
(5)	PAN card No.	Yes	No	
(6)	Professional TaxRegistration (EC/RC) certificates	Yes	No	
(7)	1. Partnership Agreement / Partnership Deed / power of attorney / Board Resolution in case of semi government / government Organization for being the tender documents etc. (if applicable)	Yes	No	
	2. Power of attorney for signing tender document etc. (if applicable)	Yes	No	
	3. Photograph of each partner or as the case maybe	Yes	No	
(8)	Solvency certificate	Yes	No	
(9)	Financial turnover certificate of last three years	Yes	No	
(10)	Certificates of successful completion of work for the works mentioned in "IT-04".	Yes	No	
(11)	A list of work on hand	Yes	No	
(12)	All the documents required as per the check list/attached annexure with the tender.	Yes	No	
(13)	Affidavit on non-judicial stamp paper of Rs. 300.00 (Annexure - A)	Yes	Yes	
(14)	Undertaking Certificate on Non Judicial Stamp Paper of Rs.300/-	Yes	Yes	
(15)	Anti-Blacklist Certificate on Non Judicial Stamp Paper of Rs.300/-	Yes	Yes	
(16)	Addenda corrigendum(s) duly sealed/ signed if applicable)	Yes	Yes	
(17)	CHECK LIST	Yes	No	

Note: -

The tenderer should be required to furnish details/certificates etc. as mentioned above otherwise their offer/tender shall be liable forrejection.

4.0 GENERAL DETAILS OF WORK IN BRIEF

1. Tenderers to note last date and time of submission of Tender Fees, EMD and other documents and that they are to be posted by Registered Post A. D. / Speed Post only.
2. Tender(Technical Bids and Documents) should be duly sealed and the covering envelope is to be only superscribed as **CONSTRUCTION OF CONVENTIONAL TYPE BRTS BUS SHELTER AT RATNAMALA JUNCTION,UNDER FLYOVER BRIDGE IN NORTH (KATARGAM) ZONE, SURAT (WORK NO.1) (2nd Attempt)**
3. Tender Security Bond for Earnest Money Deposit should be submitted as per Articles **IT-07** (Earnest Money Deposit).
4. Conditional tender will be rejected outright by the Surat Municipal Corporation, without giving any reason.
5. All information as demanded should be submitted.
6. Information regarding capability etc. as per clause No.**IT-04** (General Performance Data) should be submitted in hard copy along with tender fee and EMD.
7. Please verify before SEALING that Tender (Technical Bids and Documents) are signed, wherever required in each and every respect.

SIGNATURE OF THE CONTRACTOR WITH SEAL.
DATE:
NAME AND ADDRESS :-

EXECUTIVE ENGINEER
BRTS PROJECT
SURAT MUNICIPAL CORPORATION

5.0 INSTRUCTION TO TENDERERS

IT-01 GENERAL :

The Contract documents may be secured in accordance with the notice Inviting Tender for the work called. The work shall include supply of materials necessary for construction of the work.

IT-02 INVITATION TO TENDER:

The Surat Municipal Corporation hereinafter referred to as the Corporation will receive tenders for the **CONSTRUCTION OF CONVENTIONAL TYPE BRTS BUS SHELTER AT RATNAMALA JUNCTION, UNDER FLYOVER BRIDGE IN NORTH (KATARGAM) ZONE, SURAT (WORK NO.1) (2nd Attempt)** as per the specifications in the tender documents. The tenders shall be opened in presence of opening authority Surat in the presence of tenderers or their representatives who are present. The Corporation reserves the right to reject the lowest or any other or all tenders or part of it which in the opinion of the Corporation does not appear to be in its best interest, and the tenderer shall have no cause of action or claim against the corporation or its officers, employees, successors or assignees for rejection of his tender.

IT-03 LANGUAGE OF TENDER :

Tenders shall be submitted in English, and all information in the tender shall also be in English, Information in any other language shall be accompanied by its translation in English. Failure to comply with this may make the tender liable to reject.

IT-04 QUALIFICATIONS OF TENDERERS :

A. The Bidder should submit the enlisted documents online (Scanned) along with the Qualification Bid. If documents are insufficient or it does not match the required criteria mentioned below, the tender shall be rejected and the Price Bid of the tenderer shall not be opened.

Mainly tenderer shall fulfill following for pre-qualification,

- (a) Current Solvency certificate from bankers of schedule bank / Nationalized bank for the 20% of Estimated cost of the tender. Tenderer has to submit higher Amount of bank solvency if so desired by Commissioner.
- (b) An attested copy of registration with MES, various department of State Government, Surat Municipal Corporation, CPWD etc.
- (c) List of the works already completed in last 7 years from **(01.04.2019 to 31.03.2026)** and attested copies of certificates from head of the office concerned for completion of the works.

Following enhancement factors will be used for the cost of works executed and financial figures to common base for the value of the works completed in India.

Financial Year		Multiplying factor
One	(2025-26)	1.10
Two	(2024-25)	1.21
Three	(2023-24)	1.33
Four	(2022-23)	1.46
Five	(2021-22)	1.61
Six	(2020-21)	1.77
Seven	(2019-20)	1.95

Bidder should indicate actual figures of costs and amount for the work executed in Statement – A without accounting for the above mentioned factors.

- (d) List of work on hand.
- (e) Following Criteria should be fulfilled by tenderer
 - I. Average Annual financial turnover during the last 3 years, ending 31st March of the previous financial year, should be at least 30 % of the estimated cost. (certificate from C.A. shall be submitted)
 - II. 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. One similar completed works costing not less than the amount equal to **80 % of the estimated cost(57,55,943.30).**
 - Or
 - b. Two similar completed works costing not less than the amount equal to **50 % of the estimated cost(57,55,943.30).**
 - Or
 - c. Three similar completed works costing not less than the amount equal to **40 % of the estimates cost(57,55,943.30)**
- III. Definition of "**Similar work**" means building work likes residential buildings, Commercial buildings, Educational building, Health Centre & Hospital building with RCC framed structure.
- In addition to above the criteria regarding satisfactory performance of works, personnel, establishment, plant, equipment etc. may be incorporated according to the requirement of the Project.
- IV
 - (a) Experience certificate issued from semi Govt. / govt. Organization only will be taken in to consideration.
 - (b) The work certificate of sub-contract shall not be considered for evaluation.
 - (c) Details of 7 years experience certificate shall be fill up completely in STATEMENT - A
 - (d) List of works on hand shall be fill up completely in STATEMENT - B
 - (e) List Of Tools
 - (f) Technical Establishment/Staff.
 - V Application received from joint venture / consortium shall not be considered.
 - (a) Attested copy of partnership deed, power of attorney etc.
 - (b) Pastport size photographs of partner / all partners on relevant page of Technical Bid.
 - (c) Tenderer shall submit only one tender for the work put to this tender.
- Tenderer shall submit the certificate of Employers code number under EPF Act.

IT-05 TENDER DOCUMENTS :

Printed and online documents and set of drawings shall comprehensively be referred to as Tender documents. The several sections forming the documents are the essential parts of the contract and a requirement occurring in one shall be binding as though occurring in all. They are to be taken as mutually explanatory and describe and provide for complete works.

IT-06 EXAMINATION BY TENDERERS :

- A. At his own expenses and prior to submitting his tender, each tenderer shall (a) examine the contract Documents, (b) visit the site and determine local conditions which may effect the work including the prevailing wages and other pertinent cost factors, (c) familiarize himself with all CENTRAL, State and local laws, ordinance, rules, regulations and codes affecting the material supply including the cost of permits and licenses required for the work and (d) correlate his observations, investigations, and determinations with the requirements of the Tender Documents.
 - B. The tender quantity is approximate and may increase or decrease. Any increase or decrease in quantity will not entitle tenderer to claim any extra over the quoted rate.
 - C. Tender Documents becompleted by legible ink, checked in a responsible manner, signed, stamped and returned together with the Tender Security Bond by the stipulated date, which shall form the Tender.
- The Tenderer is required to complete :

- (i) The form of tender, including the Appendices thereto Tender Security Bond and the Tender summary duly signed and stamped.

All the pages in which entries are required to be made by the tenderer are contained in the tender documents and the tenderer shall not take out or add to or amend the text of any of the documents except in so far as may be necessary to comply with any addenda issued pursuant to Clause IT-17 hereof.

IT-07 EARNEST MONEY DEPOSIT:

- A. ~~The Tender shall be accompanied by of Earnest Money Deposit RS. 58,000.00. The tenderer shall pay Earnest Money Deposit to the extent of 50% in the form of Bank Guarantee from the Nationalized/Schedule Bank only. The balance 50% of the Earnest Money Deposit is to be deposited by pay order/demand draft issued in favour of Commissioner, Surat Municipal Corporation, Surat through Nationalized/Schedule Bank only.~~ The tenderer shall pay Earnest Money Deposit to the 100% in the form of Pay Order/ Demand Draft from the Nationalized Bank only issued in favour of Commissioner, Surat Municipal Corporation, Surat through Nationalized Bank only payable at Surat. The earnest money deposit in the form of FDR or Cheque shall not be accepted
The instruments for Earnest Money Depository shall be issued by or payable/encashable at Surat Branch of the said nationalized bank.
~~The Earnest Money Deposit in the form of FDR or cheque shall not be accepted. The validity of bank guarantee shall be for minimum period of 180 days.~~ The tenderer shall have to mention details of Earnest Money Deposit on the sealed cover of Earnest Money Deposit. The tender received without Earnest Money Deposit shall be out rightly rejected.
- B. The Earnest Money Deposit (Tender guarantee) will be forfeited in the event, the successful tenderer fails to accept the contract and fails to submit the Performance guarantee (Security Deposit) to the SMC as stipulated in this tender documents within ten days after receipt of notice of award of contract. In such case owner may disqualify the tenderer from tendering for further works, under the jurisdictions of the Corporation (S.M.C.).
- C. The Earnest Money Deposit of the successful tender shall be returned after the Performance guarantee (Security Deposit) as required, if furnished by the successful contractor.
- D. No interest shall be paid by the owner on any tender guarantee.
- E. **As per City Engineer, Note No.61, dated.05/02/2025,** The EMD for the tender (EMD) and the demand draft of tender fee shall be scanned online and the tender shall be uploaded in electronic format. The details submitted in this manner shall be deemed to have received the EMD and tender fee. And accordingly the tender will be opened only for those who have received the EMD and tender Fee in electronic format. For actual payment, the tenderer has to submit the demand draft in original form through the Register Post Add./Speed Post to the Accounts Department (Main Office) within 07 (seven) days from the last date of uploading. In the first instance of non-arrival of demand draft in original at the Chief Accounts Office of Surat Municipal Corporation within the stipulated time, penaltative action shall be taken as per the table mentioned below.

Sr.No.	Tender Amount Rs. Ps.	The Penalty Amount Rs. Ps.
1	up to 1.00 cr	10,000/-
2	above Rs.1.00 cr and Rs. Up to 10.00 cr	20,000/-
3	above 10.00 cr and up to Rs.50.00 cr	30,000/-
4	above 50.00 cr more and Rs. 100.00 cr	70,000/-
5	More than 100.00 cr	1,00,000/-

If the tenderer does not deposit the penalty amount to the Municipal Corporation within 10 days and/or if the tenderer commits this type of lapse/mistake for the second time, in case of non-Submission of the demand draft in the second time, punitive action against the tenderer (in

case the Penalty based actions for not submitting D.D. in original to Account Department (Main Office) by bidder shall be initiated and action shall be taken for abeyance of registration and cancellation of E-Tendering code for 6 month) Will be taken. Any documents in support of the tender bid required shall be scanned and sent online in electronic format and separate hard copies will not be accepted.

- F. Where the contractor is required to submit bank guarantee against payment towards any deposit e.g. EMD, SD, etc., such bank guarantee shall be produced only from any one of the following Nationalized/Schedule banks as listed below :

❖ All Nationalized Banks			
Sr.	Name of Banks	Sr. No.	Name of Banks
1	AXIS Bank	23	South Indian Bank
2	AU Small Finance Bank	24	Standard Chartered Bank
3	Bandhan Bank	25	Tamilnad Mercantile Bank
4	City Union Bank	26	Ujjivan Small Finance Bank
5	CSB Bank	27	YES Bank
6	DBS Bank India Limited	28	Ahmedabad Mercantile Co-op. Bank
7	DCB Bank	29	Nutan Nagrik Sahkari Bank Ltd.
8	Dhanlaxmi Bank	30	Rajkot Nagarik Sahakari Bank Ltd.
9	Equitas Small Finance Bank	31	Saraswat Co-Operative Bank Ltd
10	FEDERAL Bank	32	SBPP Co-operative Bank Ltd.
11	HDFC Bank	33	SVC Co-Operative Bank Ltd.
12	HSBC Bank	34	The Cosmos Co-op Bank Ltd.
13	ICICI Bank	35	The Gujarat State Co-operative Bank
14	IDBI Bank	36	The Surat District Co-op Bank
15	IDFC First Bank	37	The Surat People's Co. Op. Bank Ltd
16	Indusind Bank	38	The Baroda Central Co-operative Bank
17	Jammu and Kashmir Bank	39	The Panchmahal District Co-operative Bank
18	Jana Small Finance Bank	40	The Kalupur Commercial Co-op. Bank
19	Karnataka Bank	41	The Rajkot Commercial Co-operative Bank
20	Karur Vysya Bank	42	The Banaskantha Mercantile Co-op. Bank Ltd.
21	Kotak Mahindra Bank	43	Gujarat Gramin Bank
22	RBL Bank		

~~All the eligible banks are instructed to collect the original documents/papers guarantee from the concerned tendering authority. Such bank guarantee should be encashable at Surat~~

- ~~(A) Guarantees issued by the following banks will be accepted as SD/EMD on a permanent basis:~~
- ~~(B) Guarantees issued by the following Banks will be accepted as SD/EMD for the period up to March 31, 2027. The validity cut-off date in the GR is with respect to the date of issue of Bank Guarantee irrespective of the date of termination of Bank Guarantee.~~

IT-08 ~~INCOME TAX CLEARANCE CERTIFICATE :~~

~~In view of the latest circular of IT Department IT clearance certificate is not required. However the contractor shall give Xerox copy of the PAN card and last three years income tax return.~~

IT-09 PREPARATION OF TENDER DOCUMENTS :

Tenderers are requested to note the following while preparing the Tender Documents:

- A. Technical bid, EMD and Tender fees shall be submitted on the Tender Form bound herein in English. All tender items and statements shall be properly filled in. Numbers shall be stated both in words and in figures where so indicated, and signatures of all persons signing shall be in longhand.

- B. Technical Bid shall be accompanied by the prescribed tender security bond and other required documents and drawings. All witnesses and sureties shall be persons of status and probity and their full names, occupations and address shall be stated below their signatures. All signatures in the Tender Documents shall be dated.
- C. Variations to the Contract Documents requested by the tenderer may be affixed to the Tender Document in the space available and duly signed and stamped. Such variations may be approved or refused by the Engineer at the time of adjudications of Tenders, and in either case the Engineer is not obliged to give reasons for his decisions.
- D. Delivery of Tenders shall comply with Notice inviting tenders as to place, date and time.
- E. Price Bid shall be submitted online. Tenderers are requested to quote for all four parts of the tender.

IT 10 SUBMISSION OF TENDERER DOCUMENT :-

1. **Following documents shall be submitted in HARD COPY TO Surat Municipal Corporation: non submission of Technical Bid as well as price bid does not absolve the bidders from any liability created from the bid condition and bidding process. Technical-Bid and Price Bid in hard copy shall be submitted by Successful bidder upon intimation from Surat Municipal Corporation.**
 - **E.M.D & Tender Fee shall be submitted in electronic format only through online(by scanning) while uploading the bid. This submission shall mean that E.M.D and tender fee are received for purpose of opening the bid. Accordingly, offer/tenders of those tenderers whose E.M.D & tender fee is received electronically, shall be opened. However, for the purpose of realization of EMD and Tender fee, bidder shall send the EMD as well as Tender fee in required format in original through RPAD/Speed post so as to reach to Account Department (Main office) within stipulated date as mentioned in tender notice for the submission of tender FEE & E.M.D .(Also refer IT-07)**
 - **All documents must be colored scanned to be seen as original.**
 - **All the documents must be notarized with clearly displaying stamp, number and name of the notary.**
- "Following Documents shall only be submitted in HARD COPY to Surat Municipal Corporation by all bidders."**
- Earnest Money Deposit as mentioned in the Tender.
 - Tender Fees as mentioned in the tender
 - Affidavit of Annexure A on Non Judicial Stamp Paper of Rs.300/-
 - Anti-Blacklist Certificate on Non Judicial Stamp Paper of Rs.300/-
 - Other necessary documents mentioned in Technical Bid (if any)
 - Declaration Form.
 - Undertaking on Non-Judicial Stamp paper of Rs 300/-.

All necessary documents mentioned in Technical bid (if any). shall be submitted online.

(i) COVER-1 : Technical Bid

E.M.D and Tender Fees for the work of **CONSTRUCTION OF CONVENTIONAL TYPE BRTS BUS SHELTER AT RATNAMALA JUNCTION, UNDER FLYOVER BRIDGE IN NORTH (KATARGAM) ZONE, SURAT (WORK NO.1) (2nd Attempt)**. along with other Documents in Hard Copy on or before **17/07/2026 up to 17:00 Hrs.** Also mention the name of tenderer, address, tender notice number etc. on the cover.

The name of work to be written on cover shall be work of **CONSTRUCTION OF CONVENTIONAL TYPE BRTS BUS SHELTER AT RATNAMALA JUNCTION, UNDER FLYOVER BRIDGE IN NORTH (KATARGAM) ZONE, SURAT (WORK NO.1) (2nd Attempt)**. Also mention the name and the address of tenderer, tender notice number on the cover and to be submitted to the **Chief Accountant, Surat Municipal Corporation, Muglisara, Surat – 395 003.**

(ii) **PRICE BID**

Price bid for the work of **CONSTRUCTION OF CONVENTIONAL TYPE BRTS BUS SHELTER AT RATNAMALA JUNCTION, UNDER FLYOVER BRIDGE IN NORTH (KATARGAM) ZONE, SURAT (WORK NO.1) (2nd Attempt)** shall be submitted online.

2. Tenderer shall be required to submit the enlisted documents as mentioned below in Cover-1. If necessary document founds insufficient then the Price Bid of the tenderer shall not be opened.
 - (a) The tender shall be accompanied by Earnest Money Deposit of **58,000.00**. The tenderer will pay Earnest Money Deposit by Pay Order/Demand Draft issued in favour of "Commissioner, Surat Municipal Corporation, Surat" by Nationalized Bank. In the form of Demand Draft and Bank Guarantee.
 - (b) A covering letter detailing various considerations considered in tender shall invariably be given.
 - (c) Passport size photographs of all the partners (in case of partnership firm) to be fixed on relevant Page of the tender documents.
3.
 - (a) List of tools, plants and equipments with tenderer in detail.
 - (b) Technical establishment/staff of the tenderer in required Performa with their names, qualifications and experience.
 - (c) Tenderer shall furnish along with the tender, information regarding Income tax circle of the district in which he is assessed for income tax with PAN No.
4. Submission of a tender by a tenderer shall mean that he has read this notice and contract documents and has made himself aware of the scope and specifications of the work to be done and of conditions and nature of required quantities of materials stores, tools and plants etc. that may be required by him in carrying out the work and of local conditions and laws and bylaws of the Government, Surat Municipal Corporation and other factors bearing influence on the execution and cost of the works.
5. E.M.D., Tender Fee and other necessary document in hard copy shall be received by Registered Post A.D. or by Speed Post through Postal Authority only by the "Chief Accountant, Surat Municipal Corporation, Muglisara, Surat-395003 on During **Dt. 10/07/2026 to 17/07/2026 up to 17.00 hrs.**
Opening of Technical Bid along with other Documents submitted online through on Dt. **10/07/2026, 10.00 hrs. (Technical Bid) onwards (Probable)** in the presence of the tenderers, who shall remain present in the office of "Tender opening officer, Surat Municipal Corporation, Surat. Late tenders (i.e. tenders received after the specified time of opening), delayed tender (i.e. tenders received before the time of opening but after due date and the time of receipt of tender) shall not be considered at all. Tenders received by Registered Post A.D./ Speed Post after the time and the date specified in the tender notice shall not be received by the client from the postman. Such tenders if received will not be opened and will stand rejected.
6. Tender shall stand rejected if:
 1. Any eraser is made in the tender unauthenticated or any page or pages is/are removed or replaced.
 2. The tenderer shall submit the tender which satisfied each and every conditions laid down in the notice tender documents, failing which the tender will be liable for rejection.
 3. Tenderer's tender/quotation containing conditions shall be liable for rejection out rightly without assigning any reason for the same.
 4. Stipulates the validity period less than what is stated in the form or tender.
 5. Stipulates his own conditions.
 6. Does not quote his rates inclusive of Octroi duty and other terminal or sales tax or CENTRAL taxes in his rates.
 7. Does not disclose the full names and address of all his partners in the case of partnership firm.
 8. Does not pay the Earnest Money Deposit by Demand Draft/Pay order and Tender Fees with Technical Bid (Cover-1).
 9. Does not submit the tender before the stipulated time and specified date in the Account Office as directed.

10. Does not attached the document mentioned.
11. The tenderer proposes any alteration in the work specified in the tender or in the time limit allowed for carrying out the work or any other condition.
7. All corrections, additions or posted slips to be initialed by the tenderer.
8. All page of tender documents including specifications should be initialed by the contractor.
9. The tenderer shall submit the tender which satisfies each and every conditions laid down in this notice and tender documents failing which the tender is liable for rejection.
10. Notice of inviting tenders shall be a part of the contract documents.
11. Acceptance of tenderer/quotation will rest with the competent authority of Surat Municipal Corporation who does not bind himself to accept the Traffic B.R.T.S. Project Cell and reserves the right to accept or to reject any or all quotations/tenders and no reasons will be given for acceptance or rejection thereof.
12. The contractor shall also attach list of machineries, tools, plants, equipments which he propose to deploy for this work.
13. All octroi duty and other taxes chargeable by the Municipal Corporation shall be payable by the Contractor.
14. Tender once accepted shall be binding on the contractor even if the formal agreement is not signed.
15. Tender once offered can not be withdrawn except with the permission of head of the concerned department, Surat Municipal Corporation, Surat.
16. The successful tenderer shall be required to enter in to agreement with Municipal Corporation after placing the work order for the said work from SMC.
17. The successful tenderer may be required to furnish surety of 20% of the contract value on stamp paper if so desired by the Municipal Commissioner.
18. The tenderers are requested to give complete specification of work quoted.
19. Unless specifically mentioned by the tenderer for the extra payment of taxes on price quoted by them it will be presumed the prices quoted are inclusive of the all taxes and no claim will be entertained for payment of extra taxes on the bills submitted by them.
20. The Price-bid will be opened only after technical clarifications are clarified.
21. Surat Municipal Corporation reserves the right to open or not to open any or all Price-bid without assigning any reason thereof.

IT-11 TENDER VALIDITY PERIOD :

The validity period of the tender submitted for this work shall be of one hundred twenty (120) Calendar day from the date of opening of price bid and that the tenderer shall not be allowed to withdraw or modify the tender offer on his own during the validity period. The tenderer will not be allowed to withdraw the tender or make any modifications or additions in the terms and conditions of his own in his tender. If this is done then the owner shall, without prejudice to any right or remedy, be at liberty to reject the tender and forfeit the Earnest Money Deposit in full.

IT-12 SIGNING OF TENDER DOCUMENTS :

If the Tender is made by an individual it shall be signed with his full name above his current address. If he tender is made by a Proprietary firm it shall be signed by the proprietor above his name and the name of his firm with his current address.

If the tender is made by a firm in partnership it shall be signed by all the partners of the firm above their full names and current addresses, or by a partner holding the power of attorney for the firm signing the Tender in which case a certified copy of the power of attorney shall accompany the Tender. A certified copy of the partnership deed, current addresses of all the partners of the firm shall also accompany the tender.

If the tender is made by a limited company or a limited Corporation, it shall be by a duly authorised person holding the power of attorney for signing the Tender in which case a certified copy of the power of attorney shall accompany the Tender. Such limited company or Corporation may be required to furnished satisfactory evidence of its existence before the contract is award.

All witnesses and sureties shall be persons of status and probity and their full names, occupations and addresses shall be stated below their signatures. All signatures in the Tender document shall be dated.

IT-13 WITHDRAWAL OF TENDERS :

If, during the Tender validity period, the Tenderer withdraws his Tender, the Tender Security (Earnest Money) shall be forfeited and the Tenderer may be disqualified from tendering for further works under the jurisdiction of SURAT MUNICIPAL CORPORATION.

IT-14 INTERPRETATIONS OF TENDER DOCUMENT :

Tenderers shall carefully examine the tender documents and fully inform themselves as to all the conditions and matters which may in any way effect the work or the cost thereof. Should a tenderer find discrepancies or omission from the specifications or other documents, or should be in doubt as to their meaning, he should at once address query to the Divisional Head provided for concerned authority as referred in the Tender Document in Clause GC-01 (Definitions and interpretations) of the (General Condition of Contract). Any resulting interpretation of the Tender documents will be issued to all Tenderers as an addenda corrigendum. Verbal clarification and / or information given by the SMC / Consulting Engineer shall not be binding on the Municipal Corporation.

IT-15 ERRORS AND DISCREPANCIES IN TENDERS :

In case of conflict between the figures and words in the rates, the rates expressed in words shall prevail and apply in such cases.

IT-16 MODIFICATION OF DOCUMENTS :

Modification of specifications and extension of the closing date of the tender, if required, will be made by an addendum. Copies of each addendum will be sent to all tenderers. These shall be Signed and shall form a part of tender. The tenderer shall not add to or amend the text of any of the documents except in so far as may be necessary to comply with any addenda.

IT-17 ADDENDA

Addenda form part of the contract documents & full consideration shall be given to all addenda in the preparation of tenders. Tenderers shall verify the number of addenda issued, if, any and acknowledge the receipt of all Addenda in the Tender. Failure to acknowledge may cause the Tender to be rejected.

A. The Engineer of the owner may issue Addenda to advise Tenderers of changed requirements. Such addenda may modify previously issued Addenda.

B. No Addendum may be issued after the time stated in Notice Inviting Tenders.

IT-18 TAXES AND DUTIES ON MATERIAL :

GST(goods and service tax) has come in existence from 1st July 2017 contractor / successful bidder is bound to pay any amount of GST prescribed by the Govt. of India as per the term of contract agreed upon during the course of execution of this contract.

During the course of execution of contract, if there is any change in rate of GST (Goods & Service Tax) by the Government, The same shall be reimbursed / recovered separately by SMC. Subject to the submission of original Receipt / Proof for the amounts actually remitted by the successful Tenderer / contractor to the competent Authority along with a Certificate from Chartered Accountant of Contractor / Successful Bidder certifying that the amount of GST paid to the Government and the same shall be intimated / submitted / claimed within 30 (Thirty) Days from the date of payment Remittance of GST within stipulated period shall be the sole responsibility of the successful Bidder / Contractor, Failing which , SMC may recover the amount due, From any other payable dues with SMC and decision of Municipal Commissioner shall be final and binding on the Contractor / Successful Bidder in this regard further, the non-payment of GST to the Government may lead to the termination of contract and forfeiture of Security deposit / Performance Guarantee Amount.

If imposition of any other new Taxes / Duties / Levies / Cess or any other incidentals etc. or any increase in the existing Taxes / Duties / Levies / cess or any other incidentals etc. **(Excluding GST)** are imposed during the course of the contract. The same shall be borne by the Contractor / Successful Bidder only. In no case SMC shall be liable for the same.

1% Construction Cess will be deducted from respective R.A. Bill and Final bill in accordance with the prevailing norms of Govt. of Gujarat.

IT-19 EVALUATION OF TENDERS :

As per IT (04), Experience of the Contractor shall be considered for Similar kind of works.

IT-20 EVALUATION OF TIME REQUIRED FOR COMPLETION :

The time required for completion of work shall be considered as indicated by the tenderer in the completion schedule attached with the tender. The completion period mentioned in this schedule is to be reckoned from 11th day from the date of work order to proceed. Total completion period is calendar months from 11th day from date of issue of work order and tenderers should adhere to this delivery time.

IT-21 POLICY FOR TENDER UNDER CONSIDERATION :

Tenders shall be termed to be under consideration from the opening of the tender until such time an official announcement of award is made.

While tenders are under consideration, tenderers and their representative or other interested parties are advised to refrain from connecting by any means Municipal Corporation or representatives on matters related to the tenders under study. The Engineer's representative if necessary will obtain clarification on tenders by requesting information from any or all the tenderers either in writing or through personal contact, as may be necessary. The tenderers will not be permitted to change the substance of his tender after price submission. Non-compliance with this provision shall make the tender liable for rejection.

IT-22 PRICES AND PAYMENTS :

The tenderer must understand clearly that the price quoted are for the total works or the part of the total works quoted for and include all costs due to materials labour, equipment, supervisions, other services, royalties and Octroi etc. and to include all extras to cover the cost. No claim for additional payment beyond the prices quoted will be entertained and the tenderer will not be entitled subsequently to make any claim on any ground excepting for the condition laid down in GC-35 (Price Adjustment).

IT-23 PAYMENT TERMS :

The terms of payment are defined in the General Conditions of Contract. The Municipal Corporation shall not under any circumstances relax, their terms of payment and will not consider any alternative payment terms. Tenderers should therefore in their own interest note this provision to avoid rejection of their tenders.

IT-24 AWARD :

Award of the Contract or the rejection of tenders will be made during the Tender validity period stated in the Notice Inviting Tenders.

- A. After all contract contingencies are satisfied and the Notice of Award is issued, the successful Tenderer shall execute the Contract Agreement within the time stated in the Notice Inviting Tenders and shall furnish the Bond as required herein. The Contract Agreement shall be executed in the form stipulated by the owner. A copy of the required form is included in the contract documents.
- B. If the Tenderer receiving the Notice of Award fails or refuses to execute the Contract Agreement within the stated time limit or fails or refuses to furnish the Bond as required herein, the SMC may annul his award and declare the tender security forfeited.
- C. A Corporation, Partnership firm or other consortium acting as the Tenderer and receiving the Award shall furnish evidence of its existence and evidence that the officer signing the Contract Agreement & Bonds for the Corporation, partnership firm or other consortium acting as the Tenderer is duly authorised to do so.

IT-25 SIGNING OF CONTRACT :

The successful tender shall be required to pay the security deposit and to execute the contract within 15 days of receipt of intimation to execute the contract, failing which the Municipal Corporation will be entitled to annul the award and forfeit the Earnest Money Deposit. The person to sign the contract document shall be person detailed in Article IT-12.

IT-26 DISQUALIFICATION :

A. tender shall be disqualified and will not be taken for consideration if :-

- (a) The outer envelope does not show on the outside the reference of bid and thus get opened before the due date of opening (as per Article IT-10 i.e. Submission of Tender Document).
- (b) The tender Security Deposit is not deposited in full and in the manner i.e. Earnest Money Deposit.
- (c) The tender is in a language other than English or does not contain its English Translation in case of other language adopted for tender preparation.
- (d) The tender documents are not signed by an authorised person.
- (e) The general performance data for qualification not submitted fully.
- (f) The tenderer does not agree to deposit security amount as specified (as per Article IT-25 i.e. Signing of Contract).
- (g) The tenderer does not agree to payment terms defined as per Article IT-23 i.e. Payment Terms.)
- (h) Conditional tender.

B. Tenderer may further be disqualified if :

- (a) Price variation is proposed by the Tenderer on any principles other than provided in the Tender Documents.
- (b) Completion schedule offered is not consistent with the completion schedule defined and specified in tender documents.
- (c) The validity of tender is less than that mentioned in Article IT-11 i. e. Tender Validity Period.
- (d) Any of the page or pages of tender is/are removed or replaced.
- (e) All corrections or pasted slips are not initialed by tenderer.
- (f) Any erasure is made in the tender.

IT-27 PERFORMANCE GUARANTEE (SECURITY DEPOSIT) :

The total Security Deposit is 4% (Four) percent of contract value and shall be as under:

The successful tenderer shall have to pay initial security deposit at 2% (two) percent of the tendered amount.

- Initial Security Deposit (2%) shall be paid in form of Cash or Demand Draft/ Pay Order if the Tender Amount of work is **less than Rs. 2.00 crore.**
- Initial Security Deposit (2%) shall be paid in form of Cash or Demand Draft/ Pay Order / bank Guarantee (encashable at Surat city)/ FDR if the tender Amount of work is **more than Rs. 2.00 crore & 2.00 crore.**

The person/persons whose tender may be accepted [here-in after called the Contractor, which expression shall unless excluded by or repugnant to the context include his heirs, executors, administrators and assignees shall (within 15 days of the receipt by him of the notification of the acceptance of his tender) deposit with Municipal Commissioner cash or Government securities endorsed to the Commissioner sum sufficient which will make up the full security deposit specified in the tender.

If the amount of the security deposit to be paid in lump sum within the period specified above is not paid the tender contract already accepted shall be considered as cancelled. The security deposit lodged

by Contractor shall be refunded after the expiry of the Defects Liability period as shown in the attached Memorandum after deducting dues, if any, which become liable to be recovered from the Contractor under the terms and conditions of this Agreement.

Regarding remittance and release of Security Deposit (SD), Retention money deposit (RMD) following clause will supersede over and above all the clauses depicted in the tender document.

Tender costing Less than Rs.2.00 Crore.

(a) Remittance of SD/RMD

- (i) The total security deposit shall be recovered at the rate of 4% from contractor. Out of which, 50% of amount as Initial Security Deposit shall be payable at the rate of 2% of approved tender cost in form of Cash or Demand Draft/ Pay Order of any Nationalised Bank (encashable at Surat city).
- (ii) The remaining amount of the Security Deposit i.e. 2% to be deducted from each running account bill.
- (iii) 5% Retention money deposit (RMD) to be retained from each running account bill.

(b) Release of SD/RMD

- (i) The 2% Initial security deposit **in form of Cash or Demand Draft/ Pay Order** shall be released after clearance of Final bill by Audit Dept.
- (ii) Remaining 2% of work done in terms of performance security deposit deducted from the running and final bill shall be refunded at the end of the defect liability period, after payment of final bill and after rectifying the defects found.
- (iii) 5% Retention money deposit (RMD) to be released along with final bill.

Tender costing Rs.2.00 Crore. & more than Rs.2.00 Crore.

~~**(a) Remittance of SD/RMD**~~

- ~~(i) The total security deposit shall be recovered at the rate of 4% from contractor. Out of which, 50% of amount as Initial Security Deposit shall be payable at the rate of 2% of approved tender cost in form of in Cash or Demand Draft/ Pay Order / FDR / Bank Guarantee of any Nationalised Bank (encashable at Surat city).~~
- ~~(ii) The remaining amount of the Security Deposit i.e. 2% to be deducted from each running account bill.~~
- ~~(iii) 5% Retention money deposit (RMD) to be retained from each running account bill.~~

~~**(b 1) Release of SD/RMD**~~

- ~~(i) The 2% Initial security deposit **in form Demand Draft / Pay order / FDR** shall be released after clearance of Final bill by Audit Dept & completion of defect liability period.~~
- ~~(ii) Remaining 2% of work done in terms of performance security deposit deducted from the running and final bill shall be refunded at the end of the defect liability period, after payment of final bill and after rectifying the defects found.~~
- ~~(iii) 5% Retention money deposit (RMD) to be released along with final bill.~~

~~**(b 2) Release of SD/RMD**~~

- ~~(i) The 2% Initial security deposit **in form Bank Guarantee** shall be released along with Final Bills according to Work Quality.~~
- ~~(ii) Remaining 2% of work done in terms of performance security deposit deducted from the running and final bill shall be refunded at the end of the defect liability period, after payment of final bill and after rectifying the defects found.~~

~~(iii) 5% Retention money deposit (RMD) to be released along with final bill.~~

The amount recovered from the running bills as security deposit shall not be allowed to be transferred in the form of Bank Guarantee. However, the remaining 50% (2% of Security Deposit) of the amount so, deducted from running bills will be allowed for conversion in the form of interest bearing fixed deposit receipt, (FDR) issued in favour of the Municipal Commissioner, Surat Municipal Corporation, Surat by a Nationalized Bank located at Surat only. Additional stamp duty payable as per government prevailing rule shall be paid by contractor for remittance of this FDR.

It is clarified that the amount of security deposit shall be collected on the basis of contract price and not on the basis of Estimated Amount put to tender. As initial Security Deposit as mentioned above, accepted by the competent Authority shall have to be paid toward Security Deposit at the time of execution of agreement.

Interest will be payable on FDR (that is deducted from Running Bill and converted in to FDR for initial SD) for One year, after completion of work. After that no further interest shall be paid for any extended period what so ever.

- (I) If the Security Deposit is not paid within 15 days from the date of L.O.I. / Work Order than penalty at the rate of 0.065% per day of the amount of Security Deposit will be charged. If the Security Deposit is not paid within one month with interest, necessary actions as per condition of contract will be taken.
- (II) The Tenderer shall place Tender Deposit/Earnest Money Deposit by Demand Draft or pay order drawn on any Nationalized /Scheduled Bank situated in Surat favouring "Commissioner" Surat Municipal Corporation and payable at Surat only. The Tender Deposit/Earnest money deposit in any other form shall not be accepted and in that case the tender shall be liable for rejection without assigning any reason what so ever for such rejection.
- (III) If there is increase in amount of work more than 5% of the contract value (tendered amount + GST), the additional S.D. should be recovered from the running bill. When the total amount of work done by the Contractor upto running bills under consideration is more than 5% of the contract value (tendered amount + GST). However, such S.D. shall be recovered in the round figure of Rs. 1000/- i.e. the amount of work done when it exceeds 5% of the contract value it shall be rounded off to the nearest multiple of Rs. 25000/- such additional S.D. shall be recovered for the works amount to Rs. 5 Lacs or more at the rate of 4% of the additional amount.
- (IV) In many cases, the contractors are stopping the work half-way due to number of reasons and when the department has to take actions in accordance to clause 3(a) or (b) or (c) of the contract the remaining work has to be carried out by advertising the tender for the remaining work and the whole administrative process right from inviting tenders to finalizing the tender etc. shall be repeated. In such cases a fixed amount of Rs.1000/- should be recovered from the original contractor towards the cost of advertisement and other administrative charges incurred by the department in finalizing the contract for the remaining work. In case a separate advertisement is issued for a single work actual cost of advertisement shall be recovered such recovery shall be in addition to the recovery to be made under clause-3 or such other relevant clauses.

~~Initial Security Deposit (i.e. 2% Of Tender Amount) in form of Bank Guarantee may be accepted as per relevant tender provision, However BG shall be valid till final date of completion of work+1year (Whether final bill is audited and paid or not). It shall be contractor's responsibility to extend the BG On~~

~~Or Before expiry of time limit of BG. In case of late renewal of BG, penalty of security deposit shall be levied at the rate of 0.065% of per day of BG amount.~~

The successful tenderer shall have to enter into an agreement on a non-judicial stamp paper of Rs. 300/- if initial Security Deposit paid in form Bank Guarantee or Demand draft as per the form of the agreement approved by the Municipal Corporation, Surat.

If initial Security deposit is paid in form of Fixed Deposit, additional stamp paper amounting As per government's prevailing rule of Security Deposit shall be used to execute the agreement.

IT-28 STAMP DUTY :

The successful tenderer shall have to enter into an agreement on a non-judicial stamp paper of Rs.4.90% of S.D. Amount, if S.D. Amount in FDR and otherwise as per the form of the agreement approved by the Municipal Corporation, Surat.

The agreement shall be executed on stamp paper worth Rs.4.90% of S.D. Amount.

The Undertaking and Surety shall be executed on stamp paper worth **Rs.300/- + Rs.300/-**.

Specific references in the specifications to any materials by tender's name, or catalogue number shall be construed as establishing a standard or quality and performance and not as limiting competition and the tenderer in such cases, may at their option freely use any other product, provided that it ensures and equal or higher quality than the standard mentioned and meets Municipal Corporation approval

IT-29 BRAND NAMES :

Specific references in the specifications to any materials by tender's name, or catalogue number shall be construed as establishing a standard or quality and performance and not as limiting competition and the tenderer in such cases, may at their option freely use any other product, provided that it ensures and equal or higher quality than the standard mentioned and meets Municipal Corporation approval.

IT-30 NON-TRANSFERABLE :

Tender documents are not transferable.

IT-31 COST OF TENDERING :

The owner will not defray expenses incurred by Tenderers in tendering.

IT-32 DEFECT OF TENDER :

The Tender for the work shall remain open for a period of 120 calendar days from the date of receipt of the tenders for this work and that the tenderer shall not be allowed to withdraw or modify the offer on his own during the period. If any tenderer withdraws or makes any modifications or additions in the terms and conditions on his own, then the Municipal Corporation, shall without prejudice to any right or remedy, be at liberty to reject the tender and forfeit the earnest money in full.

IT-33 CHANGE IN A QUANTITY :

The Surat Municipal Corporation reserves the right to waive any informality in any tender and to reject one or all tenders without assigning any reasons for such rejections and also to vary to quantities of items or group as specified in the Schedule of price as may be necessary. Claim what so ever by the contractor on the basis of variation of quantities shall not be entertained.

IT-34 NEW EQUIPMENT AND MATERIAL :

All materials, equipment and spare parts thereof shall be new, unused and originally coming from manufacturer's plant to the Corporation. The rebuilt or overhauled equipment/materials will not be allowed to be used on work.

IT-35 RIGHTS RESERVED :

The SMC reserves the right to reject any or all tenders, to waive any informality or irregularity in any tender without assigning any reasons. The SMC further reserves the right to withhold issuance of the notice to proceed, after execution of the contract agreement, for the period of time stated in the notice inviting tenders and no additional payment will be made to the

successful tenderer on account of such withholding. The SMC is not obliged to give reasons for any such action.

IT-36 RIGHTS TO REDUCED THE SCOPE OF WORK:

Municipal Commissioner reserves the right to reduce the scope of work and split the tender in two or more parts without assigning any reason even after the award of contract.

IT-37 MOBILIZATION ADVANCE :

No mobilization advance or advance on machinery will be given.

IT-38 CONDITIONAL TENDER

The scope of work is clearly mentioned in the tender documents. The contractor shall have to carry out the work in accordance with the details specifications. No conditions will be accepted. The conditional tender will be liable to be rejected.

IT-39 The surplus excavated earth, after backfilling the trenches shall have to be removed from the site as directed. After compaction and consolidation, if any short fall of earth is found then contractor has to bring the same to the required quantity in order to meet shortfall at his own cost. More over, if any settlement of road after reinstatement is observed during the defect liability period of the work. Contractor shall be fully responsible for the defective work and patches/ depression / settlement shall be repaired with quarry spoil or metal at contractor's own cost. If contractor fails to repair the patches / depression / settlement in time, corporation will repair it at all risk and cost of contractor.

Surplus earth shall not be disposed off in a way that leads to nuisance to the public or SMC.

IT-40 ROYALTIES:

Tenderer/Supplier shall have to pay, and furnish all receipts of materials to The Engineer-in-charge, whenever required.

IT-41 INSURANCE:

The successful Tenderer shall furnish insurance in accordance with clause No. GC-83 of the Conditions of Contract.

IT-42 TESTING OF CEMENT AND STEEL:

It should be specifically noted that the cement and steel brought by the contractor at site of work shall be used only after the same is tested at the approved laboratory as per the direction of the Engineer-in-charge. Such approved laboratory may be located at Surat, Baroda, and Ahmedabad or Mumbai.

All the charge for the transport and testing of the samples shall have to be borne by the contractor. The frequency of testing such material shall be in accordance to the relevant Indian Standards as directed by Engineer - in- charge.

EXECUTIVE ENGINEER
BRTS PROJECT
SURAT MUNICIPAL CORPORATION ,

SIGNATURE OF THE CONTRACTOR WITH SEAL

6.0 GENERAL CONDITION OF CONTRACT

SECTION-I

GC-01 DEFINITIONS AND INTERPRETATIONS :

- 1.0 In the contract documents, as herein defined the following words and expression used shall, unless, repugnant to the subject or context thereof, have the following meanings assigned to them.
- 1.1 The "Owner/Municipal Corporation, Surat represented by Municipal Commissioner/Add.City Engineer, any officer authorised by the Municipal Corporation.
- 1.2 The "Contractor" shall mean the person or the persons, firm of company whose tender has been accepted by the owner and includes his legal representative successors and permitted assigns.
- 1.3 The "Engineer-in-charge" shall mean the person designated as such by the owner from time to time and shall include those who are expressly authorised by the Municipal Corporation to act for and on its behalf for the operation of this contract.
- 1.4 "Engineer - in - charge's Representative" shall mean any Engineer or Assist. to the Engineer-in-charge designated from time to time by the Engineer-in-charge to perform duties set forth in the Tender documents whose authority shall be notified in writing to the Contractor by the Engineer-in-charge.
- 1.5 "Tender" The offer or proposal of the Tenderer submitted in the prescribed form setting forth the prices for the work to be performed, and the details thereof.
- 1.6 "Contract Price shall mean total money payable to the Contractor under the contract documents.
- 1.7 "Addenda" shall mean the written or graphic notices prior to submission of tender which modify or interpret the contract documents.
- 1.8 "Contract Time" - The number of consecutive calendar months for the completion of work as stated in the executed contract agreement.
- 1.9 "Contract" shall mean agreements between the parties for the execution of works including therein all contract documents.
- 1.10 "Tender document" shall mean Designs, Drawings, specifications, agreed variations, if any, and such other documents constituting the tender and acceptance thereof.
- 1.11 "The Sub-Contractor" means any person, firm or company (other than the contractor) to whom any part of the work has been entrusted by the Contractor with the written consent of the Engineer-in-charge and the legal personnel representative, successors and permitted assigns of such person, firm or company.
- 1.12 "The Specifications" shall mean all directions' the various technical specifications provisions and requirements attached to the contract which pertain to the method and manner or performing the work to the quality of the work and the materials to be furnished under the contract for the work and any order(s) or instruction (a) there under. It shall also mean the latest Indian Standards Institution Specifications for or relative to the particular work or part thereof, so far as they are not contrary to the Tender specifications or I.S.I. specifications, and in absence of any tender specifications, the specifications of any other country applied in India as a matter of Standard Engineering practice and approved in writing by the Engineer-in-charge with or without modifications.
- 1.13 The "Drawing" shall include maps, plans, tracings or prints thereof with any modifications approved in writing by the Engineer-in-charge and such other drawings, as may, from time to time, be furnished or approved in writing by the Engineer-in-charge in connection with the work.
- 1.14 The "Work" shall mean the works to be executed in accordance with the context or the part thereof as the case may be and shall include extra, additional altered or substituted works as required for the purpose of the Contract. It shall mean the totally of the work by expression or implication envisaged in the contract and shall include all material,

- equipment and labour required for or relative or incidental to or in connection with the commencement, performance and completion of any work and/or for incorporation in the work.
- 1.15 The "Permanent work" means works which will be incorporation in and form part of the work to be handed over to the owner by the contractor on completion of the contract.
 - 1.16 The "Temporary Work" shall mean all temporary works of every kind required in or about the execution, completion and maintenance of the work.
 - 1.17 "Site shall mean the land and other place on, under, on or through which the work is to be carried out and any other lands or places provided by the Municipal Corporation for the purpose of the Contract together with any other places designated in the Contract as forming part of the site.
 - 1.18 "The Construction Equipment" means all appliance/equipments of whatever nature required in or for execution, completion or maintenance of work or temporary works (as hereinafter defined) but does not include materials or other things intended to form or forming part of the permanent work.
 - 1.19 "Notice in Writing or Written Notice" means a notice written, types or printed form delivered personally or sent by Registered post to the latest known private of business address at Registered Office of the Contractor.
 - 1.20 The "Alteration/Variation order" means an orders given in writing by the Engineer-in-charge to effect additions to or deletion from and alterations in the work.
 - 1.21 "Final Test Certificate" shall mean the final test Certificate issued by the owner within the provisions of the Contract.
 - 1.22 The "Completion Certificate" shall mean a certificate to be issued by the Engineer-in-charge when the work has been completed to his satisfaction.
 - 1.23 The "Final Certificate" shall mean the final certificate issued by the Engineer-in-charge after the work is finally accepted by the owner.
 - 1.24 "Defect Liability Period" shall mean the specified period between the issue of completion Certificate and the final certificate as specified in the tender.
 - 1.25 "Approved" shall mean approved in writing including subsequent modification in writing of previous verbal approval and "Approval" means approved in writing including as aforesaid.
 - 1.26 "Letter of Acceptance" shall mean an intimated by a letter to tenderer that the tender has been accepted in accordance with provisions contained therein.
 - 1.27 "Order" and "Instruction" shall respectively mean any written order or instruction given by the Engineer-in-charge within the scope of his powers in terms of the Contract.
 - 1.28 "Running Account Bill" shall mean a Bill for the payment of "On Account" money to the contractor during the progress of work on the basis of work done and the non-perishable materials to be incorporated in the work supplied by the Contractor.
 - 1.29 "Security Deposit" shall mean the deposit to be held by the owner as security for the due performance of contractual obligations.
 - 1.30 "The appointing authority" for the purpose of Arbitration shall be the Municipal Commissioner, Surat Municipal Corporation, Surat.
 - 1.31 Retention Money shall mean the money retained from R.A.Bill for due completion of "NET WORK".
 - 1.32 Unless otherwise specifically stated, the masculine gender shall include the feminine and natural genders and viceversa and the singular shall include the plural and vice-versa.
 - 1.33. All work proposed to be executed by contract shall be notified in a form of invitation to tender pasted on a board hung up in the office of the Engineer & signed by the Engineer. This form will state the work to be carried out as well as the date/or submitting and opening tenders and the time allowed for carrying out work, also the amount of earnest money to be deposited with the tender and the amount of the Security Deposit to be paid by the successful tenderer and the percentage, if any, to be deducted from bills. It will also state whether a refund of quarry fees, royalties, octroi dues and ground rent will be granted. Copies of the

- specifications, designs and drawings and estimated rated scheduled rates and any other documents required in connection with the work which shall be signed by the Engineer-in-charge for the purpose of identification shall also be open for inspection by contractors at the office of the Engineer-in-charge during office hours. Where the work are proposed to be executed according to the specifications recommended by a contractor and approved by a competent authority on behalf of the corporation, such specifications with designs and drawings shall form part of the accepted tender.
- 1.34. In the event of the tender being submitted by a firm, it must be signed separately by each partner thereof, or in the event of the absence of any partner, it shall be signed on his behalf by a person holding a power of attorney authorising him to do so.
 - 1.35. Receipts for payments made on account of any work, when executed by a firm, shall also be signed by all the partners, except where the contractor 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 persons having authority to give effectual receipts for the firm.
 - 1.36. Any persons, who submit tender shall fill up the usual printed form including the 'Column' total according to estimated quantities, stating at what rate he is willing to undertake the each item of the works, Tenders which proposal any alterations in the work specified in the said form of invitation to tender or in the time allowed for carrying out the work or which contain any other conditions of any short, will liable to be rejection No. single tender include more than one will liable to be rejection No. single tender include more then one work but contractors who wishes to tender for each. Tender shall have (to which they refer) written outside the envelope.
 - 1.37. The Commissioner or his duly authorised assistant shall open tender in the presence of any intending contractors who have submitted tender or their representatives who may be present at the time. In the event of a tender being accepted, the contractor shall there upon for the purpose of identification, sign the copies of the specifications and other documents mentioned in this tender. In the event of the tender being rejected, the divisional officer shall authorised the accountant to refund the amount of earnest money deposited to the contractor making the tender on his giving a receipt for the returned of the money.
 - 1.38. The officer competent to dispose of the tender shall have the right of rejecting all or any of the tenders.
 - 1.39. No receipts for any payment alleged to have been made by a contractor in regard to any matter to this tender shall be valid and binding on corporation unless it is signed by the Engineer-in-charge.
 - 1.40. The memorandum of work to be tendered for and the schedule of materials to be supplied by the concern department and their rates shall be filled in and completed by the officer of the Engineer-in-charge before the tender form is issued. If a form issued an intending tenderer has not been so filled in and completed, he shall request the said officer to have this done before he completes and delivers his tender.
 - 1.41. All works shall be measured net by standard measure and according to the rules and customs of the Public Works Department without reference to any local custom.
 - 1.42. Under no circumstances shall any contractor be entitled to claim enhanced rates for any items in this contract.
 - 1.43. Every contractor shall unless excepted in writing by the Additional City Engineer concerned, produced alongwith the tender, a solvency certificate of his financial stability from the Collector of the District within which he resides or a Bankers certificates. If he fails to produce such a certificate, his tender may not be considered.
 - 1.44. All corrections and additions or pasted slips should be initiated.
 - 1.45. The measurement of work will be taken according to the usual method in use in the public works department and no proposals to adopt alternative methods will be accepted. The Engineer-in-charge decision as to what is "the usual method in use in the public works department" will be final.
 - 1.46. A. The Insurance Company's bond will not be accepted against the Security Deposit.

- 1.47. The contractor shall have to attach to his tender Income Tax Clearance Certificate to be obtained from the Income Tax Officer.
- 1.48. The Contractor will have to construct a shed for storing control and valuable materials issued to him under Schedule-'A' of the agreement at work site having double locking arrangement. The materials will then be taken for use in the presence of the department person. No materials will be allowed to be removed from the site of work except with the written permission from Engineer- in-charge.
- 1.49. No foreign exchange will be released by the Corporation for the purpose of plant and machineries required for the execution of the work contracted for.
- 1.50. Controlled materials (Essentiality certificate)
 - (i) As regard controlled materials the Corporation will help to arrange for the permit as far as possible and help the contractor in securing for the permit as far as possible and help the contractor in securing the same. All incidental charges met with in procuring these materials shall be borne by the contractor himself. Though the Corporation will help to arrange for the permit as far as possible and help the contractor in obtaining the materials it shall not accept any responsibility for any delay or loss on account of delay caused to the contractor while obtaining the same.
 - (ii) The contractor shall submit to Engineer-in-charge on Close of every calender months, the monthly returns in the prescribed forms as to the receipt and actual use of the controlled materials during the month.
 - (iii) The contractor shall permit the Engineer- in- charge or his representatives to inspect the stock of the controlled materials stored by him at any time, whenever the Engineer-in- charge or his representatives so desired (s).
- 1.51. The tender for work shall remain open for a period of 120 days from the date of opening of the price bid for this works and that the tenderer shall not be allowed to withdraws or modify the offer on his own during this period. If any tenderer withdraws or makes any modifications or addition/s in the terms and conditions of his tender, not acceptable to the corporation them the corporation shall without prejudice to any right or remedy be at liberty in full the said earnest money absolutely (in figures as well as in words). This Blank Space should be filled in while preparing the draft tender papers.
- 1.52. The contractor shall employ only such labourer who shall produce a valid certificate of having been vaccinated against small pox within a period of last 3 years.
- 1.53. Tenderer should submit True Copy of the Certificate of Registration alongwith the tender without which the tender will not be considered.
- 1.54. The contractor shall have to give in writing the date completion of the work within a fortnight from the date of work completed by him. Otherwise the date noted on the record by the department shall be reawakened as final and no excuse or representation in that behalf shall be entertained at later date.
- 1.55. What ever **sales tax** is levied by the Government on works contract and if paid by the contractor in the first instance, **shall not be** refunded to the concerned contractor by Corporation.

GC-02 LOCATION OF SITE AND ACCESSIBILITY :

The site of works is within the limits of Surat Municipal Corporation. It is served by all weather roads and SOUTH WESTern Railway Broad Gauge line, Government Irrigation Canal Crossing. The intending Tenderer should inspect the site and make himself familer with site conditions and available communication facilities. Non availability of access/roads shall in no case be the cause to condon any delay in the execution of the work or be the cause for any claims or extra compensation.

GC-03 SCOPE OF WORK :

The scope of work is defined broadly in the special conditions of Contract and specifications. The Contractor shall provide all necessary materials equipment and labour etc. for the execution and of the work till completion. All materials that go with the work shall be approved by the Engineer-in-charge prior to procurement and use.

Owner at his discretion may endeavour to provide water to the Contractor at the owner's source of supply at one point at the rate charged for such works.

The contractor shall make his own arrangement for the distribution pipe networks from the source of supply after getting prior permission for the same from the Engineer-in-charge. Supply of water shall not be free and the necessary charges as fixed by the Local Body shall have to be paid by the contractor.

However, owner does not guarantee the supply of water and this does not relieve the contractor of his responsibility in making his own arrangements and for the timely completion of the work as stipulated.

POWER SUPPLY :

The Contractor shall have to make his own arrangement for power supply.

LAND FOR CONTRACTOR'S FIELD OFFICE, GODOWN & WORKSHOP:

Owner will not be a position to provide land required for Contractors shall have to make his own arrangement for the same. No land will be provided by S.M..C. to the contractor for constructing his labour and supervisory comp and other service facilities.

GC-04 RULLING LANGUAGE :

The language according to which the contractor shall be constructed and interpreted shall be English. All entries in the contract documents and all correspondence between the contractor and the Municipal Corporation or the Engineer shall be in English or/and Regional Language. All dimensions for the materials shall be given in metric units only.

GC-05 INTERPRETATION OF CONTRACT DOCUMENT :

1. The provisions of the General Conditions of Contract and special conditions of contract shall prevail over those of any other documents of the contract unless specifically provided otherwise. Should there be any discrepancy, inconsistency error or omission in the several documents forming the contract, the matter may be referred to the Engineer-in-charge for his instructions and decision. The Engineer-in-charge's decision in such case shall be the final and binding to the contractor.
2. Works shown upon the drawings but not described in the specifications or described in the specific specifications without showing on the drawings shall be taken as described in the specifications and shown on the drawings.
3. The heading and the marginal notes to the clauses of those general conditions of contract or to the specifications or to any other part of tender documents are solely for the purpose of giving a concise indication and not a summary of contents thereof or be used in the interpretation or construction thereof of the contract.
4. Unless otherwise stated specifically, in this contract documents the singular shall include the plural and vice versa wherever the context so requires. Works implementing persons shall include relevant corporated companies/ registered associations / body of individual / firm of partnership.
5. Notwithstanding the sub-divisions of the documents into separate sections and volumes every part of each shall be supplementary to and complementary of every other part and shall be read with and into the context so far as it may be practicable to do so.
6. Where any portion of the General Conditions of contract is repugnant to or at variance with any provisions of the special conditions of contract, then, unless a different intension appears, the provisions of the special conditions of contract shall be deemed to override the provisions of General conditions of Contract and shall to the extent of such repugnancy or variance prevail.

7. The materials, Design and Workmanship shall satisfy the relevant I.S.S. and Codes referred to. If Additional requirements are shown in the specifications, the same shall be satisfied over and above I.S.S. and Codes.
8. If the specification mention that the contract shall perform certain work or provide certain facilities, it will mean that the contractor shall do so at his own cost.
9. The correctness of the details given in the tender documents is not guaranteed. The contractor shall independently obtain all necessary information for making the tender. The contractor shall be deemed to have examined the Contract Documents, to have generally obtained his own information in all matters that might affect the carrying out of the work or the Tenderer rates. Any error in description of quantity or commission there from shall not vitiate the contract or release the contractor from executing the work comprised in the contract according to the Drawings and specifications at the tendered rates. He is deemed to have known the scope, nature and magnitude of the work and the requirements of materials and labour involved and as to what all works he has to complete in accordance with the contract what-soever be the defects, omissions, or errors that may be found in the contract documents. The contractor shall be deemed to have visited the site and the surroundings, to have satisfied himself to the nature of all existing structures, if any, and also as to the nature and the conditions of railways, roads, bridges and culverts, means of transport and communications, whether by land, air or water and as to possible interceptions thereto and the access and agrees from the site, to have made inquiries, examined and satisfied himself as to the sites for obtaining sand, stones, bricks and other materials, the sites for disposal of surplus materials, the available accommodation as to whatever required, the depicts and such other buildings as may be necessary for executing and completing the work, to have local independent inquiries as to the subsoil, subsoil water and variation thereof, storms, prevailing winds, climatic conditions and all other similar matters effecting the work. He is deemed to have acquainted himself as to his liability for payment of Government taxes, custom duty and other charges.
Any neglect or failure on the part of the contractor in obtaining necessary and reliable information upon the forgoing or any other matters affecting the contract shall not relieve him from any risks or liabilities or the entire responsibility from completion of the work at the tendered rates and time in strict accordance with the contract documents.
No verbal agreement or inference from conversation with any officer or employee of the worker either before or after the execution of the Contract Agreement shall in any way effect or modify any of the terms of obligations herein contained.

GC-06 CONTRACTOR TO UNDERSTAND HIMSELF FULLY :

The contractor by tendering shall be deemed to have satisfied himself, as to consideration and circumstance affecting the tender price, as to the possibility of executing the works as shown and described in the contract and to have fixed his prices according to his own view on these matters and to have understand that no additional allowances except as otherwise expressly provided, will after words be made beyond the contract price. The contractor shall be responsible for any misunder-standing or incorrect information given in writing by the Engineer.

GC-07 ERROR IN SUBMISSION ;

The contractor shall be responsible for any errors or omissions in the particulars supplied by him. Whether such particulars have been approved by the Engineer or not, provided that such discrepancies, errors or omissions be not due to inaccurate information or particular furnished in writing to the Contractor by the Municipal Corporation or the Engineer.

GC-08 SUFFICIENCY OF TENDER :

The Contractor shall be deemed to have satisfied himself before tendering as to the correctness of the tender rates which rates shall, except as or other wise provided for, cover all the

Contractor's liabilities and obligation set forth or implied in the contract for the proper execution of work for compliance with requirements of Article GC-19 thereof.

GC-09 DISCREPANCIES :

The drawings and specifications are to be considered as mutually explanatory of each other, detailed drawings being followed in preference to small scale drawings and figures dimension in preference to scale and special conditions in preference to general conditions. Special direction or dimensions given in the specifications shall supersede all else. Should any discrepancies however, appear or should any misunderstanding arise as to the meaning and intent of the said specifications or drawings, or as to the dimensions or the quality of the materials or the due and proper execution of the works, or as to the measurement or quality and valuation of the works executed under this contract or as extra there upon the same shall be explained by the Engineer-in-charge and his explanation shall subject to the final decision of the Additional City Engineer, in case reference be made to him, be binding upon the contractor shall execute the work according to such explanation (subject to aforesaid) and without addition to or deduction from the contract and shall also do all such works and things necessary for the proper completion of the works as implied by the Drawings and specifications, even though such works and things are not specially shown and described in said specifications. In cases where not particular specifications are given for any article to be used under the contract, relevant specifications of the Indian Standard Institution shall apply.

GC-10 PERFORMANCE GUARANTEE : (Security Deposit) : as per IT-27

GC-11 INSPECTION OF WORK :

1. The Engineer in charge will have full power and authority to inspect the work at any time wherever in progress either on the site or at the contractor's any other manufacturers workshops or factories wherever situated and the contractor shall afford for Engineer-in-charge every facility and assistance to carry out such inspection. Contractor or his authorised representative shall, at all time during the usual working hours and all other times when so notified, remain present to receive orders and instructions, orders given to Contractor's representative shall considered to have the same force as if they had been given to the contractor himself. Contractor shall give not less than 7 days notice in writing to the Engineer-in-charge before covering up or otherwise placing beyond reach of inspection and measuring any work in order that the same may be inspected and measured. In the event of breach of the above, the same shall be recovered at Contractor's expenses for carrying out such inspection or measurement.

2. No material shall be despatched from contract store on site of work before obtaining approval in writing of the Engineer-in-charge, Contractor shall provide at all time during the progress of work and maintenance period proper means of access with ladders, gangways, etc. and the necessary attendance to move and adopt as directed for inspection or measurement of work by Engineer-in-charge.

GC-12 DEFECT LIABILITY :

1. Contractor shall guarantee the work for a period of **12 months after Completion of Work**. Any damage or defect that may arise or that may remain undiscovered at the time of issue of completion certificate connected in any way with the equipment or materials supplied by him or in the workmanship be rectified or replaced by contractor at his own expenses as desired by Engineer-in-charge or in default may cause the same to be made good by other agency and deduct expenses of which the certificate of Engineer-in-charge shall be final from any sums that may then or any time thereafter become due to contractor of sale thereof or of a sufficient portion thereof.
2. From the commencement to completion of work contractor shall take full responsibility for the case of the work including all temporary works and in case any damage, loss or injury shall

happen to work or any part thereof or to any temporary works from any cause whatsoever and shall at his own cost repair and make good the same so that at completion work shall be in good order and in conformity in every respect with the requirements of contract and as per the instructions of the Engineer-in-charge.

3. If at any time before the work is taken over, the Engineer-in-charge shall -

(a) Decide that any work done or materials used by the contractor are defective or not in accordance with contract or that work of any portion thereof is defective or do not fulfill the requirements of contract (all such materials being hereinafter called defects in this clause and (b) as soon as reasonably practicable given to contractor notice in writing of the said defect specifying particulars of the defects alleged to exist or to have occurred, then contractor shall at his own expenses and with all speed make good the defects so specified.

(b) In case contractor fails to do so, owner may take at the cost of the contractor, such steps as may in all circumstances, be reasonable to make good such defects. The expenditure so incurred by S.M.C. will be recovered from the amount due to contractor. The decision of Engineer-in-charge with regard to the amount to be recovered from contractor will be final and binding on the contractor.

GC-13 POWER OF ENGINEER TO GIVE FURTHER INSTRUCTIONS :

The Engineer shall have the power and authority from time to time and at all times to give further instructions and directions as may appear to him necessary or proper for the guidance of contractor and the works and efficient execution of the works according to the terms of the specifications, and the contractor shall receive, execute, obey and be bound by the same, according to the true intent and meaning thereof, as fully and effectually as though the same had accompanied or had been mentioned or referred to in the specifications. No work which radically changes the original nature of the contract shall be ordered by the Engineer and in the event of any deviation being ordered, which in the opinion of the contractor changes the original nature of the contract, the contractor shall nevertheless carry it out and any disagreement as to the nature of the work & the rate to be paid thereof shall be resolved. The time of completion of works, in the event of any deviations, resulting in additional cost over the contract sum being ordered, then be extended or reduced reasonable by the Engineer. The Engineer's decision in the case shall be final and binding.

GC-14 PROGRAMME :

The time allowed for execution of works shall be essence of the contract. The contract period shall commence from date of Notice of intimation to proceed. The tenderer at the time of submitting his tender shall indicate the construction or pipeline schedule, the month-wise programme required for the execution of the works and shall confirm the same within fourteen (14) days of the acceptance of his Tender. The contractor shall provide to the Engineer-in-charge a detailed programme of time schedule for execution of the works in accordance with the specifications & the completion date. The entire programme to be finalised by the Contractor, has to confirm to the execution period mentioned alongwith the Bill of Quantities in the Tender Documents. The Engineer upon scrutiny of such submitted programme by contractor, shall examine suitability of it to the requirement of contract and suggest modifications, if found necessary.

GC-15 SUBLETTING OF WORKS :

No part of the contract nor any share or interest thereon shall in any manner or degree be transferred, assigned or sublet by the contractor directly or indirectly to any firm or Corporation whatsoever except as provided for in the succeeding sub clause without the consent in writing of the owner.

GC-16 SUB-CONTRACTORS FOR TEMPORARY WORKS ETC. :

The owner may give written consent to sub-contractors for execution of any part of the work at the site being entered upon by the contractors provided each individual's contractor is submitted to the Engineer-in-charge before being entered into and is approved by him. List of Sub-Contractors is to be supplied. Notwithstanding any subletting with such approval as aforesaid and notwithstanding the Engineer-in-charge shall have received copies of any sub-contractors, the contractors shall be and shall remain solely responsible for the quality and proper expenditures and execution of the works and the performance of all the conditions of contract in all respects as if such submitting or sub-contracting had not taken place and as if such work had been done directly by the Contractor.

GC-17 TIME FOR COMPLETION:

1. The work covered under this contract shall be commenced from the date of contract is served with a notice to proceed with the work and shall be completed before the date as mentioned in the time schedule of work. The time is the essence of the contract and unless the same is extended as mentioned in clause No. GC-18 (Extension of time) the contractor will be penalised for the delay.
2. The general time schedule for work is given in the tender document. Contractor shall prepare a detailed weekly or monthly programme of work in consultation with Engineer-in-charge soon after the agreement and the work shall be strictly executed accordingly. The time for as construction of road given includes, the time required for testing, rectification if any, retesting and completion in all respects to the entire satisfaction of the Engineer-in-charge.

GC-18 EXTENSION OF TIME :

Time shall be considered as the essence of the contract. If however, the failure of the Contractor to complete the work as per the stipulated dates referred to above arises from delays on the part of Municipal Corporation in supplying the materials of equipment it has undertaken to supply under the contract or from delays in handing over sites or from increase in the quantity of work to be done under the contract, or force Majeure an appropriate extension of time will be given. The Contractor shall request such extension within one month of the cause of such delay and in any case before expiry of the contract period.

GC-19 CONTRACT AGREEMENT :

The successful tenderer shall when called upon to do so, enter into and execute the Contract Agreement within (15) fifteen days of the Notice of Award, in the form shown in tender documents with such modifications as may be necessary in the opinion of the Municipal Commissioner. It should be incumbent on the contractor to pay the stamp duty and the legal charges for the completion of the contract agreement.

GC-20 (A)PENALTY FOR DELAY :

If the contractor fails to complete the work within the stipulated completion date for the work or he shall pay liquidated damages at one tenth of Two percent of contract value per day of delay in completion and handing over the work or part thereof as the case may be to the Municipal Commissioner. The amount of liquidated damages shall, however, be subjected to a maximum of ten (10) percent of the contract value. Delays in excess of one hundred days will be a cause for termination of the contract and forfeiture of all security for performance.

(B).BAR CHART:

The successful tenderer shall have to submit the progress bar-chart within fifteen days after the contract, and the contractor should work as per the approved bar-chart, failing the contractor shall have to pay the compensation for delay as per the decision of Municipal Commissioner.

GC-21 FORFEITURE OF SECURITY DEPOSIT :

Whenever any claim arises against the contractor for the payment of a sum of money out of or under the contract, the Surat Municipal Corporation shall be entitled to recover such sum by appropriating in part or whole, the security deposit of the contractor. In case the Security deposit is insufficient the balance recoverable shall be deducted from any sum then due or which at any time thereafter may become due to the contractor shall pay to the owner on demand may balance remaining due.

GC-22 ACTION OF FORFEITURE OF SECURITY DEPOSIT :

In any case in which under any clause or clauses of the contract, the contractor shall have forfeited the whole of his Security deposit or have committed a breach of any of the terms contained in this contract, the Surat Municipal Corporation shall have power to adopt any of the following courses as he may deem best suited to his interest -

- (a) To rescind the contract (of which rescission notice in writing to the contractor under the hand of the owner shall be conclusive evidence) in which case, the security deposit of the contractor shall stand forfeited and be absolutely at the disposal of the owner.
- (b) To employ labour and to supply materials to carry out the balance work debiting contractor with the cost of labour employed and the cost of materials supplied for which a certificate of the Engineer-in-charge shall be final and conclusive against the contractor and 10% costs on above to cover all departmental charges and crediting him with the value of work done at the same rates as if it has been carried out by the contractor under the terms of his contract. The certificate of Engineer-in-charge as to the value of the work done shall be final and conclusive against the contractor.
- (c) To measure up the work of the contractor and to take such part hereof as shall be unexecuted out of his hand to give it to another contractor to complete. In this case the excess expenditure incurred than what whole have been paid to the original contractor, if the would work had been executed by him, shall be earnest and paid by the original contractor and shall be deducted from any money due to him by the owner under the contract or otherwise and for the excess expenditure, the certificate of the Engineer-in-charge shall be final and conclusive.

In the event any of the above course being adopted by the owner, the contractor shall have no claim to compensation for any loss sustained by him by reason of his having purchased or procured any materials or entered into any agreement so or made by advance on account of or with a view to the execution of the work of the performance of the contract. In such case the contractor shall not be entitled to recover or be paid by sum for any work actually performed under this contract unless the Engineer-in-charge will certify in writing the performance of such work and the value payable in respect thereof and he shall only be entitled to be paid the value so certified. In the event of the owner putting in force the powers as stated in a, b, c, above vested in him under the preceding clause, he may, if he so desire, take possession of all or any tools and plant, materials and stores in or upon the work or the site thereof belonging to the contractor, or procured by him and intended to be used for the execution of the work or any part thereof paying or allowing for the same in account at the contract rates to be certified by the Engineer-in-charge whose certificate thereof shall be final otherwise the Engineer-in-charge may give notice in writing to the contractor or his representative requiring him to remove such tools plant materials or stores from the premises within the time specified in the notice and in if the contractor fails to comply with any such notice, the Engineer-in-charge may remove them at the Contractor's expenses or sell them by auction or private sale on account of the contractor and his risks in all respects without any further notice as to the date, time to place of the sale and the certificate of Engineer-in-charge as to the expenses of any such removal and the amount of the proceeds and the expenses of any such sale shall be final and conclusive against the contractor.

GC-23 NO COMPENSATION FOR ALTERATION IN OR RESTRICTION OF WORK :

If at any time from the commencement of work, the owner shall for any reasons whatsoever not require the whole or part thereof as specified in the tender to be carried out, the Engineer-in-charge

shall give notice in writing of the contractor, who shall have no claim to any payment or compensation whatsoever on account of any profit or advantage which he might have derived from execution of work in full, but which he did not derive in consequence of the full amount of the work not having been carried neither shall he have any claim for compensation by reason if any alternations having been made in original specifications, drawings, designs and instructions which shall involve any curtailment of the work as originally contemplated.

When the contractor is a partnership firm, the prior approval in writing of the S.M.C. shall be obtained before any change is made in the constitution of the firm, where the contractor is an individual or a Hindu Undivided Family business concern, such approval as aforesaid shall, likewise be obtained before sub-contractor enters into any agreement with other parties where under the reconstituted firm would have the right to carry out the work hereby undertaken by the contractor. In either case if prior approval as aforesaid is not obtained, the contract shall be deemed to have been allotted in contravention of sub-letting clause hereof and the same action may be taken and the same consequence shall ensure as provided in the sub-letting clause.

GC-24 IN EVENT OF DEATH OF CONTRACTOR :

Without prejudice to any of the right or remedies under the contract, if the contractor dies, the owner shall have the option of terminating the contract without compensation to the contractor.

GC-25 MEMBER OF THE OWNER NOT INDIVIDUALLY LIABLE :

No official or employee of the owner shall in any way be personally bound or liable for the acts or obligations of the owner under the contract or answerable for any default or omission in the observance or performance of the acts, matters or things which are herein contained.

GC-26 OWNER NOT BOUND BY PERSONAL REPRESENTATIONS :

The contractor shall not be entitled to any increase on the Schedule of rates or any other rights or claims whatsoever by reason of representation, explanation or statement or alleged representation, promise or guarantees given or alleged to have been given to him by any person.

GC-27 CONTRACTOR'S OFFICE AT SITE

The Contractor shall provide and maintain an office at the site for the accommodation of his agent and staff and such office shall be opened at all reasonable hours to receive instructions, notice or other communications.

GC-28 CONTRACTOR'S SUBORDINATE STAFF AND THEIR CONDUCT :

1. The contractor on award of the work shall name and depute a qualified Engineer, having experience of carrying out work of similar nature, to whom equipment's, materials, if any, shall be issued and instructions for work given. The contractor shall also provide to the satisfaction of Engineer in-charge sufficient and qualified staff to superintend the execution of the work, competent sub-agents, foremen and leading hands including those specially qualified by previous expeditions to supervise the type of works comprised in the contract in such manner as will ensure work of the best quality and expeditions working, it, in the opinion of the Engineer-in-charge, additional properly qualified supervision staff is considered necessary, if shall be employed by the contractor without additional charge on account thereof. The contractor shall ensure to the satisfaction of the Engineer-in-charge that sub-contractors, if any shall provide competent and efficient supervision over the work entrusted to them.
2. If and whenever any of the contractor's or sub-contractor agents, sub-agents, assistance, foremen or other employees shall, in the opinion of Engineer-in-charge, be guilty of any misconduct or be incompetent or insufficiently qualified or intelligent in the performance of their duties or that in opinion of the owner or Engineer-in-charge, it is undesirable for administrative or any other reason for person or persons to be employed in the works, the contractor, if so directed by the Engineer-in-charge, shall at once remove person or persons from employment thereon. Any person or persons so removed shall not again be reemployed in connection with the works without the

written permission of the Engineer-in-charge. Any person so removed from the works shall be immediately replaced at the expenses of the contractor by acqualified and competent substitute. Should the contractor be required to repatriate any person removed from the works he shall do so and shall bear all costs in connection therewith.

3. The contractor shall be responsible for the proper behavior of all the staff, foremen, workmen and others shall exercise proper control over them and in particular and without prejudice to the same. Generally, the contractor shall be bound to prohibit, and prevent any employee from trespassing or acting in any way detrimental or prejudicial to the interest of the community or of the properties or occupiers of land and properties in the neighbourhood and in the event of such employees so trespassing, the contractor shall be responsible therefore and relieve the owner of all consequent claims, actions for damages or injury or any other grounds whatsoever. The decision of the Engineer-in-charge upon any matter arising under this clause shall be final.
4. If and required by the owner, the contractor's personnel entering upon the owner's premises shall be properly identified by badges of a type acceptable to the S.M.C. which must be worn at all times on owner's premises.

GC-29 TERMINATION OF SUB-CONTRACTOR BY OWNER :

If any sub-contractor engaged upon the works at the site executes any work which in the opinion of Engineer-in-charge is not in accordance with the contract documents, the S.M.C. may give written notice to the contractor request his to terminate such sub-contract and the contractor upon the receipt of such notice shall terminate such sub-contract and the letter shall forthwith leave the works failing which the owner shall have the right to remove such sub-contractors from the site.

No action taken by the owner under the above clause shall relieve the contractor of his liabilities under the contract or give rise to any right to compensation, extension of time or otherwise.

GC-30 POWER OF ENTRY :

If the contractor shall not commence the work in the manner previously described in the contract documents or if he shall, at any time, in the opinion of Engineer-in-charge.

- (i) Fail to carry out works in conformity with the documents or
- (ii) Fail to carry out the works in accordance with the time schedule.
- (iii) Substantially suspend work or the works for a period of fourteen days without authority from Engineer-in-charge or
- (iv) Fail to carry out and execute the work to the satisfaction of the Engineer-in-charge or
- (v) Fail to supply sufficient or suitable construction plant temporary works, labour materials or things or
- (vi) Commit breach of any other provisions of the contract on his part to be performed or observed or persist in any of the above mentioned breached of the contract for fourteen days after notice in writing shall have been given to the contractor by the Engineer-in-charge requiring such breach to be remedied or
- (vii) Abandon the work or
- (viii) During the continuance of the contract becomes bankrupt, make any arrangement or compromise with his creditors, or permit any execution to be levied or go into liquidation whether compulsory or voluntary not being merely a voluntary liquidation for the purpose of amalgamation or reconstruction then in any such case.

The owner shall have the power to enter upon the works and take possession thereof and of the materials, temporary works, constructional plant and stock therein, and to revoke the contractor's licence to use the same and to complete the works by his agents, other contractor or workman or to relate the same upon any terms and to such other person, firm or corporation as the owner in his absolute discretion may think proper to employ, and for the purpose aforesaid to use or authorize the use of any materials, temporary works, constructional plant, and stock as aforesaid, without making payment or allowance to the Contractor for the said materials other than such as may be certified in written by the Engineer-in-charge to be reasonable and without making any payment or allowance to the contractor for the use of said temporary works, constructional plant and stock or being liable for

any loss or damage thereto. If the owner shall be reason of his taking possession of the works or of the work being got completed by other contractor incur excess certified by the Engineer-in-charge shall be deducted from any money which may be due for the work done by the contractor under the contract and not paid for. Any deficiency shall forthwith be made good and paid to the owner by the contractor and the owner shall have power to sell in such manner and for such price as he may think fit all or any of the constructional plant, materials etc. constructed by or belonging to and recoup and retain the said deficiency or any part thereof out of the proceeds of the sale.

GC-31 CONTRACTOR'S RESPONSIBILITY WITH THE OTHER CONTRACTOR & AGENCIES:

Without repugnance to any other condition, it shall be the responsibility of the contractor executing the work of civil construction to work in close co-operation and co-ordinate the work with other contractors or their authorised representative and the contractor will put a joint scheme with the concurrence of other contractors showing the arrangements for carrying his portion of the work to the Engineer-in-charge and get the approval. The Engineer-in-charge before approving the joint scheme will call the parties concerned and modify the scheme if required. No claim will be entertained on account of the above. The contractor shall confirm in all respects with the provisions of any statutory regulations, ordinances or by laws of any local or locally constituted authorities or public bodies which may be applicable from time to time to works or any temporary works. The contractor shall keep the owner indemnified against all penalties and liabilities of every kind arising out of non-adherence to such statutes, ordinance, laws, rules, regulations, etc.

GC-32 OTHER AGENCIES AT SITE :

The Contractor shall have to execute the work in such place and condition where other agencies will also be engaged for other works, such as site grading, filling and levelling, electrical and mechanical engineering works, etc. No claim shall be entertained for works being executed in the above circumstances.

GC-33 NOTICES :

Any notice under this contract may be served on the contractor or his duly authorized representative at the job site or may be served by registered post direct to the official address of the contractor proof of issue of any such notice could be conclusive of the contractor having been duly informed of all contents therein.

GC-34 RIGHT OF VARIOUS INTERESTS :

The Surat Municipal Corporation reserves the right to distribute the work between more than one contractor. Contractor shall co-operate and afford reasonable opportunity to other contractors for access to the works for the carriage and storage of materials and execution of their works.

Wherever the work being done by any department of the owner or by other contractor employed by the owner is contingent upon work covered by this contract, the respective rights of the various interests shall be determined by Engineer-in-charge to secure the completion of various portions of the work in general harmony.

GC-35 PRICE ADJUSTMENT :

No adjustment in price shall be allowed as the time limit for completion of the project is less than or equal to One year.

Moreover the Price adjustment shall not be made even if extension of time limit given for the work.

GC-36 TERMS OF PAYMENT :

The payment of Bills shall be made progressively according to the rules and practice followed by the Municipal Corporation. The progressive payment unless otherwise provided in the Contract Agreement or subsequently agreed to by the parties, shall be made generally monthly on submission of a bill by the Contractor in prescribed form in an amount according to the value of the work performed less the aggregate of previous progressive payments and as required by clause GC-37

(Retention money) herein. All such progressive payment shall be regarded as payment by way of advance against final payment.

Payment for the work done by the contractor will be based on the measurement at various stages of the work, in accordance with the conditions at Clause GC-77 (Measurement of Work in Progress)

GC-37 RETENTION MONEY :

Pursuant to Clause GC-36 Terms of Payment) on all money due to the contractor for work done, Municipal Corporation will hold as retention money as per IT 27. The retention money will not normally be due for payment until the completion of the entire work and till such period the work has been finally accepted by the Municipal Corporation and completion certificate issued by the Municipal Corporation in pursuant to Clause No. GC-83 (Completion Certificate).

However, after the assurance of completion certificate, and Municipal Commissioner may at its own discretion and having considered the Contractor's performance and diligence during the contract time allow the retention money to be converted into a Bond as stipulated in IT-27.

GC-38 PAYMENT DUE FROM THE CONTRACTOR :

All costs, damages or expenses, for which under the Contract the Contractor is liable to the Municipal Corporation deducted by the Municipal Corporation from any money due or becoming due to the Contractor under the contract or from any other contract with the Municipal Corporation or may be recovered by action at law or otherwise from the Contractor.

GC-39 CONTINGENT FEE :

1. The Contractor warrants that he has not employed any person to solicit or secure the contract upon any agreement for a commission, percentage, brokerage or contingent fee. Breach of this warranty shall give the Municipal Commissioner the right to cancel the contract or to take any other measure as the Municipal Commissioner may deem fit. The warranty does not apply to commissions payable by the contractor to establish commercial or selling agent for the purpose of securing business.

2. No officer, employer of the Municipal Corporation be admitted to any share or part of this contract or to any benefit that may arise therefrom.

GC-40 BREACH OF CONTRACT BY CONTRACTOR :

If the contractor fails to perform the work under the contract with due diligence or shall refuse or neglect to comply with instruction given to him in by the Engineer-in-charge accordance with the contract, or shall contravene the provisions of the contract, the S.M.C. may give notice in writing to the contractor to make good such failure, neglect or contravention. Should the Contractor fail to comply with such written notice within twenty eight (28) days or receipt, if the Municipal Commissioner shall think fit, it shall be lawful for the Municipal Corporation, without prejudice to any other rights, the contractor may have under the contract, to terminate the contract for all or part of the works, and to make any other arrangements it shall deem necessary to complete the work outstanding under the contract at the time of termination. In this event Article GC-15 (Subletting of work) and GC-16 (Sub-Contracts for Temporary Works etc.) hereof shall be invoked and the performance Bond shall immediately become due and payable to the Municipal Commissioner the value of the work done on the date of termination and not paid for shall stand forfeited to the Municipal Corporation and the Municipal Corporation shall have free use of any works which the contractor may have at the site at the time of termination of the contract.

GC-41 DEFAULT OF CONTRACTOR :

1. The Municipal Corporation may upon written notice of default to the contractor terminate the contract in circumstance detailed here under :

(a) If in the judgment of the Municipal Corporation the contractor fails to make completion of works within the time specified in the completion schedule or within the period for which extension has been granted by the Municipal Corporation /Engineer to the Contractor.

- (b) If in the judgment of the Municipal Corporation the contractor fails to comply with any of the provisions of this contract.
- 2. In the event the Municipal Commissioner terminates the contract in whole or in part as provided in Article GC-48 (Termination of Contract), the Municipal Corporation reserves the right to purchase upon such terms and in such manner as it may deem appropriate, plant similar to that terminated and the contractor will be liable to the Municipal Corporation for any additional costs for such similar and / or for liquidated damages for delay until such reasonable time as may be required for the final completion of works.
- 3. If this contract is terminated as provided in this paragraph GC - 30(Power of entry) (1) the Municipal Corporation in addition to any other rights provided in this clause, may require the Contractor to transfer title and deliver to the Municipal Corporation under any of the following cases in the manual and as directed by the Municipal Corporation. (a) Any partially completed information and contract rights as the contractor has specifically produced or acquired for the performance of the contract so terminated.
- 4. In the event the Municipal Corporation does not terminate the contract as provided in the paragraph GC- 48 (Termination of Contract) the Contractor shall continue performance of the contract, in which case the shall be liable to the Municipal Corporation for liquidated damages for delay until the works are accepted.

GC-42 BANKRUPTCY :

If the Contractor shall become bankrupt or insolvent or have a receiving order made against him, or compound with the creditors, or being the Municipal Corporation commence to be wound up, not being a member's Voluntary winding up for the purpose of amalgamation or reconstruction, or carry on its business under a receiver for the benefit of his creditors or any of them, the owner shall be at liberty to either (a) terminate the contract forthwith by giving notice in writing to the contractor or to the receiver or liquidator or to any person or organization in whom the contract may become vested and to act in the manner provided in Article GC-41 (Default of Contractor) as though the last mentioned notice had been the notice referred to in such Article of (b) to give such receiver liquidator or other person in work the contract may become vested the option of carrying out the contract subject to his providing a satisfactory guarantee for the due and faithful performance of the contract subject to his providing a satisfactory guarantee for the due and faithful performance of the contract up to an amount to be agreed. In the event that the Municipal Corporation terminates the Contract in accordance with this article, the performance Bond shall immediately become due and payable on demand to Municipal Corporation.

GC-43 OWNERSHIP :

Works supplied pursuant to the Contract shall become the property of the Municipal Corporation from whichever is the earlier of the following times, namely,

- (a) When the works are completed pursuant to the Contract.
- (b) When the Contractor has been paid any sum to which he may become entitled in respect thereof pursuant to clause GC-36 (Terms of Payment).

GC-44 DECLARATION AGAINST WAIVER :

The condonation by the Municipal Corporation of any breach of branches by the stipulations and conditions contained in the contract shall in no way prejudice or effect to the constructed as a waiver of the Municipal Corporation rights, powers and remedies under the contract in respect of any breach or breaches.

GC-45 LAWS GOVERNING THE CONTRACT :

The contract shall be constituted according to and Subject to the laws of India and the State of Gujarat and under the jurisdiction of the courts of Gujarat at Surat.

GC-46 OVERPAYMENT AND UNDERPAYMENT :

Whenever any claim for payment of a sum to the Municipal Corporation arises out of or under this Contract against the contractor the same may be deducted by the Municipal Corporation from any sum then due or which at any time thereafter may become due to the contractor under this contract and failing that under any other contract with the Municipal Corporation or from any sum due to the contractor with the Municipal Corporation (which may be available with Municipal Corporation), or from his retention money, or he shall pay the claim on demand. The Municipal Corporation reserves the right to carry out post payment audit and technical examination of the final bill including all supporting vouchers, abstracts, etc.

The Municipal Corporation further reserves the right to enforce recovery of any over payment when detected notwithstanding the fact that the amount of the final bill may be included by the Contractor. If as a result of such audit and technical examination any over payment is discovered in respect of any work done by the Contractor or alleged to have been done by him under the contract, it shall be recovered by the Municipal Corporation from the contractor by way of all the means prescribed above or if any under payment is discovered by the Municipal Corporation, any amount due to the contractor under this contract or under payment may be adjusted against any amount then due or which may at any time thereafter become due before payment is made to the contractor from him to the Municipal Corporation on any other contract account whatsoever.

GC-47 SETTLEMENT OF DISPUTES :

Except or otherwise specifically provided in the contract, all disputes concerning question of fact arising under the contract shall be decided by the Commissioner, subjected to a written appeal by the Contractor to the Commissioner and these decisions shall be final and binding on the parties hereto. Any disputes or difference including those considered as such by only one of the parties arising out of or in connection with this contract shall be to the extent possible settled amicably between the parties. If amicable settlement cannot be reached then all dispute issues shall be settled as provided in (a).

(a) DISPUTES OR DIFFERENCE TO BE REFERRED TO:

If at any time, any question, disputes or differences of any kind whatsoever shall arise between the Engineer-in-charge and the Contractor upon or in relation to or in connection with this contract, either party may forthwith give to the other, notice in writing of the existence of such question, dispute or difference as to any decision, opinion, instruction, direction certificate or evaluation of the Engineer.

The question or difference shall be settled by the Municipal Commissioner, who shall state his decision in writing and give notice of same to the Engineer and to the Contractor such decision shall be final and binding upon both parties to the contract and work on contract if not already breached or abandoned shall proceed normally unless and until the same shall be revised (or upheld) due to any judicial proceeding.

Should the Municipal Commissioner fail to give a decision within three (3) calendar months after issuance of notice of a question, dispute or difference or if the Contractor is dissatisfied with any such decision of the Municipal Commissioner, then the matter may be referred to Standing Committee. Then also, if the said question of difference or dispute remains unsolved / unsettled and if the contractor is dissatisfied with any such decision of the Standing Committee, then the matter may be referred to the court of law subject to SURAT JURISDICTION.

GC-48 TERMINATION OF THE CONTRACT:

1. If the Contractor finds it impracticable to continue operation owing to Force Majeure reasons or for any reason beyond his and/or the Municipal Commissioner find site impossible to continue operation when prompt notification in writing shall be given by the party affected to the other.
2. If the delay or difficulties so caused can not be expected to cease or become unavoidable or if operations can not be resumed within six(6) months the party shall have the right to terminate the contract upon Ten (10) days written notice to the other. In the event of such termination of the contract, payment to the Contractor will be made as follows :

- a) The Contractor shall be paid for all works approved by the Engineer and for any other legitimate expenses due to him.
 - b) If the Municipal Commissioner terminates the contract owing to Force Majeure or due to any cause beyond its control, the contractor shall additionally be paid for any work done during the said Six (6) months period including any financial commitment made for the proper performance of the Contract and which are not reasonably defrayed by payment under (a) above;
 - c) The Municipal Commissioner also release all bonds and guarantees at its disposal except in case where the total amount of payments made to the contractor exceeds the final amount due to him in which case the contractor shall refund the excess amount within Sixty (60) days after termination and the Municipal Commissioner thereafter shall release all bonds and guarantees, should the contractor fail to refund the amount received in excess within the said period such amounts shall be deducted from the bonds or guarantees provided.
3. On the termination of the contract for any cause the contractor shall see the orderly suspension and termination of operations, with due consideration to the interests of the Municipal Corporation with respect to completion, safeguarding or storing of materials procured for the performance of the contract and the salvage and resale thereof.

GC-49 CHANGES IN CONSTITUTION :

Where the contractor is a partnership firm, the prior approval in writing of the Municipal Commissioner shall be obtained any change is made in the constitution of the firm. Where the contractor is an individual or an undivided family business concern such approval as aforesaid shall likewise be obtained before the contractor enters into any partnership agreement where under the partnership firm would have the right to carry out the works hereby undertaken by the contractor. If prior approval as aforesaid is not obtained the contract shall be deemed to have been assigned in contravention of Article thereof.

GC-50 SUB-CONTRACTUAL RELATIONS :

All work performed for the contract by sub-contractor shall be pursuant to an appropriate agreement between the contractor and sub-contractor which shall contain provisions to :

- a) Protect and preserve the rights of the Municipal Corporation and the Engineer with respect to the work to be performed under the sub-contract so that the sub-contractor thereof will not prejudice such rights.
- b) Require that such work be performed in accordance with requirements of the Contract documents.
- c) Require under such contract of which the contractor is a party, the submission to the contractor of application for payment and claims for additional costs, extension of time, damages for delay or otherwise with respect to the sub-contracted portions of the work in sufficient time, that the contractor may apply for payment and comply in accordance with the contract Documents for like claim by the Contractor upon the Municipal Corporation.
- d) Waive all rights the contracting parties may have against one another for damages caused by fire or other perils covered by the property insurance except such rights as they may have to the proceeds so such insurance held by the Municipal Corporation as trustee and,
- e) Obligate each sub-contractor specifically to consent to the provisions of this Article.

GC-51 LIEN :

If, at any time, there should be evidence of any lien or claim for which owner might have become liable and which is chargeable to the contractor, the owner shall have the right to retain out of any payment then due or thereafter to become due an amount sufficient to completely indemnify the owner against such lien or claim or if such lien or claim be valid the owner may be or become due and payable to the contractor. If any lien or claims remaining, unsettled after all payments are made, the contractor shall refund or pay to the owner all money that the latter may be compelled to pay in discharging such lien or claim including all cost and reasonable expenses.

GC-52 EXECUTION OF WORK :

The whole work shall be carried out in strict conformity with the provisions of the Contract Documents, detailed drawings, specifications and the instructions of the Engineer-in-charge from time to time. The Contractor shall ensure that the whole work is executed in the most substantial, proper and best workmanship using materials of best quality in strict accordance with the specifications to the entire satisfaction of the Engineer-in-charge.

GC-53 WORK IN MONSOON :

When the work continues in monsoon, the contractor shall maintain minimum labour force required, for the work and plan and execute the construction and erection work according to the prescribed schedule. No extra rate will be considered for such work in monsoon. During monsoon and entire constructing period the contractor shall keep the site free from water at his own cost.

GC-54 WORK CLOSED ON SUNDAYS & HOLIDAYS & BETWEEN SUNSET AND SUNRISE:

No work shall be carried out on Sundays and Corporation Holidays and no work shall be carried out between sunset and sunrise. Except with the special permission of Engineer-in-charge in writing previously obtained and with holding such permissions shall be no ground of complaint on the part of contractor or cause for compensation to them. Working period shall be maximum eight (8) hours per days.

GC-55 EXTRA SUPERVISION CHARGES TO BE BORNE BY CONTRACTOR :

Further to clause No.GC-54 when Engineer-in-charge feels necessary to give permission to contractor for carrying out work for period of more than Eight hours working period in a day and/or to continue work on Sunday and Corporation holidays. Extra Supervision charges arising due to overtime working of Corporation's staff shall be borne by the contractor at prevailing rates from time to time. Such extra supervision charges shall be deducted by Corporation from the running bill/s of the contractor at Surat Municipal Corporation's description.

GC-56 DRAWING TO BE SUPPLIED BY THE OWNER :

The drawings attached with the tender documents shall be for general guidance of the contractor to enable him to visualize the type of work contemplated and scope of work involved. Detailed working drawings according to which the work is to be done shall be furnished from time to time as the work progresses. The contractor shall study the drawings thoroughly in connection with other connected details and discrepancy if any bring to the notice of the Engineer-in-charge before actually carrying out the work.

GC-57 DRAWINGS TO BE SUPPLIED BY THE CONTRACTOR :

Where drawings, date are to be furnished by the contractor they shall be as enumerated in special condition of contract and shall be furnished within the specified time. Where approval of drawings has been specified it shall be the Contractor's responsibility to have these drawings got approved before any work is taken up with regard to the same. Any changes becoming necessary in these drawings during the execution of the work shall have to be carried out by the contractor at no extra cost. All final drawings shall bear the certification stamp as indicated below duly signed by both the contractor and Engineer-in-charge.

"Certified true for _____project Agreement
No. _____ Signed _____
Contractor Engineer-in-charge Drawings will be approved within three (3) weeks of the receipt of the same by the Engineer-in-charge.

GC-58 SETTING OUT WORK :

The contractor shall set out the work on the site handed by the Engineer-in-charge and shall be responsible for the correctness of the same. The work shall be carried out to the entire satisfaction of

Engineer-in-charge. The approval thereof or partaking by Engineer-in-charge in setting out work shall not relieve contractor of any of his responsibilities.

The contractor shall provide at his own cost all necessary level posts, pegs, bamboos, flage, ranging, rods, strings and other materials and labourers required for proper setting out of the work. The Contractor shall provide, fix and be responsible for the maintenance of all stakes, temples level marks profiles and similar other things and shall take and necessary precautions to prevent their removal or disturbance and shall be responsible for the consequence for such removal or disturbance. The contractor shall also be responsible for the maintenance of all existing Survey Marks, Boundary Marks, Distance Marks and Centre line marks either existing or fixed by the Contractor. The Centre, longitudinal or face lines and cross lines shall be marked by small masonry pillars. Each pillar shall have distance mark at the centre for setting up the theodolite. The work shall not be started unless the setting out is checked by Engineer-in-charge in writing but such approval shall not relive the contractor of his responsibilities. The contractor shall provide all materials, labour and other facilities necessary for checking at his own cost.

Pillars bearing geodetic marks on site shall be protected by the Contractor. On completion of the work the contractor shall submit the Geodetic documents according to which the work has been carried out.

GC-59 RESPONSIBILITIES OF CONTRACTOR FOR CORRECTNESS OF WORK:

The contractor shall be entirely and exclusively responsible for the correctness of every part of the work and shall rectify completely and errors thereon at his own cost when so instructed by Engineer-in-charge.

1. **Materials to be supplied by Contractor :**

Contractor shall procure and provide all the materials required for the execution and maintenance of work including M.S. rods, all tools, tackle, construction plant and equipment except the materials to be supplied by the owner detailed in the contract documents and for the transport thereof, owner, shall made recommendations to the respective authorities if designed by the contractor but assumes no responsibility or any nature. Owner shall insist for procurement of materials with ISI Marks supplied by reputed firms on the DGS & D List. 2. If however the Engineer-in-charge feels that work is likely to be delayed due to contractor's inability to procure the materials, the Engineer-in-charge shall have the right to procure materials from the market and the contractor will accept these materials at the rates decided by Engineer-in-charge.

GC-60 MATERIALS TO BE SUPPLIED BY THE OWNER :

1. If the contract provides certain materials or stores to be supplied by the S.M.C. such materials and stores shall be transported by the contractor at his cost from S.M.C's stores or Railway Station. The sum due from contractor for the value of materials supplied by the owner will be recovered from the R.A.Bill on the basis of actual consumption of materials in the work covered and for which R.A.Bill has been prepared. After completion of the work contract has to account for the full quantity of materials supplied to him.
2. The value of store materials supplied by the S.M.C. to the contract shall be charged at rates shown in the contract document and in case any other material not listed in the schedule of materials is supplied by the S.M.C., the same shall be charged at cost price including carting and other expenses incurred in procuring the same. All materials so supplied shall remain the property of the owner and shall not be removed from the site on any account. Any material remaining unused at the time of completion of work or termination of contract shall be returned to S.M.C.'s store or any other place as directed by the Engineer-in-charge in perfectly good condition at contractor's cost. When materials are supplied free of cost for use in work and surplus and unaccounted balances thereof are not returned to the Municipal Corporation, recovery in respect of such balance will be effected at double the applicable issue rate of the materials or the market rate whichever is higher.

GC-61 MATERIALS PROCURED WITH ASSISTANCE OF THE OWNER :

Notwithstanding anything contained to the contrary in any of the clauses of this contract, where any materials for the execution of the contract are procured with the assistance of the S.M.C. either by issue from S.M.C. stock or purchase made under orders or permits or licences issued by the Government, the contractor shall hold the same materials as trustees for owner and use such materials economically and solely for the purpose of contract and not dispose them off without the permission of S.M.C. and return, if required by Engineer-in-charge, all surplus or unserviceable materials that may be left with him after the completion of the contract or at its termination for any reason whatsoever on his being paid or credited such prices as Engineer-in-charge shall determine having due regard to the conditions of the materials. The price allowed to contractor shall not exceed the amount charged to him excluding the storage charges if any. The decision of Engineer-in-charge shall be final and conclusive in such matters. In the event of breach of the aforesaid condition, the contractor shall in terms of licence of permits and/or for criminal breach of trust be liable to compensate S.M.C. at double rate or any higher rates. In the event of these materials at that time having higher rate or not being available in the market then any other rate to be determined by the Engineer-in-charge and his decision shall be final and conclusive.

GC-62 MATERIALS OBTAINED FROM DISMANTLING :

If the contractor, in the course of execution of work is called upon to dismantle any part for reasons other than on account of bad or imperfect work, the materials obtained from dismantling will be the property of the S.M.C. and will be disposed of as per instruction of Engineer-in-charge in the best interest of the S.M.C.

GC-63 ARTICLE OF VALUE OR TREASURE FOUND DURING CONSTRUCTION:

All gold, silver and other minerals of any description and all precious stones, coins, treasures, relics, antiquities and other similar things which shall be found in under or upon site shall be the property of the owner and the contractor shall properly preserve the same to the satisfaction of Engineer-in-charge and shall hand over the same to the owner.

GC-64 DISCREPANCIES BETWEEN INSTRUCTIONS :

If there is any discrepancy between the various stipulations of the contract documents of instructions to the contractor or his authorised representative or if any doubt arises as in the meaning of such stipulation or instructions, the contractor shall immediately refer in writing to the Engineer-in-charge whose decision shall be final and conclusive and no claim for losses caused by such discrepancy, shall in any event be admissible.

In case there is any discrepancy in measurements shown in drawing and specifications, the same shown in drawing shall be considered as final and will be binding upon the contractor.

GC-65 SCHEDULE OF QUANTITIES AND EXTRA ITEMS :**A. Schedule of Quantities :**

Variations in the quantities of work in schedule of quantities shall not vitiate the contract. The rates quoted for the individual items shall apply for the quantities of work increased or decreased by not more than twenty percent for each of the items, should the quantities of work actually involved under any item vary by more than Thirty (30%) percent, the rate for such item of work shall be revised in accordance with the procedures indicated under clause "Extra Items". The payment for the items will, however, continue to be at the original rate till the revised rate decided.

B. Extra Items :

Extra Items of work shall not vitiate the contract. The contractor shall be bound to execute extra items of work as directed by the Engineer-in-charge. The rates for extra items shall be derived from the S.O.R. (R&B Division & SMC) Year 2024-2025 (1% Construction Cess shall be added in R & B S.O.R. Rate) and quoted premium of tender. If the rate of extra item is not available in S.O.R. it will be derived on prevailing market rate.

GC-66 ACTION WHEN NO SPECIFICATION IS ISSUED :

In case of any class of work for which no specification is supplied by the S.M.C. in the tender documents, such work shall be carried out in accordance with I.S.S. do not cover the same, the work should be carried out as per standard Engineering practice subject to the approval of Engineer-in-charge.

GC-67 ABNORMAL RATES :

Contractor is expected to quote rate for each item after careful analysis of cost involved for the performance of the completed item considering all specifications and conditions of contract. This will avoid loss of profit or gain in case of curtailment or change or specification for any item. In case it is noticed that the rates quoted by a tenderer for any item is usually high or unusually low, it will be sufficient cause for rejection of tender unless the S.M.C. is convinced about the reasonableness of the rates on scrutiny of the analysis for such rate to the furnishing by the tenderer or demand.

GC-68 ASSISTANCE TO ENGINEER-IN-CHARGE :

Contractor shall make available to Engineer-in-charge free of cost all necessary instruments and assistance in checking of any work made by the contractor for taking measurement of work.

GC-69 TEST OF QUALITY OF WORK :

1. All workmanship shall be of the best kind described in the contract document and in accordance with the instructions of Engineer-in-charge and shall be subjected from time to time to such test at contractor's cost as the Engineer-in-charge may direct at the place of manufacture or fabrication or on site or at any such place. Contractor shall provide assistance, instruments, labour and materials as are normally required for examining, measuring and testing any work. Workmanship as may be selected and required by Engineer-in-charge.
2. All tests will be necessary in connection with the execution of work as decided by Engineer-in-charge shall be carried out at an approved laboratory at contractor's cost.
3. The contractor shall furnish to Engineer-in-charge for approval when requested or if required by the specification adequate samples of all materials and finished goods to be used in work and sufficiently in advance to permit test and examination thereof. All materials furnished and finished goods applied in work shall be exactly as per the approved samples.
4. All the testing charges shall be borne by the Contractor. The contractor shall have to bear all charges for testing and inspection purpose. The Contractor shall have to bear the cost of and travelling allowance of SMC officials.

GC-70 ACTION AND COMPENSATION IN CASE OF BAD WORKMANSHIP :

If it shall appear to the Engineer-in-charge that any work has been executed with materials of inferior description, or quality or are unsound or with unsound, imperfect or unskilled workmanship or otherwise not in accordance with the contract, the contractor shall, on demand in writing from Engineer-in-charge or his authorised representative specifying the work, materials or articles complained of, notwithstanding that the same may have been inadvertently passed, certified and paid for, forthwith rectify or remove and reconstruct the work, specified and in the event of failure to do so within a period to be specified by Engineer-in-charge in his aforesaid demand, contractor shall be liable to pay compensation at the rate of one (1) percent of the tendered cost of work for every Ten (10) days limited to a maximum of Ten (10%) Percent of the value of work while his failure to do so continues and in the case of any such failure the Engineer-in-charge may on expiry of the notice period rectify and remove and re-execute the work or remove and replace with other at the risk and cost of the Contractor. The decision of the Engineer-in-charge as to any question arising under this clause shall be final and conclusive.

GC-71 SUSPENSION OF WORK :

Contractor shall, if ordered in writing by Engineer-in-charge or his representative temporarily suspend the work or any part thereof for such time (not exceeding two months) as ordered and

shall not after receiving such written order proceed with the work until he shall have received a written order to proceed therewith the contractor shall not be entitled to claim compensation for any loss or damage sustained by him by reason of temporary suspension of work as aforesaid. An extension of time for completion of work will be granted to the contractor corresponding to the delay caused by such suspension of work if the applied for the same provided the suspension was not consequent upon any default or failure on the part of the contractor.

GC-72 OWNER MAY DO PART OF THE WORK :

When the contractor fails to comply with any instructions given in accordance with the provisions of this contract, the S.M.C. has the right to carry out such parts of work as the S.M.C. may designate whether by purchasing materials and engaging labour or by the agency of another contractor. In such case the S.M.C. shall deduct from the amount which otherwise might become due to contractor the cost of such work and materials with Ten (10%) percent added to cover all departmental charges and should the total amount thereof exceed the amount due to contractor, contractor shall pay the difference to S.M.C.

GC-73 POSSESSION PRIOR TO COMPLETION :

The Engineer-in-charge shall have the right to take possession of or to use any completed or partly completed work or part of work, such possession or use shall not be deemed to be an acceptance of any work completed in accordance with the contract. If such prior possession or use by Engineer-in-charge delays the progress of work, equitable adjustment in the time of completion will be made and the contract shall be deemed to be modified accordingly.

GC-74 COMPLETION CERTIFICATE :

As soon as the work has been completed in accordance with contract (except in minor respect that do not effect their use for the purpose for which they are intended and except for maintenance thereof) as per general conditions of contract and has passed the tests on completion, the Engineer-in-charge shall issue a certificate (hereinafter called completion certificate) in which he shall certify the date on which work has been completed and has passed the said tests and S.M.C. shall be deemed to have taken over work on the date so certified. If work has been divided in various groups in contract, S.M.C. shall be entitled to take over any group or groups before the other or others and there-upon the Engineer-in-charge will issue a completion certificate which will, however, be for such group or groups so taken over only. In order that contractor could obtain a completion certificate, he shall make good, with all speed any defect arising from the defective materials supplied by contractor or workmanship or any act or omission of contract that may have been discovered or developed after the work or group of works has been taken over. The period allowed for carrying out such work will be normally, one month. If any defect be not remedied within a reasonable time, S.M.C. may proceed to do work at contractor's risk and expenses and deduct from the final bill such amount as may be decided by S.M.C. If by reason of any default on the part of the contractor, a completion certificate has not been issued in respect of every portion of work within one month after the date fixed by contractor for completion of work, S.M.C. shall be at liberty to use work or any portion thereof in respect of which a completion-certificate has been issued, provided that work or the portion thereof so used as aforesaid shall be afforded reasonable opportunity for completion of this work for the issue of completion certificate.

1. When the contractor fulfil his obligation as per terms of contract he shall be eligible to apply for completion certificate. Contractor may apply for separate completion certificate in respect of each such portion of work by submitting the completion documents along with such application for completion certificate.

The Engineer-in-charge shall normally issue to contractor the completion certificate within 2 (Two) month after receiving an application thereof from contractor after verifying from the complete documents and satisfying himself that work has been completed in accordance with and as set out in the construction and erection drawings and the contract document. Contractor

after obtaining the completion certificate is eligible to present the final bill for work executed by him under the terms of contract.

2. Within 2 (Two) month of completion of work in all respect contractor shall be furnished with a certificate by the Engineer-in-charge of such completion but no certificate shall be given nor shall work be deemed to have been executed, until all (1) scaffolding, surplus materials and rubbish is clearing off site completely (2) until work shall have been measured by the Engineer-in-charge whose measurement shall be binding and conclusive and (3) until all the temporary works, labour and staff colonies etc. constructed are removed and the work site cleaned to the satisfaction of the Engineer-in-charge. If contractors shall fail to comply with the requirements as aforesaid or before date fixed for the completion of work, the Engineer-in-charge may at the expenses of contractor remove such scaffolding, surplus materials and rubbish and dispose of the same he thinks fit.
3. The following documents will form the completion documents :
 - (a) Technical documents according to which work was carried out.
 - (b) Construction drawings showing therein the modifications and corrections made during the course of execution signed by Engineer-in-charge.
 - (c) Completion certificate for "Embedded" or "Covered" up work.
 - (d) Certificate of final levels as set out for various works.
 - (e) Material appropriation statement for the materials issued by owner for work and list of surplus materials returned to S.M.C.'s store duly supported by necessary documents.
4. Upon expiry of the period of defects liability and subject to Engineer-in-charge being satisfied that work has been duly maintained by contractor during the defects liability period as fixed originally, or as external subsequently and the contractor has in all respects made up by subsidence and performed all his obligations under contract, the Engineer-in-charge shall (without prejudice to the rights of owner in any way) give final certificate to that effect. The Contractor shall not be considered to have fulfilled the whole of his obligation until final certificate shall have been given by the Engineer-in-charge notwithstanding previous entry upon and taking possession, working or using of the same or any part thereof by owner.
5. Final Certificate only Evidence of Completion :

Except the final certificate no other certificate or payments against a certificate or an general account shall be taken to be an admission by owner of the due performance of contract or any part thereof or of occupancy validity of any claim by the contractor.

GC-75 SCHEDULE OF RATES :

1. The price/rates quoted by the contractor shall be remain firm till the issue of final certificate and shall be subject to price ADJUSTMENT CLAUSE GC-35. Schedule of rates shall be deemed to include and cover all costs expenses and liabilities of every description and all risks of every kind to be taken in executing, completing and handling overwork to owner by contractor. Contractor shall be deemed to have known the nature, scope, magnitude and the extent of work and materials required through contract documents may not fully and precisely furnish them. He shall make such provision in the schedule of rates as he may consider necessary to cover the cost of such items of work and materials as may be reasonable and necessary to completion work. The opinion of Engineer-in-charge as to the item of work shall be final and binding on Contractor although the same may be not shown on or described specifically in contract documents.
2. The Schedule of rates shall be deemed to include and cover the cost of all constructional plant, temporary work, pumps, materials, labour and all other materials in connection with each item in schedule of rates and the execution of work or any portion thereof furnished complete in every respect and maintained as shown or described in the contract document or as may be ordered in writing during the continuance of the contract.
3. The Schedule of rates shall be deemed to include and cover the cost of all royalties and free for the articles and processes, protected by letters patent or otherwise incorporated in or used in connection with work, also all royalties, and other payments in connection with materials of whatsoever kind for work and shall include an indemnity to-owner which contractor hereby gives

against all action, proceeding, claims, damages, costs and expenses arising from the incorporation in use of work of any such articles, processes or materials. Octroi of other Municipal or Local Board charges if levied on materials equipment of machineries to be brought to site for use on work shall be borne by the contractor.

4. No exemption or reduction of custom duties excise duties, sales-tax or any other taxes or charges of the Central or State Government any local body whatsoever will be granted to obtained. All of such expenses shall be deemed to have been included in and covered by schedule of rates. Contractor will also obtained and pay for all permits or other privileges necessary to complete work.
5. The schedule of rates shall be deemed to include and cover risk on account of delay or intereference with contractor's conduct of work which may occure from any cause including orders of S.M.C. in the exercise of his power and no account of extension of time granted due to various reasons.
6. For work under unit rate basis no alteration will be allowed in the schedule of rates by reason of work or any part of them being field, altered extended, diminished or ommitted.

GC-76 PROCEDURE FOR MEASUREMENT OF WORK IN PROGRESS :

1. All measurements shall be in metric system. All the work in progress will be jointly measured by the representative of Engineer-in-charge and contractor's authorised agent. Such measurements will be got recorded in the measurement book by the Engineer or his authorised representative and signed by contractor or his authorised agent in token of acceptance. If the contract or his authorised agent fails to be present when even required by the Engineer-in-charge for taking measurements for any reasons whatsoever, the measurement will be taken by the Engineer - in - charge or his authorised representative not withstanding the absence of contract and these measurement will be deemed to be correct and binding on contractor.
2. Contractor will submit a bill in approved proforma in duplicate to the Engineer - in - charge of the work giving abstract and detailed measurements of various items executed during a month as mutually agreed. The Engineer-in-charge shall verify the bill and the claim, far as admissible, adjusted if possible, within 10 days of presentation of the bills.
3. In case of Tenders for completed items of work, contractor may be allowed 'Secured Advance' on the Security of materials brought to site for execution of the constructed items of work the extent of 75% of the value of materials of unperishable nature and an agreement bedrawn up with contractor under which the owner secured a lien on these materials and is safe guarded against losses due to any reasons whatsoever. Recoveries of advance paid would not be post-poned till the whole work is completed but shall be adjusted from his work done or the materials used, the necessary deductions being made when the items of work in which they are used and are billed for. When the mode of measurement is not covered by contract for any item of work it shall be as per latest I.S.I.

GC-77 RUNNING ACCOUNT PAYMENT TO BE RECOVERED AS ADVANCES :

1. All running account payments shall be regarded as payments by way of advance against the final payment only and not as payment for work actually done and completed and shall not preclude the requiring of bad, unsound and imperfect or unskilled work to be removed and taken away and reconstructed or to be considered as an admission of the due performance of contract or any part thereof.

GC-78 NOTICE FOR CLAIM FOR ADDITIONAL PAYMENT :

If the contractor considers that he is entitled to extra payment or compensation or any claim whatsoever in respect of work, he shall forthwith give notice in writing to the Engineer-in-charge about his extra payment and/or compensation. Such notice shall be given to the Engineer-in-charge within Ten (10) days from the happening of any event upon which contractor basis such claims and such notice shall contain full particular of the nature of such claim with full details and amount claimed. Failure on the part of the contractor to put forward any claim with the necessary particulars as

above within the time above specified shall be an absolute waiver thereof. No commission by S.M.C. to reject any such claim and no delay in dealing therewith shall be waiver by S.M.C. of any rights in respect thereof.

GC-79 PAYMENT OF CONTRACTOR'S BILL :

1. The price to be paid by the S.M.C. to contractor for the work to be done and for the performance of all the obligations under taken by the contractor under contract shall be based on the contract price and payment to be made accordingly for the work actually executed and approved by the Engineer-in-charge.
2. No payment shall be made for work costing less than Rs.5,000/-till the work is completed and a certificate of completion given. But in case of work estimated to cost more than Rs.5,000/-contractor on submitting the bill thereof will be entitled to receive a monthly payment, proportionate to the part thereof, approved and passed by Engineer-in-charge whose certificate of such approval and passing of the sum so payable shall be final and conclusive against contractor. This payment will be made after making necessary deductions as stipulated elsewhere in the contract documents for materials, security deposit, etc. The payment shall be released to the contractor within Thirty (30) days of submission of the bill in case of running bill and with in two (02) months in case of final bill, contractor shall present the bill duly pre-receipted on proper revenue stamp.
Payment due to Contractor shall be made by the by crossed Accounts payee cheque in Indian currency forwarding the same to the registered office of the contractor. Owner shall not be responsible if the cheque is mislaid or misappropriated by unauthorised person.

GC-80 FINAL BILL :

The final bill shall be submitted by Contractor within two (02) month of the date of physical completion of work, Otherwise the Engineer-in-charge certificate of the measurement and of total amount payable for work shall be finalised binding on all parties.

GC-81 RECEIPT FOR PAYMENT :

Receipt for payment made on account of work when executed by a firm must be signed by a person holding power of attorney in this respect on behalf of contractor except when described in the tender as a limited company in which case the receipt must be signed in the name of the company by one of its principal officers or by some other person having authority to give effectual receipt for the Company.

GC-82 TAXES, DUTIES, OCTROI, ETC :

GST(goods and service tax) has come in existence from 1st July. 2017 contractor / successful bidder is bound to pay any amount of GST prescribed by the Govt. of india as per the term of contract agreed upon during the course of execution of this contract.

During the course of execution of contract, if there is any change in rate of GST (Goods & Service Tax) by the Government, The same shall be reimbursed / recovered separately by SMC. Subject to the submission of original Receipt / Proof for the amounts actually remitted by the successful Tenderer / contractor to the competent Authority along with a Certificate from Chartered Accountant of Contractor / Successful Bidder certifying that the amount of GST paid to the Government and the same shall be intimated / submitted / claimed within 30 (Thirty) Days from the date of payment Remittance of GST within stipulated period shall be the sole responsibility of the successful Bidder / Contractor, Failing which , SMC may recover the amount due, From any other payable dues with SMC and decision of Municipal Commissioner shall be final and binding on the Contractor / Successful Bidder in this regard further, the non-payment of GST to the Government may lead to the termination of contract and forfeiture of Security deposit / Performance Guarantee Amount.

If imposition of any other new Taxes / Duties / Levies / Cess or any other incidentals etc. or any increase in the existing Taxes / Duties / Levies / cess or any other incidentals etc. (Excluding GST) are imposed

during the course of the contract. The same shall be borne by the Contractor / Successful Bidder only. In no case SMC shall be liable for the same.

1% Construction Cess will be deducted from respective R.A. Bill and Final bill in accordance with the prevailing norms of Govt. of Gujarat.

GC-82(A) Bills and Rates Payable :

The contractor shall submit all the bills on the printed forms at the office of the Engineer-in-charge. The charges to be made in the bills shall always be entered at the rates specified in the agreement or at the partly reduced rates subject to the approval by the Engineer-in-charge in the case of items not completed/executed or in the case of any extra work ordered in pursuance of these conditions and not mentioned or provided for the tender, at the rate here in after provided for such work. **Contractor has to submit invoice of R.A bill as per approved rate plus GST, every running bill. Rate is without GST (Including Cess) and GST charges will be paid as extra by SMC.** During the course of execution of contract, if there is any change in rate of GST (Goods & Service Tax) by the Government, The same shall be reimbursed / recovered separately by SMC.

If in future any changes in GST shall be given separately only after taking opinion from GST departments/GST consultant of SMC also burden in GST. If any shall only be payable only after that additional amount of GST have been deposited on GST portal.

GC-83 INSURANCE :

Contractor shall at his own expenses carry and maintain with reputable Insurance Companies to the satisfaction of owner as follows :

1. **Employees State Insurance Act :**

Contractor agrees to and does hereby accept full and exclusive liability for compliance with all obligations imposed by the Employees' State Insurance Act 1948, and Contractor further agree to defend, indemnify and hold owner harmless from any liability or penalty which may be imposed by the Central or State Government or Local authority by reasons of any asserted violation by contractor or Sub-Contractor of the Employees' State Insurance Act, 1948 and also from all claims, suits or proceedings that may be brought against owner arising tender, growing out of or by reasons of the work provided for by this contract whether brought by employees of Contractor, by third parties or by Central or State Government authority or any administrative Sub-division thereof. Contractor agrees to fill in with the Employees State Insurance Corporation, the declaration form and all forms which may be required in respect Contractor's or Sub-contractor's employees these aggregate remuneration is Rs. 400/-p.m.or less and who are employed in work provided for or those covered by E.S.I from time to time under the agreement. The Contractor shall deduct and secure the agreement of the Sub-contractor to deduct the employees' contribution as per the first Schedule of the Employees' State Insurance Act from wages. Contractor shall remit and secure the agreement of Sub-contractor to remit to the State Bank of India Employees' State Insurance Corporation Accounts, the employees contribution as required by the Act Contractor agrees to maintain all cares and record as required under the Act in respect of employees and payments and contractor shall secure the agreements of the sub-contractors to maintain such records, any expenses incurred for the contributions or maintaining records shall be to contractor's or sub-contractor' account. Owner shall retain such sum as may be necessary from the contract value until contractor shall furnish satisfactory proof that all contribution as required by the Employees' State Insurance Act 1948 have been paid.

2. **Workman's Compensation And Employees Liability Insurance :**

Insurance shall be effected for all contractors employees engaged in the performance of this contract. If any part of work is sublet, contractor shall require the sub-contractor to provide

workmans' compensation and employer's liability insurance which may be required by owner.

3. Other Insurance required under law or regulation by owner :

Contractor shall also carry and maintain any and all other insurance which may be required under any law or regulation from time to time. He shall also carry and maintain any other insurance which may be required by owner.

GC-84 DAMAGE TO PROPERTY :

1. Contractor shall be responsible for making good to the satisfaction of owner any loss of and any damage to all structures and properties belonging to owner or being executed or Procured by owner or of other Agencies within the premises of all work of owner, if such loss or damage is due to fault and / or the negligence or will full act or ommission of contractor, his employees, agent representatives or Sub- contractors.
2. Contractors shall indemnify and keep owner harmless of all claims for damage to properties other than S.M.C's property arising under or by reasons of this agreement if such claims result from the fault and / or negliance or willful act of ommission of contractor,his employees, agents, representatives or sub-contractors.

GC-85 LABOUR LAWS AND REGULATIONS :

1. The contractor shall be reponsible for the strict compliance of and shall ensure strict compliance by his sub contractor employees and agents of all labours and others laws, rules or regulations having the force of law affecting the relationship of employer and employee between the contractor/ sub-contractor and their respective employees.
2. No labour below the age of eighteen (18) year be employed on work.
3. Contractor shall pay to the labours engaged on work according the law.
4. The Contractor and sub-contractors o f the contractor shall obtain proper authority designated in this behalf under any application law, rules or regulations (including but not restricted to the factories Act and Contract Labour Abolition and Regulation Act 1970,) in so far as applicable) any and all such licences, consents, Registration and / or other authorisation as shall from time to time be or become necessary for relatint to the execution of work or any part of portion thereof or the storage or supply of any materials or otherwise in connection with the performance of the contract and shall at all times observance by the sub- contractors, employees and agents of all terms and conditions of the said licences,consents, regulation and other authorisation and laws, rules and regulations applicable thereto.

GC-86 CONTRACTOR TO INDEMNIFY OWNER :

1. The Contractor shall indemnify and keep indemnified the owner and every member, officer and employee of owner from and against all action, claims, demands and liabilities whatsoever and in respect of the breach of any of the above clauses and/or against any claim, action or demand by any workman/ employee of the contractor or any sub-contractor and or from any liability and way to any workman / employee of the contractor or any sub-contractor under any law, rule or regulations having the force of law, including but not limited to claims against the owner under the workman compensation Act 1923. The employees' Provident Funds Act 1952 and/or the Contract Labour (Abolition and Regulations) Act, 1970.
2. Payment of claims and damages :
If owner has to pay any money in respect of such claims or demands as aforesaid, the amount so paid and the cost incurred by the owner shall be charged to and paid by contractor without any dispute notwithstanding the same may have been paid without the consent or authority of the Contractor.
3. In every case in which by virtue of any provision applicable in the workman's Compensation Act 1923 or any other Act, be obliged to pay compensation to workman employed by Contractor the amount of compensation so paid, and without prejudice to the rights of S.M.C. under

sec.(12) Sub-section (2) of the said Act, S.M.C. shall be at liberty to recover such amount from any surplus due to the contractor or the security deposit. S.M.C. will not be bound to contest any claim made under section (12) Sub-section (2) of the said Act except or written request of Contractor and upon the contesting of such claim.

4. The Contractor shall protect adjoining sites against structural decorative and other damages that could be caused to adjoining premises by the execution of these works and made good at his cost, any such damage, so caused.

GC-87 IMPLEMENTATION OF APPRENTICE ACT 1964 :

Contractor shall comply with the provisions of the Apprentice Act 1964 and the orders issued there under from time to time. If he fails to do so, it will be a breach of contract. Contractor shall also be liable for any particular liability arising on account of any violation of the provisions of the Act by him.

GC-88 HEALTH AND SANITARY ARRANGEMENTS FOR WORKERS :

Contractor shall comply with all the rules and regulations of the local sanitary authorities or as framed by owner from time to time for the protection of health and sanitary arrangements of all labour directly or indirectly employed on the work of this contract.

GC-89 SAFETY CODE :

GENERAL :

Contractor shall adhere to safe construction practice and guard against hazardous and unsafe working conditions and shall comply with owner's safety rules and set forth herein.

1. First Aid and Industrial Injuries :
 - 1.1 Contractor shall maintain first aid facilities for its employees and those of his sub-contractor.
 - 1.2 Contractor shall make outside arrangements for ambulance service and for the treatment of industrial injuries. Name of those providing these services shall be furnished to Engineer-in-charge prior to start of construction, and their telephone numbers shall be prominently posted in contractor's field office.
 - 1.3 All injuries shall be reported promptly to Engineer-in-charge, and a copy of Contractor's report covering each personal injury requiring the attention of a physician shall be furnished to owner.
2. General Rules :
 - 2.1 Carrying, striking, matches, lighters inside the project area & smoking within the job site is strictly prohibited. Violators of smoking rules shall be discharged immediately. Within the operation area, not hot work shall be permitted without valid gas safety, fire permits. The Contractor shall also be held liable and responsible for all lapses of his sub-contractors/employees in this regard.
3. Scaffolding :
 - 3.1 Suitable scaffolding shall be provided for workmen for all works that can not 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 man shall be engaged for holding the ladder and if the latter is used for carrying materials as well, suitable foothold and handholds shall be provided on the ladder and the same shall be given inclination not steeper than 1 to 4 (1 horizontal and 4 vertical).
 - 3.2 Scaffolding or staging more than 3.6 M (12') above the ground or floor, swing or suspended from an overhead support or erected with stationary support shall have a guard rail properly attached, bolted, braced and otherwise fixed at least 1.0 M (3') high above the floor or platform of scaffolding or staging and extending along the entire length of the outside ends thereof with only such openings as may be necessary for the delivery of materials. Such scaffolding or staging shall be so fastened as to prevent it from swaying from the building or structure.

4. Maintenance of Safety Devices :
 - 4.1 All scaffolds, ladders and other safety devices mentioned or described herein shall be maintained in some 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 place or work.
5. Display or Safety Instructions :
 - 5.1 These safety provisions should be brought to the notice of all concerned by display 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.
6. Enforcement of Safety Regulations :
 - 6.1 To ensure effective enforcement of the rules and regulations relating safety precautions, the arrangements made by the contractor shall be open to inspection by the welfare Officer, Engineer-in-charge of safety Engineer of the owner or their representatives.
7. No Exemption :
 - 7.1 Notwithstanding the above clause 1.0 to 13.0 there is nothing to exempt the contractor from the operations of any other Act or rules in force in the Republic of India.
 - 7.2 In addition to the above, the Contractor shall abide by the safety code provision as per C.P.W.D. Safety Code framed from time to time.

GC-90 ACCIDENTS :

It shall be the contractor's responsibility to protect against accidents on the work. He shall indemnify the Municipal Corporation against any claim for damage or for injury to persons or property resulting from, and in the course of work and also under the provision of the Workman's Compensation Act. On the occurrence of an accident arising out of the works which results in death or which is so serious as to be likely to result in death, the contractor shall within twenty four hours of such accident, report in writing to the Engineer-in-charge, the facts stating clearly and in sufficient details the circumstances of such accident and the subsequent action. All other accidents on the works involving injuries to persons or damage to property other than that of the contractors shall be promptly reported to the Engineer-in-charge stating clearly and in sufficient details and facts and circumstances of the accidents and the action taken. In all cases the contractor shall indemnify the Municipal Corporation against all loss of damage resulting directly or indirectly from the Contractor's failure to report in the manner aforesaid. This includes penalties or fine consequence of failure to give notice under the workman's compensation Act or failure to confirm to the provisions of the said Act in regard to such accidents.

In the event of an accident in respect of which compensation may become payable under the workmen's compensation Act VIII of 1923 including all modification thereof whether such compensation may become payable by the contractor only.

GC-91 SECURED ADVANCES:

No Secured advances shall be paid.

GC-92 STAR/BASIC RATE:

No Star/Basic Rate shall be considered for any item procured by the contractor at his own cost for this work.

GC-93 SUBMISSION/COMPULSION BY CONTRACTOR:

The contractor registered with S.M.C. or any other Govt. organisation is required to employ minimal technical staff as detailed in the certificate issued to him. If contractor does not employ same technical staff over works entrusted to him, should submit photo-identity and education qualification of technical staff appointed at site.

"The contractor shall have to keep the record of the labourers employed for the concerned work. The contractor should provide attendance card, identification card, pay slip etc to the labourers employed.

Further, the amount of E.S.I. & Provident Fund should be deducted from the salary of the labourers employed and such amount should invariably be deposited to the concerned Government Departments. In addition, the amount of social security under E.P.F. & M.P. act 1952 shall be recovered every month & such amount should invariably be deposited directly to the concern Government Departments. In the same context, the details regarding such amount deposited to the concern Govt. Deptt. and labourers employed shall be furnished to the office of Traffic Cell Department of S.M.C. every month. In case of failure, such amount shall be deducted/recovered from the running bill directly in accordance with the details given by contractor regarding labourers employed and as per the prevailing rules of Government. In absence of detail, an adhoc suitable amount of the total amount of work done shall be recovered directly from the running bills. On submission of evidence of recovery of such amount, the amount recovered/deducted shall be released in the next bill after due sanction of Competent Authority of S.M.C.”

GC-94 Removal of contractor's Employees:

The contractor shall employ in and about the execution of the works only such persons as are careful, skilled, competent and experienced in their several trades and shall on the direction of the Engineer-in-charge for the with cease to employ in and about the execution of the works any person who in the opinion of the client or Engineer-in-charge, misconducts himself, or is incompetent or negligent in the proper performance of his duties or whose continue demployment is undesirable for any reason. Such persons shall not be again employed upon the works without the written permission of the client / Engineer-in-charge.

GC-95 SPECIAL RISK

If during the contract, there shall be outbreak of war (whether war is declared or not), major epidemic, earthquake, or similar occurrence in any part of the world beyond the control of either party to the contract which whether financially or otherwise materially affects the execution of the contract, the contractor shall unless and until, the contract is terminated under the provisions of this article, use his best endeavors to complete the execution of the contract, provided always that the Corporation shall be entitled at any time after the onset of such special risks, to terminate the contract by giving written notice to the contractor and upon such notice being given this contract shall terminate but without prejudice to the rights of either party in respect of any antecedent breach thereof. If any of the works, or materials to be deli subjected to damage or distribution by reasons for the special risks, the contractor shall be entitled to payment for such damage or destroyed materials and to any costs involved in making good damages or destroyed materials as may be required by the Municipal Corporation.

The contractor shall not be liable for payment of compensation for delay or for failure to perform the contract for reasons of Force Majeure such as acts of public enemy, acts of Government fires, floods, cyclone, epidemics, quarantine restrictions, lockouts, strikes, freight embargoes and provided that the contractor shall within Ten (10) days from the beginning of such delay notify the Engineer-in-charge in writing the cause of delay. The Municipal Commissioner shall verify the facts and grant such extension as the facts justify.

GC-96 SECURITY DEPOSIT

The person/persons whose tender may be accepted (hereinafter called the contractor, which expression shall unless excluded by or repugant to the context include his heirs, executors, administrators and assignees) shall (within 15 days of the receipt by him of the notification of the acceptance of his tender otherwise 0.065% per day of S.D. amount will be charged as penalty) deposit with Municipal Commissioner in cash or Government securities endorsed to the Commissioner sum sufficient which will make up the security deposit specified in the tender.

If the amount of the security deposit to be paid in lump sump within the period specified above is not paid the tender contract already accepted shall be considered as cancelled. The security deposit lodged by contractor shall be refunded after the expiry of the Defects Liability period as

shown in the attached Memorandum after deducting dues, if any, which become liable to be recovered from the contractor under the terms and conditions of this Agreement.

GC-97COMPENSATION OF THE DELAY

The time allowed for carrying out the work as entered in the tender shall be strictly observed by the contractor and shall be reckoned from the date on which the order to commence work is given to the contractor. The work shall through out the stipulated period of the contract be proceeded with, all due diligence (time being deemed to be the assence of the contract on the part of the contractor) and the contractor shall pay as compensation a percentage amount (shown in the attached Memorandum) of the tendered cost of the whole work as shown by the tender for every day that the work remains uncommenced or unfinished after the proper days, And further to ensure good progress during the execution of the work the contractor shall be bound, in all cases in which the time allowed for any work exceeds one month, to complete parts of the work during the period shown in the attached Memorandum.

In the event of the contractor failing to comply with these conditions he shall be liable to pay as compensation, the amount mentioned above for every day that the due quantity of work remained incomplete provided always that the total amount of compensation to be paid under the provision of this clause shall not exceed 10 percent of the Tendered cost of the work as shown in the tender.

GC-98ACTION WHEN WHOLE OF SECURITY DEPOSIT IS FOREFITED

In any case in which under any clause of or clauses this contract the contractor shall have tendered himself liable to pay compensation amounting to the whole of this security deposit (whether paid in one sum or deducted by instalments) or in the case of abandonment of the work owing to serious illness or death of the contractor or any other causes, the Commissioner on behalf of the Corporation shall have power to adopt of the following courses, as he may deem best suited to the interest of Municipal Corporation .

- (a) To rescind the contract (of which rescission notice in writting to the contractor under the hand of the Commissioner shall be conclusive evidence) and in that case that security deposit of the contractor shall stand forfeited and be absolutely at the disposal of Municipal Corporation .
- (b) To employ labour paid by the Zone/Department and to supply material to carry out the works, or any part of the work debitting, the contractor with errectness of which cost and price the certificate of Executive Engineer shall be final and conclusive against the contractor and crediting him with the value of the work done, in all respects in the same manner and at the same rates as if it had been carried out by the contractor under the terms of his contract, and in that case the certifate of the Executive Engineer as to the value of the work done shall be final and conclusive agains the contractor.
- (c) To order that the work of the contractor be in measured up and to take such part thereof as shall be unexecuted out of his hands, and to give it to another contractor to complete, in which case any expenses which may be incurred in excess of the sum which would have been paid to original ontractor, if the whole work had been executed by him (as to the amount of which excess expenses the certificate in writing of the Executive Engineer shall be finl and conclusive) be borne & paid by the original contractor shall be deducted from any money due to him by Municipal Corporation under the contract or otherwise from his security deposit or the proceeds of sale thereof, or a sufficient part thereof.

Action when the progress of any perticular portion of the work if unsatisfactory

In the event of any of the above courses be adopted by the Commissioner the contractor shall have no claim to compensation for any loss sustained by him by reason of his purchased or procured any materials or entered into any engagements, or made any advances on account of or with a view to the execution of the work or the performance of the contract. And in case the contract shall be reseinded under provision aforesaid, the contractor shall not be entitled to recover, or be paid any sum for any work thereto actually performed by him under this contract unless and until the Executive Engineer shall have certified in writing the performance of such work and the

amount payable to him in respect thereof, and he shall only be entitled to paid the Particular amount so certified.

GC-99COMPENSATION TO LOSS

Contractor remains liable to pay compensation if action not taken under clause(3)

If the progress of any particular portion of the work is unsatisfactory the Commissioner shall notwithstanding that the general progress of the work is satisfactory in accordance with clause 2, be entitled to take action under clause 3(b) after giving the contractor 10 day's notice in writing and contractor will have no claim for compensation for any loss sustained by him owing to such action.

GC-100Power to take possession of require to removal of, or self contractor's plan

In any case in which any of the powers conferred upon the Commissioner by clause 3 and 4 hereof shall have become exercisable and same shall not have been exercised the non-exercise thereof shall not constitute a waiver of any of the conditions hereof such powers shall notwithstanding

be exercisable in any future case default by the contractor for which by any clause or clauses hereof he is declared liable to pay compensation mounting to the whole of his security deposit require or and the liability of the contractor for past and future compensation shall remain unaffected.

In the event of the Commissioner taking action under sub-clause (a) or (c) of clause 3, he may, be he so desire to take possession of all or any tools, plant materials and stores in or upon the works, or the site thereof or belonging to the contractor, or procured by him and intended to be used for the execution of the work of any part thereof, paying or allowing for the same in account at the contract rates, or in the case of contract rates not being applicable, at current market rates, to be certified by the Executive Engineer whose certificate thereof shall be final. In the alternative the Commissioner may by notice in writing to the contractor or his clerk of the works. Foremen or other authorised agent require him to remove such tools, plant, materials, or stores from the premises within a time specified in such notice; & in the event of the contractor failing to comply with any such requisition, the Commissioner may remove them at the contractor's expense or sell them by action or private sale at the risk and account of the contractor in all respects, and certificate of the Executive Engineer as to the expense of any such removal, and the amount of the proceeds and expense of any of any sale shall be final and conclusive against the contractor.

GC-101EXTENSION OF TIME:

If the Contractor shall desire an extension of the time for completion of the work on the ground of his having been unavoidably hindered in its execution or on any other ground, he shall apply in writing to the Commissioner within 30 days from the date on which he was hindered as aforesaid on or which the cause for asking for extension occurred and the Commissioner may, if in his opinion, there are reasonable grounds for granting an extension, grant such extension as he thinks necessary or proper. The decision of the Commissioner in this matter shall be final.

GC-102FINAL CERTIFICATION:

On completion of the work the contractor shall be furnished with a certificate by the Executive Engineer (hereinafter called the Engineer-in-charge) of such completion, but no such certificate shall be given nor shall the work be considered to complete until the contractor shall have removed from the premises on which the work shall have been executed all scaffolding, surplus materials and rubbish, and shall have cleaned of the dirt from all woodwork, doors, windows, walls, floors or other parts of any building, in or upon which the work has been executed, or of which he may have had possession for the purpose of executing the work, nor until the work shall have been measured by the Engineer-in-charge or where the measurement have been taken by his subordinates until they have received the approval of the Engineer-in-charge, the said measurement being binding and conclusive against the contractor.

If the contractor shall fail to comply with the requirements of this clause as to the removal of scaffolding, surplus materials and rubbish. And cleaning off dirt on or before the date fixed for the

completion of the work, the Engineer-in-charge may, at the expense of the contractor remove such scaffolding surplus material and rubbish, and dispose off the same as he thinks fit and clean off such dirt as aforesaid; and contractor shall forthwith pay the amount off all expenses so incurred, but shall have no claim in respect of any such scaffolding or surplus materials as aforesaid except for any sum actually realized by the sale thereof.

GC-103 PAYMENT ON INTERMEDIATE CERTIFICATE TO BE REGARDED AS ADVANCE.

No payment shall be made for any work, on estimated to cost less than rupees one thousand, till after the whole of the said work shall have been completed & a certificate of completion given. But in the case of works estimated to cost more than rupees one thousand, the contractor shall, on submitting a monthly bill therefore be entitled to received payment proportionate to the percentage shown in the attached Memorandum of the part of the works than approved and passed by the Engineer-in-charge, whose certificate of such approval and passing of the sum so payable shall be final and conclusive against the contractor.

All such intermediate payment shall be regarded as payment by way of advance against the final payments only & not as payments for work actually done and completed and shall not preclude the Engineer-in-charge from requiring bad, unsound imperfect or unskilful work to be removed & taken away & reconstructed, or re-erected. nor shall any such payment be considered as an admission of the due performance of the contract or any part thereof in any respect of the accruing of and claim; nor shall it conclude, determine or affect in any way the Powers of the Engineer-in-charge as to the final settlement and adjustment of the accounts or otherwise, or in any other way very or affect the contract. The final bill shall be submitted by the contractor within one month of the date fixed for the completion of the work, otherwise the Engineer-in-charge's certificate of the measurement and of the total amount payable for the work shall be final and binding on all parties.

GC-104: PAYMENT AT REDUCED RATE ON ACCOUNT OF ITEM OF WORK NOT ACCEPTED AS COMPLETED TO BE THE DISCRETION OF THE ENGINEER-IN-CHARGE

The rates for several items of the work agreed to within, shall be valid only when the item concerned is accepted as having been completed fully in accordance with the sanctioned specifications. In cases where the items of works are not accepted as so completed the Engineer-in-charge may make payment on account of such items at such reduced rates as he may consider reasonable in the preparation of final or on account bills.

CLAUSE-10 Time for Bills to be submitted

A bill may be submitted by the contractor once in each month on or before the date fixed by the Engineer-in-charge for all works executed in the previous months, and the Engineer-in-charge shall take or cause to be taken the requisite measurement for the purpose of having the same verified, and the claim, so far as it is admissible shall be adjusted if possible within fifteen days from the presentation of the bill. If the contractor does not submit the bill within the time fixed as aforesaid, Engineer-in-charge may depute a subordinate to measure up the said work in the presence of the contractor or his duly authorised agent whose counter signature to the measurement list shall be sufficient warrant, and the Engineer-in-charge may prepare a bill from such list which shall be binding on the contractor in all respects.

GC-105: BILLS TO BE ON PRINTED FORMS

The contractor shall submit all bills on the printed forms to be had on application at the office of the Engineer-in-charge. The charges to be made in the bills shall always be entered at the rates specified in the tender or in the case of any extra work ordered in pursuance of these conditions, and not mentioned or provided for in the tender at the rates hereinafter provided for such work.

GC-106 STORES SUPPLIED BY SMC.

If the specification or estimate of the work provides for the use of any special description of materials to be supplied from the Municipal Store or if it is required that the contractor shall use certain stores to be provided by the Engineer-in-charge (such materials and stores and the prices to

be charged thereof as hereinafter mentioned being so far as practicable for the convenience of the contractor but not so as in any way to control meaning or effect of the contract specified in the schedule or memorandum hereto annexed) the contractor shall be supplied with such materials and stores as may be required from time to time to be used by him for the purpose of the contract only and the value of the full quantity of materials and stores so supplied shall be set off deducted from any sums then due, or thereafter to become due to the contractor under the contract, or otherwise or from the security deposit, or the proceeds of sale thereof shall be deposit is held in Gouvernement securities the same or a sufficient portion thereof shall in that case be sold for the purpose. All material supplied to the contractor shall remain the absolute property of Municipal Corporation and shall on no account be removed from the site of the work, and shall at all times be opened to inspection by the Engineer-in-charge. Any such materials unused and in perfectly good condition at the time of completion or determination of the contract shall be returned to the East Zone (Varachha) store, if the Engineer-in-charge so requires by a notice in writing given under his hand, but the contractor shall not be entitled to return any such materials except with such consent and he shall have no claim for compensation on account of any such materials supplied to him as aforesaid but remaining unused by him or for any wastage in or damage thereto.

GC-107:WORKS TO BE EXECUTED IN ACCORDANCE WITH SPECIFICATIONS, DRAWINGS ORDERS ETC.

The contractor shall execute the whole and every part of the work in the most substantial and workman like manner, and both as regards materials and in every other respect in strict accordance with the specifications. The contractor shall also conform exactly, fully and faithfully to designs, drawings and instructions in writing relating to the work signed by the Engineer-in-charge and lodged in his office and to which the contractor shall be entitled to have access for the purpose of inspection at such office, or on the site of the work during office hours, and the contractor shall, if he so requires, be entitled at his own expense to make or cause to be made copies of the specifications and of all such designs, drawings and instruction on aforesaid.

GC-108 : ALTERATION ON SPECIFICATIONS AND DESIGN NOT TO INVALIDATE CONTRACTORS. RATES FOR WORKS NOT ENTERED IN ESTIMATE OR SCHEDULE TO RATES OF THE SMC

The Engineer-in-charge shall have power to take any alteration in, or addition to the original specifications, drawings, designs and instruction that may appear to him to be necessary or advisable during the progress of the work, and the contractor shall be bound to carry out the work in accordance with any instructions in this connection which may be given to him in writing signed by the Engineer-in-charge and such alteration shall not invalidate the contract and any additional work which the contractor may be directed to do in the manner above specified as part of the work shall be carried out by the contractor on the same conditions in all respect on which he agreed to do the main work and at the same rates as are specified in the tender for the main work. And if the additional and altered work includes any class of work for which no rates is specified in this contract then such class of work shall be carried out at the rates entered in the schedule of rates of Municipal Corporation or at the rates mutually agreed upon between the Engineer-in-charge and the contractor whichever are lower if the additional or altered work for which no rate is entered in the schedule of Rates of Municipal Corporation is ordered to be carried out before the rates are agreed upon then the contractor shall, within seven days of the date of receipt by him of the order to carry out the work, inform the Engineer-in-charge of the rate which it is his intention to charge for such class of work and if the Engineer-in-charge does not agree to this rate he shall by notice in writing be at liberty to cancel his order to carry out such class of work, and arrange to carry it out in such manner as he may consider advisable provided always that if the contractor shall commence the work or incur any expenditure in regards thereto before the rates shall have been determined as lastly herein before mentioned, then in such case he shall only be entitled to be paid in such case he shall only be entitled to be paid in respect of the work carried out or expenditure incurred by him prior to the date of the determination of the rate as aforesaid according to such rate or rates as shall be fixed by the Engineer-in-charge. In the event of a dispute, the decision of the

Commissioner will be final.

Where, however, the work shall have to be executed according to the designs; drawings and specifications recommended by the contractor and accepted by the competent authority the alteration above referred to shall within the scope of such designs drawings and specification appended to the tender.

Extension of time in consequence of additions or alterations.

The time limit for the completion of work shall be extended in the proportion that the increase in its cost occasioned by alterations or addition the cost of the original contract work, and the certificate of the Engineer-in-charge as to such proportion shall be conclusive.

GC-109: NO COMPENSATION FOR ALTERATION IN OR RESTRICTION OF WORKS TO BE CARRIED OUT

If at any time after the execution of the contract documents the engineer-in-charge shall for any reason whatsoever, require the whole or any part of the work as specified in the tender to be stopped for any period or shall not require the whole or part of the work to be carried out at all or to be carried out by the contractor, he shall give notice in writing of the fact to the contractor who shall thereupon suspend or stop, the work totally or partially, as the case may be. In any such case, except as provided hereunder, the contractor shall have no claim to any payment or compensation whatsoever on account of any profit or advantage which he might have derived from the execution of the work in full but which he did not so derive in consequence of the full amount of the work nor having been carried out, or on account of any loss that he may be put to on account of materials purchased or agreed to be purchased, or for unemployment of labour recruited by him. He shall not also have any claim for compensation by reason of any alteration having been made in the original specifications, drawings, designs and instructions may involve any curtailment of the work as originals contemplated. Where which however, materials have already been purchased or agreed to be purchased by the contractor, before receipt by him of the said notice, the contractor shall be paid for such materials at the rate determined by the Engineer-in-charge, provided they are not in excess of requirements and are of approved quality and/or shall be compensated for the loss, if any that he may be put to in respect of materials agreed to be purchased by him, the amount of such compensation to be determined by the Engineer-in-charge, whose decision shall be final. If the contractor suffers any loss on account of his having to pay labour charges during the period during which to stoppage of work has been ordered under this clause the contractor shall on application be entitled to such compensation on account of labour charges as the Engineer-in-charge, whose decision shall be final, may consider reasonable, provided that the contractor shall not be entitled to any compensation on account of labour charges if, in the opinion of the Engineer-in-charge, the labour could have been employed by the contractor elsewhere for the whole or part of the period during which the stoppage of the work has been ordered as aforesaid.

GC-110

The contractor is to set out and level the work & will be responsible for the accuracy of same. He is to provide and maintain measuring and surveying instruments including steel tapes, theodolite and dumpy level at all times for proper carrying of the work and for the use of Executive Engineer and his representative including skilled attendance.

GC-111

The Contractor is to cover up and protect the works from the weather, and is suspend all 'wet' operations during weather which, in the Executive Engineer opinion, will be detrimental to the work.

GC-112

Samples of each class of material and workmanship shall be submitted by the Contractor for the approval of Executive Engineer and after such approval these samples shall be deposited at any place the Executive Engineer may appoint and the Contractor shall be required to perform all the works of this contract in accordance with the samples.

GC-113

On completion, all work must be cleaned down; rubbish removed and the works and land cleaned of rubbish; surplus materials and other accumulations, and everything left in a clean and ordinary condition.

GC-114

The contractor shall provide, erect and maintain proper sheds and temporary buildings for the storage and protection of materials and goods and for the execution of work which may be fabricated or brought on the site.

GC-115

The contractor is to set out and level the works and will be responsible for the accuracy of the same. He shall also be responsible for the correctness of the positions, levels, dimensions and alignment of all parts of the structures as shown in the drawings supplied to him. If at any time any error shall appear during the progress of any part of the work, the contractor shall at his own expense rectify such error if called upon to the satisfaction of the Executive Engineer.

GC-116

The contractor shall permit the execution of the work not provided for in the tender by artists; tradesman, or others engaged by the Municipal Corporation. The contractor shall allow all reasonable facilities and the use of his scaffolding and water for the execution of such work, but is not required to provide any special scaffolding for the execution of such work except by special arrangement with Municipal Corporation.

GC-117: TIME LIMIT FOR UNFORESEEN CLAIM

Under no circumstance whatsoever shall the contractor be entitled to any compensation from Municipal Corporation on any account unless the contractor shall have submitted a claim in writing to the Engineer-in-charge within one month of cause of such claim occurring.

GC-118: ACTION AND COMPENSATION PAYABLE IN CASE OF BAD WORK:

If at any time before the security deposit is refunded to the contractor, it shall appear to the Engineer-in-charge or his subordinate in charge of the work that any work has been executed with unsound imperfect, or unskillful workmanship or with materials of inferior quality; or that any materials or articles provided by him for the execution of the work are unsound, or of a quality inferior to that contracted for, or otherwise not in accordance with the contract, it shall be lawful for the Engineer-in-charge to intimate this fact in writing to the contractor and then notwithstanding the fact that the work, materials or articles complained of may have been inadvertently passed, certified and paid for, the contractor shall be bound forthwith to rectify, or remove and reconstruct the work so specified in whole or in part as the case may require, or if so required shall remove the materials or articles so specified and provide other proper and suitable materials or articles at his own charge and cost; and in the event of his failing to do so within a period to be specified by the Engineer-in-charge in the written intimation aforesaid, the contractor shall be liable to pay compensation at the rate of one percent on the amount of the tender for every day not exceeding ten days, during which the failure so continued and in the event of any such failure as aforesaid the Engineer-in-charge may rectify or remove and execute the work or remove and replace the materials or articles complained of as the case may be at the risk and expense in all respects of the contractor, should the Engineer-in-charge consider that any such inferior work or materials as described above may be accepted or made use of it; shall be within his discretion to accept the same at such reduced rates along with the appropriate penalty as the Commissioner may deem fit.

The period to be counted from that date of final completion and handing over of the work to the Municipal Corporation during which the contractor is so liable for any defects in the work shall be the Defects Liability Period shown in the attached Memorandum.

GC-119: WORK TO OPEN BE INSPECTION

Contractor is responsible agent to be present.

All works under in course of execution or executed in pursuance of the contract shall at all time be open to the inspection and supervision of the Engineer-in-charge and his subordinates, and the contractor shall at all times during the usual working hours, and at all other times at which reasonable notice of the intention of the Engineer-in-charge or his subordinate to visit the work shall have been given to the contractor, either himself be present to receive orders and instructions, or have a responsible agent duly accredited in writing present for that purpose. Orders given to the contractor's duly authorised agent shall be considered to have the same force and effect as if they had been given to the contractor himself.

GC-120: NOTICE TO BE GIVEN BEFORE WORK IS COVERED UP

The contractor shall give not less than five day's notice in writing to the Engineer-in-charge or his subordinate in charge of the work before covering up or other wise placing beyond the reach of measurement any work in order that the same may be measured; and correct dimensions thereof taken before the same is so covered up or placed beyond the reach of measurement any work without the consent in writing of the Engineer-in-charge or his subordinate in charge of the work, and if any work shall be covered up or placed beyond the reach of measurement without such notice having been given or consent obtained, the same shall be uncovered at the contractor's expense, and in default thereof no payment or allowance shall be made for such work or for the materials with which the same was executed.

GC-121: Contractor Liable For Damage Done, And Or Imperfection For Three Months After Certificate.

If the contractor or his workmen; or servants shall break, deface injure or destroy any part of a building in which they may be working, or any building, road, fence enclosure or grass land or cultivated ground continuous to the premises on which the work of any part thereof is being executed; or if any damage shall be done to the work for any cause whatever while it is in progress or if any imperfection become apparent in it within the Defect liability period mentioned above by Engineer-in-charge the contractor shall make good the same at his own expense, or in default the Engineer in charge may cause the same to be made good by other workmen and deduct the expenses (of which certificate of Engineer-in-charge shall be final) from any sum that may be due or thereafter become due to the contractor or from his security deposit or the proceeds of sale thereof or of a sufficient portion thereof.

GC-122: CONTRACTOR TO SUPPLY PLANT, SCAFFOLDING ETC.

And if liable for damages arising from a provision of light fencing etc.

The contractor shall supply at his own cost all materials (except such special materials, if any, as may be supplied from the Public works department Stores in accordance with the contract). plant tools, appliances implements, ladders, cordage, scaffolding and any temporary works which may be required for the proper execution of the work, in the original; altered or substituted from, and whether included in these specification or, other documents forming part of the contract or referred to in these conditions or not and which may be necessary for the purpose of satisfying or complying with the requirements of the Engineer-in-charge as to any matter on which under these conditions he is entitled to be satisfied, or which he is entitled to require together with carriage thereof. To and from the work. The contractor shall also supply without charge the requisite number of persons with the means and materials necessary for the purpose of setting out works and counting, weighing and assisting in the measurement or examination at any time and from time to time of the work or materials, Failing this the same may be provided by the Engineer-in-charge at the expense of the contractor and the expense may be deducted from any money due to the contractor under the contract, or from his security deposit or the proceeds of sale thereof or of a sufficient portion thereof. The contractor shall provide all necessary fencing and lights required to protect the public from accident; and shall also be bound to bear the expenses of every suit. Action or other legal proceedings, at law, that may be brought by any person for Injury sustained owing to negligence of

the above precautions, and to pay damages and costs which may be awarded in any such suit action or proceedings, to any such person, or which may with the consent of the contractor be paid in compromising any claim by any such person.

GC-123:

The contractor shall make his own arrangement for drinking water for the labour employed by him.

GC-124: LIABILITY OF CONTRACTOR FOR ANY DAMAGE DONE IN OR OUTSIDE WORK AREA.

Compensation for all damage done intentionally or unintentionally or by contractor's labourers whether in or beyond the limits of municipal property shall be estimated by the Engineer-in-charge or such other office as he may appoint & estimates of Engineer-in-charge subject to the decision of the Commissioner on appeal be final & the contractor shall be bound to pay the amount of the assessed compensation of demand failing which the same will be recovered from the contractor as damage from the security deposit or deducted by the Engineer-in-charge from any sum that may by due or become due from Mahanagar Seva Sadan to the contractor under this contract or otherwise.

The contractor shall bear the expenses of defending any action or other legal proceedings that may be brought by any person from injury sustained by him owing to negligence of precautions to prevent the spread of fire & he shall also pay any damages and cost that may be awarded by the court in consequence.

GC-125:

Contract may be rescinded by and security deposit forfeited for subletting it without approval or for being a public officer or if contractor becomes insolvent:

The contract shall not be assigned or subject without the written approval of the Engineer-in-charge, and if the contractor shall assign or sublet his contract or attempt to do so or become insolvent or commence any proceedings to be adjudicated an insolvent or make any composition with his creditors, or attempt to do the Engineer-in-charge may, by notice in writing rescind the contract. Also if any bribe, gratuity gift, loan, perquisite, reward or directly advantage, pecuniary or otherwise, shall either or indirectly be given, promised, or offered by the contractor, or any of his servants agents to any public officer or person in the employ of Municipal Corporation in any way relating to his office or employment, or if any such officer or person shall become in any way directly or indirectly interested in the contract the Engineer-in-charge may be notice in writing rescind the contract. In the event of contract being rescinded, the security deposit of the contractor shall thereupon stand forfeited and be absolutely at the deposit of the Mahanagar Seva Sadan & the same consequences shall ensue as if the contract had been rescinded under clause-3 hereof and in addition the contractor, shall not be entitled to recover or be paid for any work thereto for, actually performed under the contract.

GC-126: SUM PAYABLE BY WAY OF COMPENSATING TO BE CONSIDERED AS REASONABLE COMPENSATION WITHOUT REFERENCE ACTUAL LOSS.

All sums payable by a contractor by way of compensation under any of these conditions shall be considered as a reasonable compensation to be applied to the use of Municipal Corporation without reference to the actual loss or damage sustained and whether any damage has or has not been sustained.

GC-127: CHANGES IN THE CONSTITUTION OF FIRM TO BE NOTIFIED.

In the case of a tender by partners any change in the constitution of a firm shall be forthwith notified by the contractor to the Engineer-in-charge for his information.

GC-128: WORKS TO BE UNDER THE DIRECTION OF EXECUTIVE ENGINEER

All works to be executed under the control shall be executed under the directions and subject to the approval in the respects of the Executive Engineer who shall be entitled to direct at what point or points and in what manner they are to be commenced, and from time to time carried on.

GC-129: DECISION OF THE COMMISSIONER TO BE FINAL

Except where otherwise specified in the contract decision of the Commissioner shall be final conclusive and binding on all parties to the contract upon all questions relating to the meaning of the specification designs, drawings and instructions here in before mentioned and as to the quality of workmanship, or materials used on the work, or as to any other question, claim, right, matter, or thing whatsoever in any way arising or relating to the contract, designs, drawings, specifications, estimates, instructions, orders or these conditions, or otherwise concerning the works or the execution or failure to execute the same, whether arising, during the progress of the work or after the completion or abandonment thereof.

GC-130: LUMP SUM IN ESTIMATES:

When the estimate on which a tender is made includes lump sums in respect of parts of the work the contractor shall be entitled to payment in respect of the item of work involved or the part of the work in question at the same rates as are payable under this contract of such items of if the part of the work in question is not in the opinion of the Engineer-in-charge capable of measurement the Engineer-in-charge may at his discretion pay the lump sum amount entered in the estimate, and the certificate in writing of the Engineer-in-charge shall be final and conclusive under the provision of the clause.

GC-131: ACTION WHERE NO SPECIFICATION

In the case of any class of work of which there are on such specifications as are mentioned in Rule 1 such work shall be carried out in accordance with the Municipal or Gujarat Government P.W.D. specifications, and in event of there being no Municipal or Government P.W.D. specifications, then in such case the work shall be carried out in all respects in accordance with the instructions & requirement of the Engineer- in-charge.

GC-132: DEFINITION OF WORKS

The expression "works" or "Work" where used in these conditions shall, unless there be something in the subject or context repugnant to such construction be constructed to mean the work of works the contracted to be executed under or in virtue of the contract, whether temporary or permanent, and whether original altered, substituted or additional.

GC-133: REFUND OF QUARRY FEES AND ROYALTIES:

All quarry fees and royalties shall be paid by the contractor All octroi taxes shall also be paid contractor according to the Municipal rules in force at the time and no refund shall be given Certificate for refund of quarry fees and royalties in admissible under existing rules shall be given by the Municipal to the contractor after successful completion of the contract. For the levy of water charges for construction work, please see the attached Memorandum.

GC-134: COMPENSATION UNDER WORKMEN'S COMPENSATION ACT:

The contractor shall be responsible for and shall pay any compensation to his workmen payable under the workmen's Compensation Act 1923 (VIII of 1923) or any statutory modification thereof for injuries caused to workmen.

GC-135: CLAIM FOR QUANTITIES OF WORK ENTERED IN THE TENDER ESTIMATE:

Quantities shown in the tender are approximate and no claim shall be entertained for quantities of work executed being either more or less than those entered in the tender of estimate.

GC-136: CLAIM FOR COMPENSATION DELAY IN STARTING THE WORK:

No compensation shall be allowed for any delay caused in the starting of the work on account of any acquisition of land and in the case of clearance work, for any delay in accordance to estimate.

GC-137: CLAIM FOR COMPENSATION FOR DELAY IN THE EXCAVATION OF WORK.

No compensation shall be allowed for any delay in execution of the work on

account of water standing in borrow pits or compartments. The rates are inclusive for hard or cracked soil, excavation in mud, sub-soil water or water standing in borrow pits, and no claim for an extra rate shall be entertained, unless otherwise expressly specified.

GC-138: ENTERING UPON OR COMMENCING ANY PORTION OF WORK:

The contractor shall not enter upon or commence any portion of work except with the written authority and instructions of the Engineer-in-charge or of his subordinate in charge of the work failing such authority the contractor shall have no claim to ask for measurements for payment of work,

GC-139: MINIMUM AGE OF PERSONS EMPLOYED THE EMPLOYMENT OF DONKEYS AND OR OTHER ANIMALS & THE PAYMENT OF FAIR WAGES:

- (i) No contractor shall employ any person who is under the age of 18 years.
- (ii) No contractor shall employ donkeys or other animals with breching of string or thin rope. The breeching must be atleast three inches wide and should be of tape (Nawar).
- (iii) No animals suffering from sores, lameness or emaciation or which is immature shall be employed on the work.
- (iv) The Engineer-in-charge or his agent is authorised to remove from the work any person or animal found working which does not satisfy these conditions and no responsibility shall be accepted by Municipal Corporation for any delay caused in the completion of the work by such removal.
- (v) The contractor shall pay fair & reasonable wages to the workmen employed by him in the contract undertaken by him in the event of any dispute arising between the contractor and his workmen on the grounds that the wages paid are not fair and reasonable, the dispute shall be referred without delay to the Executive Engineer who shall decide the same.

The decision of the Executive Engineer shall be conclusive and binding.

On the contractor but such decision shall not in any way affect the condition in the contract regarding the payment to be made by Municipal Corporation at the sanctioned tender rates.

GC-140: CLAUSE HEADINGS

The clause headings in these conditions are for purposes of reference only and are not to be deemed to form part of this contract.

Disputes if any, shall be discussed and mutually settled and in case of disagreement the same shall be referred to Commissioner/Standing Committee. After referring to Commissioner/Standing Committee if the said dispute is not solved, the same shall be referred to the court subject to Surat Jurisdiction only.

GC-141: THE FOLLOWING CONDITION ARE BEING INCLUDED IN THIS TENDER AND SHALL BE CONSIDERED AS A PART OF TENDER DOCUMENT.

- (i) In case the total amount of work done is less than 5% of the contract value, prorata S.D. to that extent may be refunded to the contractor while releasing the payment of final bill. In short, the S.D. to be retained by the Corporation after payment of final bill shall be equal to 2% of the amount of final bill as per the prevailing norms or as per the norms decided from time to time.
- (ii) If there is increase in amount of work more than 5% of the Contract value. The Additional S.D. shall be recovered from the running bill. When the total of any of work done by the Contractor up to running bills under consideration is more than 5% of the contract value. However, such S.D. shall be recovered in the round figure of Rs. 1000/- i.e. the amount of work done when it exceeds 5% of the contract value it shall be refunded of to the nearest multiple of Rs.25000/- such additional S.D. shall be recovered for the works amount to Rs. 5 Lacs or more at the rate of 4% of the additional amount.
- (iii) In many cases, the contractors are stopping the work half-way due to number of reason and when the department has to take actions in accordance to clause 3(a) or (b) or (c) of the contract the remaining work has to be carried out by advertising the tender for the remaining work and the whole administrative process right from inviting tenders to finalising the tender etc.

In such cases a fixed amount of Rs.1000/- should be reversal from the original contract towards the cost of advertisement and other administrative charges incurred by the department in finalising the contract for the remaining work. In case a separate advertisement is issued for a single work actual cost of advertisement shall be recovered such recovery shall be in addition to the recovery to be made under clause-3 or such other relevant clauses.

GC-142: In continuation of clause No.85(i) if any contractor found employing person or persons under the age of 18 years, during course of the construction at any stage, legal actions shall be taken against him as stipulated in Child Labour (Prohibition & Regulation) Act 1986 and also, a penalty of Rs.20,000/- (Rupees Twenty thousand) shall be imposed which shall be deposited with District Collector in Child Labour Rehabilitation cum Welfare Fund.

GC-143 EVALUATION OF SUBMITTED QUALIFICATION OFFER BASED ON SUBMISSIONS MADE BY THE TENDERER.

The tenderer shall be fully responsible for correctness of submissions made whether same has been examined and approved by employer or not. In the event of misrepresentation or suppression of the matter/ fact by the tenderer, the action will be taken on the wrong tenderer as per procedure/ provision outlined in the tender document. Price bid will be opened of those tenderers, whose post qualification bids meet requirements of the qualifying criteria as laid down in tender.

GC-144 Force Majeure.

144.1. Neither party shall be liable to the other for any loss or damage occasioned by or arising out of acts of god, and in particular, unprecedented Floods, volcanic eruption, earthquake or other convulsion of nature, and other acts such as but not restricted to general strike, invasion, the act of foreign countries, hostilities or war like operations before or after declaration of war, rebellion, military or usurp power, strikes or boycotts (other than those involving the Contractor or their respective employees/representatives or attributable to any act or omission of any of them), An act of war (whether declared or undeclared), invasion, armed conflict or act of foreign enemy, blockade, embargo, riot, insurrection, terrorist or military action, civil commotion, or politically motivated sabotage, Expropriation or compulsory acquisition by any Government Agency of any Project Assets or rights of the Contractor, which prevent performance of the contract and which could not have been foreseen or avoided by a contractor or Employer (the "Force Majeure").

144.2. On occurrence of Force Majeure Event, Parties are excused from the Performance of their Obligations.

144.3. In the Event of occurrence of Force Majeure Event both the party shall try to continue to perform their obligation stipulated in this contract. If Force Majeure Event subsists for 120 days then either party may by notice to other party terminate the Contract.

144.4. In the event that Parties are unable to agree in good faith about the occurrence of or existence of a Force Majeure event, such dispute shall be finally settled in accordance with the Dispute Resolution Procedure; provided that the burden of the proof as to the occurrence of Force Majeure Event shall be upon the Party claiming relief and/or excuse on account of such Force Majeure Event.

144.5. Termination of the Contract (a) shall not relieve the Contractor or Employer of any obligations hereunder which expressly or by implication survives Termination hereof, and (b) except as otherwise provided in any provision of the Tender expressly limiting the liability of either Party, shall not relieve either Party of any obligations or liabilities for loss or damage to the other Party arising out of or caused by acts or omissions of such Party prior to the effectiveness of such Termination or arising out of such Termination.

GC-145The contractor shall submit registration certificate under BOCW Act, 1996,

(As per City Engineer Note No.388, dtd.27/05/2022)

Under the Building and Other Construction Workers (Regulation of Employment and Conditions of Employment) Act, 1996 (The BOCW Act, 1996), every employer shall send a notice in Form-4 prescribed under the said Act to the office under the control of the Director, Industrial Safety and Health of the respective district, 30 days before commencing construction activity. Also, within 60 days of starting the work, the organization must be registered under the BOCW Act, 1996 and a copy of the certificate must be submitted here.

EXECUTIVE ENGINEER
BRTS PROJECT
SURAT MUNICIPAL CORPORATION.

SIGNATURE OF THE CONTRACTOR WITH SEAL

7.0 RESPONSIBILITY OF CONTRACTOR UNDER CONSTRUCTION AND DEMOLITION WASTE (C & D WASTE) RULES 2016

- Contractor shall remove all construction and demolition waste (C & D waste) and clean the area every day, or depending upon (1) The type & schedule of the work, (2) The quantity and type of waste generated, appropriate storage and collection facility shall be developed at site. Reasonable timeframe shall be worked out in consultation with engineer in charge of the project, for storage & usage of C & D waste.
- If it's found that contractor is irregular and showing negligence to management of C & D waste, then if deemed fit, engineer in charge would arrange to dispose the said C & D waste through an authorized C & D waste contractor/agency of surat municipal corporation and all the expenditure made towards disposal of this C & D waste shall be recovered from the contractor as per the prevailing charges.
- Contractor shall have to bear the expenses towards management of C & D waste as per the prevailing norms, no extra payment shall be entertained for the same.
- Contractor shall keep record of generation and disposal of construction and demolition waste (C & D waste) and proof of its disposal as per the provision of C & D waste rules and he has to submit along with running bills.
- If contractor fails to upkeep and maintain records of C & D waste generation- disposal records etc., then it shall be calculated as per the provision of the standing committee resolution no 1621/2016, dt.01/10/2016 and charges shall be recovered from due of contractor with surat municipal corporation.

Contractor shall also ensure use of recycled products made from SMC authorized C & D waste agency as far as possible to promote the C & D waste management project.

EXECUTIVE ENGINEER
BRTS PROJECT
SURAT MUNICIPAL CORPORATION

Signature of the contractor with seal:-

8.0 SCHEDULE – A

The Surat Municipal corporation shall not issue cement and reinforcement steel. Contractor shall make his own arrangement to procure all materials, cement and reinforcement steel. The cement, reinforcement steel and rough kotah stone (water table) required for the above said work shall be procured by contractor at its own cost.

The brands for cement shall be **Ambuja, Ultratech, Sanghi, Hathi, Sidhdhi & JK Laxmi** company confirming to IS-12269/87 latest amendment ISO-9000 of 53 grade only.

Approved make of TMT reinforcement steel :- **TATA, SAIL, Rastriya Ispat, Electrothurm, National, JSW steel Ltd., Ramsarup Kalika steel Alloys Pvt. Ltd., Jalna, Mono Steel India Ltd., Kutch, Welspun Shield Private Ltd., Kutch, Rajuri Steel & TMT Bars Pvt. Ltd., Metaroll Ispat Pvt. Ltd, Jalna.** as per confirming to IS 1786/85 latest amendment TMT Fe-415/Fe-500. TMT Steel shall be purchased by only manufacturing company/Authorised dealer/ Distributor/ Stockist only shall be allowed to use 6 mm plain steel shall be as per IS 2062/99 with latest emendment of any brand/make.

Any of the above mentioned brands of Cement and Reinforcement steel shall only be used by the contractor at the time of execution.

The test certificates regarding its property including indication of its Thermo-Mechanically treated must accompany every lot and shall be submitted to Surat Municipal Corporation before utilizing the same. Unless and until such certificate is submitted, the steel procure at site will not be allowed to be used.

Cement, Reinforcement steel and other materials:

The cement and steel shall not be issued by SMC

- (1) Penalty for cement shall be levied as below against variation than the actual consumption:
 - (a) No penalty if actual total consumption is equal to or more than standard theoretical total consumption. For over consumption of cement no extra payment shall be made.
 - (b) The Basic Rate of Month of **June-2026** for Cement is **Rs.5,600/-** per MT (Without GST)
 - (c) The Basic Rate of Month of **June-2026** for **(A) High Strength TMT Steel is Rs.50,500/- per MT (Without GST) AND (B) High Strength TMT CRS Steel is Rs.53,000/- per MT (Without GST) for variation in steel consumption less than 7.5% standard theoretical consumption.**
- (2) The payment for reinforcement bar will be made on theoretical weight basis but not exceeding actual procurement at site. The weight shall be computed on the basis of the length of the steel used in the work multiplied by the standard unit weight of MS/HYSD (TMT) bar as mentioned in IS Code No. 1786/85.
- (3) No separate payment shall be made for any kind of wastage/excess consumption in the materials.
- (4) Ultimately the liability for assurance of the good quality work as per tender provision lies with the contractor.

Testing of Cement, Steel and other materials:

It should be specifically noted that the Cement, Steel, etc. brought by the contractor at site of work shall be used only after the same is tested at the approved laboratory as per the direction of Engineer-in-charge. The testing of all the materials shall be carried out as per relevant codes of I.S. All the charge for the transport and testing of the samples etc. shall have to be borne by the contractor. The frequency of testing such material shall be in accordance to the relevant Indian Standards as directed by Engineer-in charge. The contractor shall have to make his own arrangement for transportation of inspecting authorities/ agencies/PMC at his own cost.

EXECUTIVE ENGINEER
BRTS PROJECT
SURAT MUNICIPAL CORPORATION

Signature of the contractor with seal:-

9.0 MEMORANDUM

- | | | | |
|------|---|----|--|
| (1) | General Description of the Work | :- | CONSTRUCTION OF CONVENTIONAL TYPE BRTS BUS SHELTER AT RATNAMALA JUNCTION, UNDER FLYOVER BRIDGE IN NORTH (KATARGAM) ZONE, SURAT. (WORK NO.1) (2nd Attempt) |
| (2) | Estimated Cost | :- | RS. 57,55,943.30Ps. |
| (3) | Earnest Money Deposit | :- | Rs. 58,000.00 Ps. |
| (4) | Security Deposit (refer IT -25) | | |
| | (i) Initial Security Deposit | :- | Rs. 2% of the Tender Amount. |
| | (ii) To be deducted from R.A.Bills | : | Rs. 2% of each R. A. Bill amount. |
| | Total Security Deposit | : | Rs.4% of the Tender Amount. |
| (5) | Time allowed for the completion of the Work from date fixed in Work Order Letter to commence | :- | 06 (Six) months(Including Monsoon). |
| (6) | Percentage to be retained from running Account Bills | :- | 5% (Five Percent) (refer IT -27) |
| (7) | Panelty for delayed Work | :- | 0.2 % (Zero point Two percent) of the Tender Value per day, maximum up to 10 % (Ten percent) of the Tender Value. |
| (8) | The progress of the Work shall confirm to the following schedule | | |
| | 10% of the work to be done in | : | 25% of the time. |
| | 40% of the work to be done in | : | 50% of the time. |
| | 70% of the work to be done in | : | 75% of the time. |
| | 100% of the work to be done in | : | 100% of the time. |
| (9) | Defect Liability Period | :- | 01 (One) Year From the Completion of work. As per GC-12 of this Tender. |
| (10) | Water Charges | :- | CONDITION FOR THE WATER SUPPLY & ELECTRIC SUPPLY on next page. |
| (11) | Construction Cess will be deducted from respective R.A. Bills and Final bill in accordance with the prevailing norms of Govt. of Gujarat. | :- | 1% of Work Done Amount in R.A. Bill |

SIGNATURE OF THE CONTRACTOR WITH SEAL

NAME AND ADDRESS :-

EXECUTIVE ENGINEER
BRTS PROJECT
SURAT MUNICIPAL CORPORATION

10.CONDITION FOR THE WATER SUPPLY & ELECTRIC SUPPLY

FOR WATER CHARGE (As per City Engineer Note No.386, dtd.30/7/2012)

In case of Municipal Network or distribution center available or not at near by area

OPTION-1:

Contractor has to make his own arrangement for construction work whether from private boring or tankers. Contractor has to submit test report of water whether it is of good quality for construction work or not and contractor has to inform about it within 30 days of starting the work. If the contractor makes his own arrangement for water required for construction and labour camp etc. by drilling own bore or tankers, no water charges will be recovered from the contractor .

OPTION-2:

If contractor wants to use Municipal Water he has to follow procedure within below:

- 1. Contractor has to apply for water connection by Municipal Licensed plumber in prescribed form.**
- 2. Contractor has followed all procedure with his own expenses.**
- 3. According to rule Municipal Corporation issue bill to contractor for consumption of water and contractor has to paid it within stipulated time and contractor has submit one copy of bill and payment receipt to concern department. If contractor fail to pay the bill the amount of bill/paid receipt can be recover from contractor's bill.**
- 4. If Municipal Corporation network is not available then Contractor can make arrangement of water tanker from nearby distribution center after depositing required amount.**
- 5. After completion of work contractor has to can-celled the water connection and inform the concern department.**
- 6. If network and distribution center/network are both not available in that case contractor has to make his own arrangement for good quality construction water and has to follow the option-1.**
- 7. If contractor is taking water connection or even if the contractor is not taking connection and makes other arrangement to use Municipal Water by tanker or tapping water from near private connection, water charges shall be recovered at the rate of 3% (THREE Percent) of the civil items in which water consumed.**

The contractor shall make his own arrangement at his cost for electric supply required for operating various plants and machineries required for the works and for general lighting purpose for site, office labour colony etc.The energy bills shall also be paid by the contractor.

**EXECUTIVE ENGINEER
BRTS PROJECT
SURAT MUNICIPAL CORPORATION,**

SIGNATURE OF THE CONTRACTOR WITH SEAL

11.0 IMPORTANT INSTRUCTION-A TO THE TENDERER

- (1) This tender document containing Page No.01 to 239 duly signed by the tenderer, should be furnished to Corporation treasury along with the amount of earnest money deposit as mentioned in tender notice. If any of the drawings or papers removed from the tender, the tender shall be rejected and E.M.D. shall be forfeited.
- (2) The tenderer who wants to propose something in written, he should write it on his letter pad or another paper. Anything written on tender papers shall not be considered by Corporation and Contractor shall not be intend to do so.
- (3) Following Certificate shall be enclosed with tender.
 - (a) Current Solvency Certificate amounting of 20% of Estimated amount.
 - (b) **Registration Certificate of required class given by Government or Semi-Government firm.**
 - (c) List of work done by Contractor with its volume.

EXECUTIVE ENGINEER
BRTS PROJECT
SURAT MUNICIPAL CORPORATION,

SIGNATURE OF THE CONTRACTOR WITH SEAL

IMPORTANT INSTRUCTION-B TO TENDERER

1.

Affix latest passport size photo of tenderer duly signed	Specimen Signature of the Contractor
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2.

(1)	(2)	(3)	(4)
AFFIX LATEST PASSPORT SIZE PHOTOGRAPH OF ALL PARTNERS IN CASE OF PARTNERSHIP AGENCY			

Specimen signature of all partners incase of partnership agency.

(1) _____ (2) _____ (3) _____ (4) _____ _____	Submission of Registered Agreement is compulsory in case of partnership agency.
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3. Submission of audited account balance sheet of last three years is compulsory for tenderer submitting agency.
4. Submission of sale tax certificate, with proof of residence is compulsory for tenderer.
5. In case of Government royalty applicable to tenderer, it is compulsory to submit a receipt of royalty payment with tender.
6. The Photograph and specimen signature of contractor will be cross checked, whenever contractor receives payment in account section of S.M.C.
7. The specimen signature of contractor will be cross checked by Account Department of S.M.C., in case of representative of Contractor alongwith letter of authority of a person who signed an agreement, receives payment.

SIGNATURE OF THE CONTRACTOR WITH SEAL

EXECUTIVE ENGINEER
BRTS PROJECT
SURAT MUNICIPAL CORPORATION,

12.0 SPECIAL NOTE

- (1) The work shall be carried out strictly according to the specifications given in Bombay Public Works Department Hand Book Vol.1 and II (The latest edition) whenever applicable as directed by Executive Engineer.
- (2) The work shall have to be started by the contractor at as many places as ordered by the Executive Engineer.
- (3) If during excavation or carrying out of any item of the work, any electric pole, electric cable, telephone cables, telegraph cable, gas line, drain connection pipeline, water service pipeline, sewer main, water mains, etc. is/are damaged by the contractor shall be liable to pay the full expenditure required and to repair the same or charges for the same (as the case may be) decided by the electric company, Gas Company, Government Authority or the Surat Municipal Corporation which ever may be.
- (4) The work shall be carried out in workman like manner, and best skilled worker should be employed. If any defect in the work is found out the contractor shall have to rectify within the time fixed by Executive Engineer. If he fails to rectify the defect Executive Engineer after giving due notice shall rectify the defect at the risk and cost of the contractor.
- (5) All the work shall be done strictly according to the instruction of Executive Engineer.
- (6) No compensation shall be paid if the work is stopped due to defective work or as per the instruction from Engineer-in-charge due to any reasons.
- (7) The rates given in the schedule shall hold good for all works done under this contract without reference to quantities or location of work.
- (8) The contractors are particularly directed to observe from the specification what is to be included in the items and rates for the several portion of the work frame out all their rates for items accordingly.
- (9) The date of starting of the work is considered to be the date specified in the final work order.
- (10) If any Clause of Arbitration is there in tender document is deleted here with.
- (11) The project under this tender may be executed under strict supervision of P.M.C. if deployed by S.M.C. Contractor shall carry out the instructions of P.M.C.
- (12) Third Party Inspection shall be deployed by S.M.C.
- (13) The contractor shall submit the advance Pour Card in prescribed form for the type of work which he planned to carry out with the skilled / unskilled labour deployed by him for the work.
- (14) The contractor shall establish concrete cube testing machine and other equipments required for quality checking of materials as per instructions of PMC/ Engineer-In-charge.
- (15) The contractor shall use the materials of the specified brands only. Request for equivalent brands will be considered only if specified brand is not available in market.
- (16) ACCIDENT LIABILITIES:
The Contractor shall be responsible for all liabilities under workman compensation act, as under:
 - (a) On occurrence of accident, resulting in death of workman employed by the Contractor which is so serious as is likely to result in death of such workman who meet with accident, the Contractor shall within 24 hours of accident, will intimate in writing to Engineer-in-charge of such incidence. The Contractor shall indemnify client, against all losses/damages sustained by the client resulting directly or indirectly from his failure to give such intimation to client including penalties/fines if any, payable by client as a consequence of client's failure to give notice under workman's compensation act or otherwise to conform the provision of this act in regard to such accidents.

(b) In case when such compensations as above becomes payable under workman's compensation act, whether by contractor or by client as principal employer, it shall be law full for the Engineer-in-charge to retain out of money due and payable to the Contractor, such sum or sums of money as may in the opinion of the Engineer-in-charge be sufficient to meet such a liability, the opinion of the Engineer-in-charge shall be final in regard to all matters arising under this clause.

(17) **INSURANCE:**

The Contractor shall take "All Contract Risk Insurance Policy" for the estimated cost of this work "Work's Man Compensation Policy" for all workers and labours of contractor and client working atsite and "Third Party Insurance Policy" to fully cover all third party type risk. The insurance policy so taken by the Contractor for such purposes shall be in the joint name of the Contractor and the client and the policy shall be deposited with the client.

Contractors shall have to use maximum machinery for the work as per the direction of Engineer-In-Charge. If possible, space for stacking the surplus excavated earth will be provided by SMC. Otherwise the contractor shall arrange for the same at no extra cost to SMC.

(18) Contractor has to fixed display board describing the necessary information / particulars of work at specific location and shall submit the evidence to engineer-in-charge along with photographs. otherwise , 0.25% to 1.0% of tender amount as per description of engineer-in-charge shall be kept hold, while making payment to the contractor until the evidences as stated above is submitted. No extra payment shall be payable for fixing display boards.

(19) The Contractor shall paint building numbers & Flat numbers as per guideline of SMC without any extra payment.

(20) **PLEASE READ CAREFULLY**

Following details pertaining to work progress is mandatory.

(A) Bar chart: Contractor shall submit barchart showing schedule of execution of various activities within stipulated time limit

(B) Material Management : Contractor shall provide following details

- Source of materials i.e. yellow earth, Coarse aggregate, Grit, fine aggregates, bricks, cement, steel etc.
- Supply schedule : According to bar chart, the flow diagram of materials.

(1) Man power management :

The contractor shall submit details of manpower of various categories (skilled & unskilled labours) to be deployed for the work as under.

- Minimum no. of skilled and unskilled labors to be deployed on the work
- List of supervisors & engineers for supervision & quality control of the work.

(21) All the applicant contractors are required to have their own employers code number under EPF Act, 1952 and are required to comply the applicable provisions of said statute regularly and totally.

(22) Further the contractors for services are required to produce the certified copies of paid challans in respect of employees/workers employed by said contractor in respect of work allotted by Surat Municipal Corporation, along with copies of Pay Roll and Muster Roll. If the same are not produced, the bills will not be released.

SIGNATURE OF THE CONTRACTOR WITH SEAL

EXECUTIVE ENGINEER
BRTS PROJECT
SURAT MUNICIPAL CORPORATION

13.0 SPECIAL CONDITIONS OF CONTRACT

1.1 GENERAL :

Clause given under these special conditions shall be read in conjunction with conditions of the contract and in case of any conflict the provisions of special conditions will override the provisions of general conditions of contract.

The tenderer shall acquaint himself with the access to site, availability of local facilities such as transport, materials, labour and shall price his tender accordingly.

1.2 ROAD INFRASTRUCTURE :

The bidder shall acquaint himself with the access to site. The successful tenderer shall have make road and other infrastructure facility for the easy access to the site at his own cost.

1.3 SAFETY :

All the safety and entry rules shall be strictly followed. The contractor is fully responsible for the safety of his staff and workmen and must equip them with safety appliances and tools.

1.4 TIME SCHEDULE :

The work shall be executed strictly as per the time schedule/bar chart submitted alongwith price bid offer. The entire job/project has to be completed within a **period of 06 (Six) months(Including Monsoon)** from the Date of placement of order. The time limit includes the time limit required for testing, rectification, if any, retesting and completion in all respect to the entire satisfaction of the Engineer-in-charge. The timely completion of this project is very very important for the citizen of Surat City, and hence weightage will be given on strict compliance of work as per the sanctioning schedule of work/bar chart.

1.5 Penalty for delay :

If the contractor fails to complete the whole project by the stipulated completion date, he shall also pay liquidated damages at one fifth of one percent i.e. 0.2% of tender amount per day of delay in completion and handing over the work to the Surat Municipal Corporation. The amount of liquidated damages shall however be subjected to maximum of ten (10) percent of the tender amount. Delays in excess of one hundred days will be a cause for termination of contract and for forfeiture of all performance security.

1.6 Scope of Supply of material :

(a) Supply of material :

All materials, consumables, testing appliances, tools, tackles and spares etc. necessary for the successful execution completion, and maintenance till handing over to S.M.C. shall be procured and provided by the tenderer. No materials will be supplied by the owner. Except mention in Schedule -`A.

(b) Water :

Contractor shall have to make his own arrangement for water required for construction, testing and for his labour/employees too.

(c) Power :

Power required for the constructions, erection and other allied job shall be arranged by the contractor at his own cost.

The Contractor shall have to make his own arrangement for getting electric power. The S.M.C. will issue only recommendation letter to the contractor if required. No compensation shall be paid for delay in getting power supply.

(d) Cement :

Cement required for the construction shall be arranged by the contractor at his own cost.

(e) Steel :

All types of TMT reinforcement steel shall be arranged by the contractor at his own cost.

1.7 Construction of Stores and site office :

Suitable areas will be allocated by the S.M.C. to the Contractor to build storages for storing his equipments, plant, materials etc. and also to build his site offices. He will be solely responsible for watching and guarding of his stores, offices etc.

The contractor shall cover all his equipments and materials at site with requisite insurance against theft, larceny, decoity, fire tempest, flood earthquake etc.

On completion of the works undertaken by the contractor, he shall remove all temporary works erected by him and have the site cleaned as directed by the Engineer. The S.M.C. reserves the right to ask the contractor any time during the tenure of the contract to vacate the land by giving 7 day's notice on security reasons or on national interest or otherwise.

1.8 Labour and supervisory Camps:

No land will be provided by the S.M.C. to the Contractor for constructing his labour and supervisory camps and other service facility. Contractor shall make his own arrangements outside the site boundary.

1.9 Construction Equipments :

The contractor shall make his own arrangement to procure all constructional plant and equipments for his own. He shall also state the type and number of different equipments with their capacities in good working conditions which he will use on the site to ensure completion of the work in the specified time.

All materials, construction plants and equipments once brought by the contractor to site are not to be removed from there without the written authority of the Engineer-in-charge. Also, the Contractor shall have adequate stock of spare parts for the equipment on the site and work shall not be delayed on this account. Similarly all temporary works built by the Contractor for the main construction undertaken by him, are not be dismantled and removed without the written authority of the the Engineer-in-charge.

1.10 Co-operation with other contractors :

The contractor shall execute his work in phased manner as directed by the Engineer from time to time so as not to obstruct or retard the work being executed simultaneously by other agencies.

1.11 Safety :

The contractor shall be responsible for provision of safety arrangement and protective clothing for all operators on the site whether or not engaged in actual operation of supervision. The contractor shall also be responsible for safety arrangements of all equipment used for construction and shall employ trained workmen conversant with safety regulation. The contractor shall use only tested equipment and tools and shall periodically renew tests to the satisfaction of the Engineer. All test certificate shall be made available to the Engineer at the site of the work. If at any time, in the opinion of the Engineer, this provision is not completion with, the Contractor shall forthwith replace such equipment and tools.

The contractor shall display notices and arrange proper fencing at such places where hazardous work is being carried out. The contractor shall provided at his own expense on the works to the satisfaction of the Engineer at such places, proper and sufficient fire fighting, first and appliances etc. which shall at all times be available for use.

1.12 The contractor shall have to take photographs during various stages of construction activity for each of the work at no extra cost. The photograph shall be of size 4" x 6" on mat paper. The number of photographs shall be not be less than 200.

1.13 No mobilisation advance will be paid.

1.14 It is further to clarify that, the retention money deducted from each running bill will be released at the time of final bill. The security deposit remitted by the contractor will be released after the completion of defect liability period.

- 1.15 No compensation of any item shall be paid in case any of the item is omitted i.e. not executed at all.
- 1.16 It is clarify once again that, the serviceable materials obtained during dismantling/clearing of the site or the extra excavated stuff shall have to be carted by the contractor at the places shown by the Engineer-in-charge any where within city limit.
- 1.17 Out of the amount payable/creditable to contractor's account, the Central Government/State Government tax/taxes shall be deducted at source in accordance with the relevant laws/rules from time to time prevailing.
- 1.18 Surat Municipal Corporation shall not provide 'C' form for tax purpose.

SIGNATURE OF THE CONTRACTOR WITH SEAL

EXECUTIVE ENGINEER
BRTS PROJECT
SURAT MUNICIPAL CORPORATION

14.0 SPECIFICATIONS OF MATERIALS

Note:- Consider latest revision of the said I.S. wherever its applicable.

M-1 WATER :

- 1.1 Water shall not be salty or brackish and shall be clean, reasonably clear and free from objectionable quantities of silt and traces of oil and injurious alkalies, salts, organic matter and other deleterious material which will either weaken the mortar or concrete or cause efflorescence or attack the steel in R.C.C. Container for transport, storage and handling of water shall be clean. Water shall conform to the standards specified in I.S. 456-1978.
- 1.2 If required by the Engineer-in-charge it shall be tested by comparison with distilled water. Comparison shall be made by means of standard cement tests for soundness, time of setting and mortar strength as specified in I.S. 269-1976. Any indication of unsoundness, change in time of setting by 30 minutes or more or decrease of more than 10 percent in strength of mortar prepared with water sample when compared with the results obtained with mortar prepared with distilled water shall be sufficient cause for rejection of water under test.
- 1.3 Water for curing mortar, concrete or masonry should not be too acidic or too alkaline. It shall be free of elements which significantly affect the hydration reaction or otherwise interfere with the hardening of mortar or concrete during curing or those which produce objectionable stains or other unsightly deposits on concrete or mortar surfaces.
- 1.4 Hard and bitter water shall not be used for curing.
- 1.5 Portable water shall generally be found suitable for curing mortar or concrete.

M-2 LIME :

- 2.1 Lime shall be hydraulic lime as per I.S. 712-1973. Necessary tests shall be carried out as per I.S. 6932 (Parts I to X) 1973.
- 2.2 The following field tests for limes are to be carried out ---
 - a] A very rough idea can be formed about the type of lime by its visual examination i.e. fat lime bears pure white colour, lime in form of porous lumps of dirty white colour, indicates quick lime, and solid lumps the unbrunt lime stone.
 - b] Acid tests for determining the carbonate content in lime. Excessive amount of impurities and rough determination of class of lime.
- 2.3 Storage shall comply with I.S. 712-1973. The slaked lime, if stored, shall be kept in a weather proof and damp proof shed with impervious floor and sides to protect it against rain, moisture, weather and extraneous materials mixing with it. All lime that has been damaged in any way shall be rejected and all rejected materials shall be removed from site of work.
- 2.4 Field testing shall be done according to I.S. 162-1974 to show the acceptability of materials.

M-3 CEMENT :

- 3.1 Cement shall be ordinary portland cement of 53 grade as per I.S. 12269/87 (with latest amendment) namely Ambuja, Ultra tech, Sanghi, Hathi, Sidhdhi, J.K.Laxmi. (Refer Schedule "A")

M-4 WHITE CEMENT :

- 4.1 The white cement shall conform to I.S. 8042-1978.

M-5 COLOURED CEMENT :

- 5.1 Coloured cement shall be with white or grey portland cement as specified in the item of the work.

- 5.2 The pigments used for coloured cement shall be of approved quality and shall not exceed 10% of cement used in the mix. The mixture of pigment and cement shall be properly ground to have a uniform colour and shade. The pigments shall have such properties as to provide for durability under exposure to sun-light and weather.
- 5.3 The pigment shall have the properties such that it is neither affected by the cement nor detrimental to it.

M-6 SAND :

- 6.1 Sand shall be natural sand, clean, well graded, strong, durable and gritty particles free from injurious amounts of dust, clay, kankar nodules, soft or flaky particles, shale, alkali, salts, organic matter, loam, mica or other deleterious substances and shall be got approved from the Engineer-in-charge. The sand shall not contain more than 8% of silt as determined by field tests. If necessary the sand shall be washed to make it clean.
- 6.2 Coarse Sand : The fineness modulus of coarse sand shall not be less than 2.5 and shall not exceed 3.0. The sieve analysis of coarse sand shall be as under ---

I.S.Sieve Designation	% by weight passing sieve	I.S.Sieve Designation	% by weight passing sieve
4.75 mm	100	600 Micron	30-100
2.36 mm	90-100	300 Micron	5-70
1.18 mm	70-100	150 Micron	0-60

- 6.3 Fine Sand : The fineness modulus shall not exceed 1.0. The sieve analysis of fine sand shall be as under ---

I.S.Sieve Designation	% by weight passing thru'	I.S.Sieve Designation	% by weight passing thru'
4.75 mm	100	600 Micron	40-85
2.36 mm	100	300 Micron	5-50
1.18 mm	70-100	150 Micron	0-10

M-7 STONE DUST :

- 7.1 This shall be obtained from crushing hard black trap or equivalent, it shall not contain more than 8% of silt as determined by field test with measuring cylinder. The method of determining silt contents by field test is given as under.
- 7.2 A sample of stone dust to be tested shall be placed without drying in 200 mm measuring cylinder. The quantity of the sample shall be such that it fills the cylinder upto 100 mm mark. The clean water shall be added upto 150 mm mark. The mixture shall be stirred vigorously and the content allowed to settle for 3 hours.
- 7.4 The height of silt visible as settled layer above the stone dust shall be expressed as percentage of the height of the stone dust below. The stone dust containing more than 8% silt shall be washed so as to bring the silt content within the allowable limit.
- 7.5 The fineness modulus of stone dust shall not be less than 1.80.

M-8 STONE GRIT :

- 8.1 Grit shall consist of crushed or broken stone and be hard, strong, dense, durable, clean, of proper gradation and free from skin or coating likely to prevent proper adhesion of mortar. Grit shall generally be cubical in shape and as far as possible flaky elongated pieces shall be avoided. It shall generally comply with the provisions of I.S. 383-1970. Unless a special stone of a particular quarry is mentioned, grit shall be obtained from the best black trap or equivalent hard stone as approved by the Engineer-in-charge. The grit shall have no deleterious reaction with cement.

8.2 The grit shall conform to the following gradation as per sieve analysis :

I.S.Sieve Designation	% passing thru' sieve	I.S.Sieve Designation	% passing thru' sieve
12.50 mm	100%	4.75 mm	0.20%
10.00 mm	85-100%	2.36 mm	0.25%

8.3 The crushing strength of grit will be such as to allow the concrete in which it is used to build-up the specified strength of concrete.

8.4 The necessary tests for grit shall be carried out as per the requirements of I.S. 2338 (Parts I to VIII) 1963, as per instruction of the Engineer-in-charge. The necessity of test will be decided by the Engineering-in-charge.

M-9 CINDER :

9.1 Cinder is well burnt furnace residue which has been fused or sintered into lumps of varying sizes.

9.2 Cinder aggregates shall be well burnt furnace residue obtained from furnace using coal fuel only. It shall be sound clean and free from clay, dirt, ash or other deleterious matter.

9.3 The average grading for cinder aggregates shall be as mentioned below :-

20 mm	100
10 mm	86
5.75 mm	70
2.36 mm	52

M-10 LIME MORTAR :

10.1 LIME : Shall conform to specification M-2. WATER : Water shall conform to specification M-1. SAND : Sand shall conform to specification M-6.

10.2 PROPORTION OF MIX Mortar shall consist of such proportions of slaked lime and sand as may be specified in the item. The slaked lime and sand shall be measured by volume.

10.3 PREPARATION OF MORTAR Lime mortar shall be prepared by wet process as per I.S. 1625-1971. Power driven mill shall be used for preparation of lime mortar. The slaked lime shall be placed in the mill in an even layer and ground for 180 revolutions with sufficient water. Water shall be added as required during grinding (care being taken not to add more water) that will bring the mixed material to a consistency of stiff paste. Thoroughly wetted sand shall then be added evenly and the mixture ground for another 180 revolutions.

10.4 STORAGE : Mortar shall always be kept damp, protected from sun and rain till used up, covering it by tarpaulin or open sheds.

10.5 USE : All mortar shall be used as soon as possible after grinding. It should be used on the day on which it is prepared. But in no case mortar made earlier than 36 hours shall be permitted for use.

M-11 CEMENT MORTAR :

11.1 Water shall conform to specification M-1. Cement shall conform to specification M-3. Sand shall conform to M-5.

11.2 PROPORTION OF MIX : 11.2.1 Cement and sand shall be mixed to specified proportions, sand being measured by measuring boxes. The proportion of cement shall be by volume on the basis of 50 Kg./Bag of cement being equal to 0.0342 cu.m. The mortar may be hand mixed or machine mixed as directed.

- 11.3 PREPARATION OF MORTAR : 11.3.1 In hand mixed mortar, cement and sand in the specified proportions shall be thoroughly mixed dry on a clean impervious platform by turning over atleast 3 times or more till a homogeneous mixture of uniform colour is obtained. Mixing platform shall be so arranged that no deleterious extraneous material shall get mixed with mortar or mortar shall flow out. While mixing, the water shall be gradually added and thoroughly mixed to form a stiff plastic mass of uniform colour so that each particle of sand shall be completely covered with a film of wet cement. The water cement ratio shall be adopted as directed.
- 11.4 The mortar so prepared shall be used within 30 minutes of adding water. Only such quantity of mortar shall be prepared as can be used within 30 minutes.

M-12 STONE COARSE AGGREGATE FOR NOMINAL MIX CONCRETE :

- 12.1 Coarse aggregate shall be of machine crushed stone of black trap or equivalent and be hard, strong, dense, durable, clean and free from skin and coating likely to prevent proper adhesion of mortar.
- 12.2 The aggregate shall generally be cubical in shape. Unless special stones of particular quarries are mentioned aggregates shall be machine crushed from the best black trap or equivalent hard stone as approved. Aggregate shall have no deleterious reaction with cement. The size of the coarse aggregate for plain cement concrete and ordinary reinforced cement concrete shall generally be as per the table given below. However, in case of reinforced cement concrete the maximum limit may be restricted to 6 mm. less than the minimum lateral clear distance between bars or 6mm. less than the cover whichever is smaller.

TABLE

I.S. Sieve Designation	Percentage passing for single sized aggregates of nominal size			I.S. Sieve Designation	Percentage passing for single sized aggregates of nominal size		
	40 mm	20 mm	16 mm		40 mm	20 mm	16 mm
80 MM	--	--	--	12.5 MM	---	--	---
63 MM	100	--	--	10 MM	0.5	0.20	0.30
40 MM	85-100	100	--	4.75 MM	--	0.50	0.50
20 MM	0-20	85-100	100	2.35 MM	--	--	--
16 MM	--	--	85-100				

NOTE:- This percentage may be varied somewhat by the Engineer-in-charge when considered necessary for obtaining better density and strength of concrete.

- 12.3 The grading test shall be taken in the beginning and at the change of source of materials. The necessary tests indicated in I.S. 383-1970 and I.S. 456-1978 shall have to be carried out to ensure the acceptability. The aggregates shall be stored separately and handled in such a manner as to prevent the intermixing of different aggregates. If the aggregates are covered with dust, they shall be washed with water to make, them clean.

M-13 BLACK TRAP OR EQUIVALENT HARD STONE COARSE :

- 13.1 Aggregate for Design Mix Concrete : Coarse aggregate shall be of machine crushed stone of black trap or equivalent hard stone and be hard, strong, dense, durable, clean and free from skin and coating likely to prevent proper adhesion of mortar.
- 13.2 The aggregates shall generally be cubical in shape, unless special stones of particular quarries are mentioned, aggregates shall be machine crushed from the best, black trap or equivalent hard stones as approved. Aggregate shall have no deleterious reaction with cement.

- 13.3 The necessary tests indicated in I.S. 383-1970 and I.S. 456-1978 shall have to be carried out to ensure the acceptability of the material.
- 13.4 If aggregate is covered with dust it shall be washed with water to make it clean.

M-14 BRICK BATS AGGREGATE :

- 14.1 Brick bat aggregate shall be broken from well burnt or slightly over burnt and dense bricks. It shall be homogeneous in texture, roughly cubical in shape, clean and free from dirt of any other foreign material. The brick bats shall be of 40 mm to 50 mm size unless otherwise specified in the item. The underburnt or overburnt brick bats shall not be allowed.
- 14.2 The brick bats shall be measured by volume by suitable boxes as directed.

M-15 BRICKS :

- 15.1 The bricks shall be hand or machine moulded and made from suitable soils and kiln burnt. They shall be free from cracks and flaws not nodules of free lime. They shall have smooth rectangular faces with sharp corners and shall be of uniform colour. The bricks shall be moulded with a frog of 100mm x 40 mm and 10mm to 20mm deep on one of its flat sides. The bricks shall not break when dropped on the ground from a height of 600 mm.
- 15.2 The size of modular bricks shall be 190mm x 90mm x 90mm.
- 15.3 The size of conventional bricks shall be as under --- 225 x 110 x 75mm.
- 15.4 Only bricks of one standard size shall be used on one work. The following tolerances shall be permitted in the conventional size adopted in a particular work.
- Length : 3.00 mm
 - Width : 1.50 mm
 - Height : 1.50 mm
- 15.5 The crushing strength of the bricks shall not be less than 35 Kg./Sq.Cm. The average water absorption shall not be more than 20% by weight. Necessary tests for crushing strength and water absorption etc. shall be carried out as per I.S. 3495 (Part I to IV)-1976.

M-15A FLYASH BUILDING BRICKS :

The Flyash building bricks shall conform to Grade-5 of IS-13757. The frog of the 80 to 100 mm x 40 mm x 10 to 20 mm size.

The size of modular bricks shall be 190 mm x 90 mm x 90 mm.

The size of conventional brick shall be 230 mm x 110 mm x 70 mm. Only bricks of one standard size shall be used on one work. The following tolerances shall be permitted in the conventional size adopted in a particular work:

- Length : + 4 mm
- Width : + 2 mm
- Height : + 2 mm

The physical characteristic of bricks shall be as follows.

The minimum compressive strength of Flyash building bricks shall not be less than 70 Kg/Sq.Cm. and the test shall be conform to IS-3495 (Part-I).

The average water absorption not more than 20 percentage by weight and the test shall conform to IS-3495(Part-3). Sampling of Flyash building bricks and criteria for conformity shall be as per I.S.:5454.

M-16 STONE :

- 16.1 The stone shall be of the specified variety such as Granite/Trap stone/Quartzite or any other type of good hard stones. The stones shall be obtained only from the approved quarry and shall be hard, sound, durable and free from defects like cavities, cracks, sand holes, flaws, injurious veins, patches of loose or soft materials etc. and

weathered portions and other structural defects or imperfections tending to affect their soundness and strength. The stone with round surface shall not be more than 5% of dry weight. When tested in accordance with I.S. 1134-1974. The minimum crushing strength of the stone shall be 200 Kg./Sq.Cm. unless otherwise specified.

- 16.2 The samples of the stone to be used shall be got approved before the work is started.
- 16.3 The khanki facing stone shall be dressed by chisel as specified in the item for khanki facing in required shape and size. The face of the stone shall be so dressed that the bushing on the exposed face shall not project by more than 40 mm. from the general wall surface and on face to be plastered it shall not project by more than 19 mm nor shall it have depressions more than 10 mm from the average wall surface.

M-17 LATERITE STONE :

- 17.1 Laterite stone shall be obtained from the approved quarry. It shall compacted in texture, sound, durable and free from soft patches. It shall have a minimum crushing strength of 100 Kg/Sq.Cm. in its dry condition. It shall not absorb water more 20% of its own weight, when immersed for 25 hours in water. After quarrying, the stone shall be allowed to weather for some time before using in work.
- 17.2 The stone shall be dressed into rectangular blocks so that all faces are from waviness and unevenness and the edges true and square.
- 17.3 Those type of stone in which white clay occurs should not be used.
- 17.4 Special corner stones shall be provided where so directed.

M-18 MILD STEEL BARS/TMT BARS :

- 18.1 Mild steel bars reinforcement TMT Bars for R.C.C. work shall FE 415/500 conform to I.S. 1786/85 (with latest ammendment) and shall be of tested quality. It shall also comply with the relevant part of I.S. 456-1978 and revised latest I.S. Code.
- 18.2 All the reinforcement shall be clean and free form dirt, paint, grease, mill scale or loose or thick rust at the time of placing.
- 18.3 For the purpose of payment the bar shall be measured correct upto 10 mm length and weight payable worked out as per the rate specified below :

i] 6mm	0.22 Kg/Rmt.	viii]	20mm	2.47 Kg/Rmt.
ii] 8mm	0.39 kg/Rmt.	ix]	22mm	2.98 kg/Rmt.
iii] 10mm	0.62 kg/Rmt.	x]	25mm	3.85 kg/Rmt.
iv] 12mm	0.89 kg/Rmt.	xi]	28mm	4.83 kg/Rmt.
v] 14mm	1.21 kg/Rmt.	xii]	32mm	6.31 kg/Rmt.
vi] 16mm	1.58 kg/Rmt.	xiii]	36mm	7.31 Kg/Rmt.
vii] 18mm	2.00 Kg/Rmt.	xiv]	40mm	9.86 Kg/Rmt.

M-19 HIGH YIELD STRENGTH STEEL DEFORMED BARS :

- 19.1 High yield strength steel deformed bars shall be either cold twisted or hot rolled and shall conform to I.S. 1786/85 (with latest ammendment) and following makes TATA, SAIL, RINL, Electrotherm, Ramasroop, National, JSW.
- 19.2 Other provision and requirements shall conform to specification No. M-18 for Mild Steel Bars.

M-20 HIGH TENSILE STEEL WIRES :

- 20.1 The high tensile wires for use in prestressed concrete shall conform to I.S. 2090-1983.
- 20.2 The tensile strength of the high tensile steel bars shall be as specified in the item. In absence of the given strength and minimum strength shall be taken as per para 6-1 of the I.S. 1785-1962. Testing shall be done as per I.S. requirements.

- 20.3 The high tensile steel shall be free from loose mill scale, rust, oil, grease or any other harmful matter. Cleaning of steel bars may be carried out by immersion in solvent solution, wire brushing or passing through a pressure box containing carborundum.
- 20.4 The high tensile wire shall be obtained from manufactures in coils having diameter not less than 350 times the diameter of wire itself so that wire springs back straight on being uncoiled.

M-21 MILD STEEL BINDING WIRE :

- 21.1 The mild steel wire shall be of 1.63mm or 1.22mm (16 or 18 guage) diameter and shall conform to I.S. 280-1978.
- 21.2 The use of black wire will be permitted for binding reinforcement bars. It shall be free from rust, oil, paint, grease, loose mill scale or any other undesirable coating which may prevent adhesion of cement mortar.

M-22 STRUCTURAL STEEL :

- 22.1 All structural steel shall conform to I.S. 226-1965. The steel shall be free from the defects mentioned in I.S. 226- 1975 and shall have a smooth finish. The material shall be free from loose mill scale, rust pits or other defects affecting the strength and durability. Rivet bars shall conform to I.S. 1148-1973.
- 22.2 When the steel is supplied by the contractor test certificates of the manufacturers shall be obtained according to I.S. 226-1975 and other relevant Indian Standards.

M-23 GALVANISED IRON SHEETS :

- 23.1 The galvanised iron sheets shall be plain or corrugated sheets of gauge as specified in item. The G.I. Sheets shall conform to I.S. 277-1977. The sheets shall be undamaged in carriage and handling either by rubbing off of zinc coating or otherwise. They shall have clean and bright surface and shall be free from dents, bends, holes, rust or white powdery deposit.
- 23.2 The length and width of G.I. sheets shall be as directed as per site condition.

M-23-A G.I.VALLEYS GUTTER, RIDGES :

- 23-A.1 The G.I. ridges and hips shall be of plain galvanised sheets class-3 of the thickness as specified in item. These shall be 600 mm width and properly bent up to shape without damage to the sheets in process of bending.
- 23-A.2 Valleys gutters and flashings shall be also of galvanised sheet of thickness as specified in item. Valleys shall be 900 mm. wide over all and flashing shall be 380 mm wide over all. They shall be bent to the required shape without damage to the sheet in the process of bending.

M-24 ASBESTOS CEMENT SHEETS :

- 24.1 Asbestos cement sheets plain, corrugated or semi-corrugated shall conform to I.S. 459-1970. The thickness of the sheets shall be as specified in the item. The sheet shall be free from all defects such as cracks, holes, deformities, chipped edges or otherwise damaged.
- 24.2 Ridges and Hips :
 - 24.2.1 Ridges and hips shall be of same thickness as that of A. C. sheets. The types of ridges shall be suitable for the type of sheets and locations.
 - 24.2.2 Other accessories to be used in roof such as flashing pieces, eaves filler pieces, valley gutters, north light and ventilator curves, barge boards etc. shall be of standard manufacture and shall be suitable for the type of sheets and location.

M-25 MANGALORE PATTERN ROOF TILES :

- 25.1 The Mangalore pattern tiles shall conform to I.S. 654-1972 for Class 'AA' or 'A' type as specified in item. Samples of the tiles to be provided shall got approved from the Engineer-in-charge. Necessary tests shall be carried out as directed.

M-26 SHUTTERING :

- 26.1 The shuttering shall be either of wooden planking of 30mm minimum thickness with or without steel lining or of steel plates stiffened by steel angles. The shuttering shall be supported on battens and beams and props of vertical ballies properly cross bracked together so as to make the centering rigid. In places of ballie props, bricks pillar of adequate section built in mud mortar may be used.
- 26.2 The form work shall be sufficiently strong and shall have camber, so that it assumes correct shape after deposition of the concrete and shall be able to resist forces caused by vibration of concrete, live load of men working with it and other incidental loads associated with it. The shuttering shall have smooth and even surface and its joints shall not permit leakage of cement grout.
- 26.3 If at any stage of work during or after placing concrete in the structure, the form work sags or bulges out beyond the required shape of the structure, the concrete shall be removed and work redone with fresh concrete and adequately rigid form work. The complete form work shall be got inspected by and approved from the Engineer-in-charge, before the reinforcement bars are placed in position.
- 26.4 The props shall consists of bullies having 100mm minimum diameter measured at mid length and 80mm at thin end and shall be placed as per design requirement. These shall rest squarely on wooden sole plates 40 mm. thick and minimum bearing area of 0-10 sq.m. laid on sufficiently hard base.
- 26.5 Double wedges shall further be provided between the sole plate and wooden props so as to facilitate tightening and easing of shuttering without jerking the concrete.
- 26.6 The timber used in shuttering shall not be so dry so as to absorb water from concrete and swell or bulge nor so green or wet so as to shrink after erection. The timber shall be properly sawn and planed on the sides and the surface coming in contact with concrete. Wooden form work with metal sheet lining or steel plates stiffened by steel angles shall be permitted.
- 26.7 As far as practicable, clamps shall be used to hold the forms together and use of nails and spikes avoided.
- 26.8 The surface of timber shuttering that would come in contact with concrete shall be well wetted and coated with soap solution before the concreting is done. Alternatively coat of raw linseed oil or oil of approved manufacture may be applied in place of soap solution. In case of steel shutteirng either soap solution or raw linseed oil shall be applied after thoroughly cleaning the surface. Under no circumstances black or burnt oil shall be permitted.
- 26.9 The shuttering for beams and slabs shall have camber of 4mm per metre (1 in 250) or as directed by the Engineer-in-charge so as to offset the subsequent deflection. For cantilevers, the camber at free end shall be 1/50 of the projected length or as directed by the Engineer-in-charge.

M-27 EXPANSION JOINTS - PREMOULDED FILLER :

- 27.1 The item provideds for expansion joints in R.C.C. frame structures for internal joints, as well as exposed joints, with the use of premoulded bituminous joint filler.
- 27.2 Premoulded bituminous joint filler, i.e. performed stirp of expansion joint filler shall not get deformed or broken by twisting, bending or other handing when exposed to atmospheric condition. Pieces of joint filler that have been damaged shall be rejected.
- 27.3 Thickness of the pre moulded joint filler shall be 25 mm unless otherwise specified.
- 27.4 Premoulded bituminous joint filler shall conform to 1.5 1838-1961.

M-28 EXPANSION JOINTS - COPPER STRIPS AND HOLD FASTS :

- 28.1 The item provides for expansion joints in R.C.C. frame structure for internal joints as well as for exposed joints with the use of necessary copper strip and holdfasts.
- 28.2 Copper sheet shall be 1.25 mm thick and of 1.25 mm with 'U' shape in the middle, copper strip shall have holdfast of 3 mm diameter copper rod fixed to the plate soldered on strip at intervals of about 30 cm. or as shown in the drawing or as directed. The width of each flange (horizontal side) of the copper plate to be embedded in the concrete work shall be 25 mm. Depth of 'U' to be provided in the expansion joint, in the copper plate shall be of 25 mm.

M-29 TEAK WOOD :

- 29.1 The teak wood shall be of good quality as required for the item to be executed. When the kind of wood is not specifically mentioned, good Indian teak wood as approved shall be used.
- 29.2 Teak wood shall generally be free from large, loose, dead or cluster knots, flaws, warps, twists, shakes, bends or any other defects. It shall generally be uniform in substance and of straight fibres as far as possible. It shall be free from rot, decay, harmful fungi and other defects of harmful nature, which will affect the strength, durability or its usefulness for the purpose for which it is required. The colour shall be uniform as far as possible. Any effort like painting, using any adhesive or resinous materials made to hide the defects shall render the pieces liable to rejection by the Engineer-in-charge.
- 29.3 All scantlings, planks etc. shall be sawn in straight lines and planes in the direction of grains and of uniform thickness.
- 29.4 The tolerances in the dimensions shall be allowed at the rate of 1.5 mm per face to be planed.
- 29.5 First Class Teak Wood :
First class teak wood shall have no individual hard and sound knots, more than 6 sq.cm. in size and the aggregate area of such knots shall not be more than 1% of area of piece. The timber shall be closed grained.
- 29.6 Second Class Teak Wood :
No individual hard and sound knots shall be more than 15 sq.cm. in size and aggregate area of such knots shall not exceed 2% of the area of piece.

M-29-A NON-TEAK WOOD :

The non teak wood shall be chemically treated, seasoned as per I.S. Specifications and of good quality. The type of wood shall be got approved before collecting the same on site. Fabrication of wooden members shall be started only after approval. For this purpose wood of Bio, Kalai, Sires, Saded, Behda, Jamun, Sisoo will be used for door frames whereas only Kalai, Siras, Halda, Kalam etc. will be permitted for shutters after proper seasoning and chemical treatment.

The non teak wood shall be free from large, loose dead or cluster knots, flows, shakes, warps, bends, or any other defect. It shall be uniform in substance and of straight fibres as far as possible. It shall be free from rots, decay, harmful fungi and other defects of similar nature which will affect the strength, durability or its usefulness for the purpose for which it is required. The colour of the wood shall be uniform as far as possible. The scantlings, planks etc. shall be sawn in straight lines and planes in the direction of grain and of uniform thickness. The department will use the Agency to produce a certificate from the Forest Department in the event of a dispute and the decision of the Department shall be final and binding to the contractor.

The tolerance in the dimension shall be allowed at 1.5 mm. per face to be planed.

M-30 WOODEN FLUSH DOOR SHUTTERS (SOLID CORE) :

- 30.1 The solid core type flush door shutters shall be of decorative or non-decorative type as specified in the drawing. The size and thickness of the shutter shall be as specified in drawings or as directed. The timber species for core shall be used as per I.S. 2202-(Part-I)-1980. The timber shall be free from decay and insect attack. Knots and knot holes less than half the width of cross-section of the members, pitch streaks and harmless pin holes shall be permissible except in the exposed edges of the core members. The commercial plywood, cross bands shall conform to I.S. 303-1275.
- 30.2 The face panel of the shutters shall be formed by gluing by the hot press process on both faces of the core with either plywood or cross bands, and face veneers. The lipping, rebating, opening of glazing, venetion etc. shall be provided if specified in the drawing.
- 30.3 All edges of the door shutters shall be square. The shutters shall be free from twist or warp in its plane. Both faces of the shutters shall be sand papered to smooth even texture.
- 30.4 The shutters shall be tested for ---
- i] End Immersion Test : The test shall be carried out as per I.S. 2202 (Part-I) 1980. There shall be no delamination at the end of the test.
 - ii] Glue Adhesion Test : The flush door shall be tested for glue adhesive test in accordance with I.S. 2202(Part-I)-1980. The shutters shall be considered to have passed the test if no delamination occurs in the glue lines in the plywood and if no single delamination more than 80 mm. in length and more than 3 mm. in depth has occurred in the assembly glue lines between the plywood face and the style and rail. Delamination at the corner shall be measured continuously around the corner. Delamination at the knots knot, hole and other permissible wood defects shall not be considered in assessing the sample.
- 30.5 The tolerance in size of solid core type flush door as under:-
In nominal thickness # 1.2 mm. In nominal height # 3 mm. The thickness of the shutters shall be uniform throughout with a permissible variation of not more than 0.8 mm. when measured at any two points.

M-31 ALUMINIUM DOORS, WINDOWS, VENTILATORS :

- 31.1 Aluminium alloy used in the manufacture of extruded window sections shall conform to I.S. designation HEA-WP of I.S. : 733-1975 and also to I.S. Designation WVG - WP OF I.S. : 1285-1975. The sections shall be as specified the drawing and design. The fabrication shall be done as directed.
- 31.2 The hinges shall be cast or extruded aluminium hinges of same type as in window but of large size.
- 31.3 The hinges shall normally be of 50 mm projecting type non projecting type of hinges may also be used if directed. The handles of door shall be of specified design. A suitable lock for the door operable either from outside shall be provided. In double shutter door, the first closing shall have a concealed aluminium alloy bolt at top and bottom.

M-32 ROLLING SHUTTERS :

- 32.1 The rolling shutters shall conform to I.S. 6248-1979. Rolling shutters shall be supplied of specified type with accessories. The size of the rolling shutters shall be specified in the drawings. The shutters shall be constructed with interlocking lath sections formed from cold rolled steel strips not less than 0.9 mm. thick and 80 mm. wide for shutters upto 3.5 m. Width not less than 1.25 mm. thick and 80 mm. wide for shutters 3.5 m. in width and above unless otherwise specified.
- 32.2 Guide channels shall be of mild steel deep channel section and of rolled pressed or built up (fabricated) jointless construction. The thickness of sheet used shall not be less than 3.15 mm.

- 32.3 Hood covers shall be made of M.S. sheets not less than 0.92 mm. thick. For shutters having width 3.5 mts. and above, the thickness of M.S. sheet for the hood covers shall be not less than 1.25 mm.
- 32.4 The spring shall be of best quality and shall be manufactured from tested high tensile spring steel wire or strip of adequate strength to balance the shutters in position. The spring pipe shaft etc. shall be supported on strong M.S. or malleable C.I. brackets. The brackets shall be fixed on the or under the lintel as specified with rawl plugs and screws bolts etc.
- 32.5 The rolling shutters shall be of self rolling type upto 8 sq.m. clear area without ball bearing and upto 12 sq.m. clear area with ball bearing. If the rolling shutters are of larger then gear operated type shutters shall be used.
- 32.6 The locking arrangement shall be provided at the bottom of shutter at both ends. The shutters shall be opened from outside.
- 32.7 The shutters shall be completed with door suspension, shafts, locking arrangements, pulling hooks, handles and other accessories.

M-33 COLLAPSIBLE STEEL GATE :

- 33.1 The collapsible steel gate shall be in one or two leaves and size as per approved drawings or as specified. The gate shall be fabricated from best quality mild steel channels, flats etc. Either steel pulleys or ball bearings shall be provided in every double channel. Unless otherwise specified the particulars of collapsible gate shall be as under ---
- i] Pickets : These shall be of 20 mm. M.S. channels of heavy sections unless otherwise shown on drawings. The distance centre to centre of pickets shall be 12 cms. with an opening of 10 cms.
 - ii] Pivoted M.S. flats shall be 20 mm. x 6 mm.
 - iii] Top and bottom guides shall be from tee or flat iron of approved size.
 - iv] The fittings like stoppers, fixing hold fasts, locking cleats, brass handles and cast iron rollers shall be of approved design and size.

M-34 WELDED STEEL WIRE FABRIC :

- 34.1 Welded steel wire fabric for general purpose shall be manufactured from cold drawn steel 'as drawn' or galvanised steel conforming to I.S. 226-1975 With longitudinal and transverse wire securely connected at every intersection by a process of electrical resistance welding and conforming to I.S. 4948-1974. It shall be fabricated and finished in a workman like manner and shall be free from injurious defects and shall be rust proof. The type of mesh shall be oblong or square as directed. The mesh sizes and sizes of wire for square as well as oblong welded steel wire fabric shall be as directed. The steel wire fabric in panels shall be in one whole piece in each panel as far as stock sizes permit.

M-35 EXPANDED METAL SHEETS :

- 35.1 The expanded metal sheets shall be free from flaws, joints, welds, broken, stands, laminations and other harmful surface defects Expanded metal steel sheet shall conform to I.S. 412 -1975 except that blank sheets need not be with guaranteed mechanical properties. The size of the diamond mesh of expanded metal and dimensions of strands (width and thickness) shall be as specified. The tolerance on nominal weight of expanded metal sheets shall be of + 10 per cent.
- 35.2 Expanded metal in panels shall be in one whole piece in each panel as far as stock sizes permit. The expanded metal sheets shall be coated with suitable protective coating to prevent corrosion.

M-36 MILD STEEL WIRE (Wire Gauze Jali) :

- 36.1 Mild steel wire may be galvanised, as indicated. All finished steel wire shall be well cleanly drawn to the dimensions and size of wire as specified in item. The wire shall be

sound, free from slits, surface flaws, rough jagged and imperfect edges and other harmful surface defects and shall conform to I.S. 280-1978.

M-37 PLYWOOD :

- 37.1 The Plywood for general purpose shall conform I.S. 303-1975. Plywood is made by cementing together thin boards or sheets of wood into panels. There are always an odd number of layers 3, 5, 7, 9 ply etc. The plies are placed so that the grain of each layer is at right angles to the grain in the adjacent layers.
- 37.2 The chief advantage of plywood over a single board of the same thickness is the more uniform strength of the plywood along the length and width of the plywood and greater resistance to cracking and splitting with change in moisture content.
- 37.3 Usually synthetic resins are used for glueing. Phenolic resins are usually cured in a hot press which compresses and simultaneously heats the plies between hot plates which maintain a temperature of 90 degree C. to 140 degree C. and a pressure of 11 to 14 Kg./Sq.cm. on the wood. The time of heating may be anything from 2 to 60 minutes depending upon thickness.
- 37.4 When water glue are used the wood absorbs so much Water that the finished plywood must be dried carefully, When synthetic resins are used as adhesive the finished plywood must be exposed to atmosphere of controlled humidity until the proper amount of moisture has been absorbed.
- 37.5 According to I.S. : 303-1975 the plywood for general purpose shall be of three grades namely BWR, WWR and CWR depending upon the adhesives used for bonding the veneers and it will be further classified into six types namely AA, AB, AC, BB, BC and CC based on the quality of the two faces, each face being of three kinds namely A, B and C. After pressing, the finished plywood should be reconditioned to a moisture content not less than 8 percent and not more than 16 percent..
- 37.6 THICKNESS OF PLYWOOD BOARDS

TABLE

Board	Thickness
3 Ply	3 mm
	4 mm
	5 mm
	6 mm
5 Ply	5 mm
	6 mm
	8 mm
	9 mm
7 Ply	9 mm
	13 mm
	16 mm
9 Ply	13 mm
	16 mm
	19 mm
11 Ply	19 mm
	22 mm
	25 mm

M-38 GLASS :

- 38.1 All glass shall be of the best quality, free from specks, bubbles, smokes, veins, air holes blisters and other defects. The kind of glass to be used shall be as mentioned in the item or specification or in the special provisions or as shown in detailed drawings. Thickness of glass panes shall be uniform. The specifications for different kinds of glass shall be as under ----

38.2 Sheet Glass :

- 38.2.1 In the absence of any specified thickness or weight in the item or detailed specifications of the item of work, sheet glass shall be weighing 7.5 Kg./Sq.m. for panes upto 600 mm. x 600 mm.
- 38.2.2 For panes larger than 600 mm. x 600 mm. and upto 800 mm. x 800 mm. glass weighing not less than 8.75 Kg./Sq.m. shall be used. For bigger panes upto 900 mm. x 900 mm. glass weighing not less than 11.25 Kg./Sq.m. shall be used.
- 38.2.3 Sheet glass shall be patent flattened glass of best quality and for glazing and framing purposes shall conform to I.S. 761-1960. Sheet glass of the specified colours shall be used, if so shown on detailed drawings or so specified. For important buildings and for panes with any dimensions over 900 mm. plate glass of specified thickness shall be used.

38.3.0 Plate Glass :

- 38.3.1 When plate glass is specified it shall be "Polished Patent Plate Glass" of best quality. It shall have both the surface ground flat and parallel and polished to obtain clear undisturbed vision and reflection. The plate glass shall be of the thickness mentioned in the item or as shown in the detailed drawing or as specified. In the absence of any specified thickness, the thickness of plate glass to be supplied shall be 6 mm. and a tolerance of 0.20 mm. shall be admissible.

38.4.0 Obscured Glass :

- 38.4.1 This type of glass transmits light so that vision is partially or almost completely obscured. Glass shall be plain rolled, figured, ribbed or fluted, or frosted glass as may be specified as required. The thickness and type of glass shall be as per details on drawings or as specified or as directed.

38.5.0 Bajari Glass :

Glass shall be with bajari pattern embedded in a sheet of plane glass. It should be of best quality as approved by Engineer-In-Charge. Thickness of glass shall not be less than 4 mm. bajari glass shall be of type and thickness as specified.

M-39 ACRYLIC SHEETS :

- 39.1 Acrylic sheets shall be of thickness as specified in the item and of a specified shape and size as the case may be. Panels may be flat or curved. It should be light in weight. It shall be colourless or coloured or opaque as specified in the item. Colourless sheet shall be as transparent as the finest optical glass. Its light transmission rate shall be about 95%. Transparency shall not be affected for the sheets of larger thickness. It shall be extremely resistant to sunlight, weather and low temperatures. It shall not show any significant yellowing or change in physical properties or loss of light transmission over a longer period of use.
- The sheet shall be impact resistant also. Sheets should be available in complete range of standard transparent, translucent and opaque colours. Sheets should be available in complete range of standard transparent, translucent and opaque colours. Sheets shall be of such quality that they can be cut, bent and jointed as desired. Solution for the joints shall be used as per the requirement of manufacture.

M-40 (A) PARTICLE BOARD :

- 40.1 The particle boards used for face panels shall be of best quality free from any defects. The particle boards shall be made with phenolmaldehyde adhesive. The particle boards shall conform to I.S. 3087-1965. "Specification for wood particle board for general purpose." The size and the thickness of the particle board shall be as specified.

M-40 (B) CEMENT BONDED PARTICLE BOARD :

1. The particle board should confirm to IS-14276-1995 or latest.
2. It should be free from any cracks and flacks.
3. Cement bonded Particle board may be replaced by any other equivalent material as suggested Engineer-In-Charge

M-41 EXPANDED POLYSTYRENE OR FRAMES STYROPER SLEBS :

- 41.1 The expanded polystyrene ceiling boards and tiles shall be of approved make and shall be of size thickness, finish and colour and indicated. It shall be of high density and suitable for use as insulating material. The insulating material shall be like slab of thermocole etc.

M-42 RESIN BONDED FIBRE GLASS :

- 42.1 The resin bonded fibre glass tiles or rools shall be of approved make and shall be sizes, thickness and finish as indicated.
- 42.2 For test of Mineral wool thermal insulation Blanket I.S. 3144-1965 followed.
- 42.3 Insulation wool blanket shall be with the following coverings on one or both sides as indicated.
 - (1) Bituminised bessian kraft paper suitable for use in position where moisture has to be excluded.
 - (2) Hessain cloth or Kraft paper for keeping out dust.
 - (3) G. I. wire netting, suitable or surfaces to be plastered over.

M-43 FIXTURES & FASTENINGS :**General ---**

- i] The fixtures and fastenings, that is, butt, hinges, tee and strap hinges, sliding door bolts, tower bolts, door latch, bath-room latch, handles, door stoppers, casement window fasteners, casement stays and ventilator catch shall be made of the metal as specified in the item or its specifications.
- ii] They shall be of iron, brass, aluminium, chromium plated iron, chromium plated brass, copper oxidised iron, copper oxidised brass or anodised aluminium as specified.
- iii] The fixtures shall be heavy, medium or light type. The fixtures and fastenings shall be smooth finished and shall be such as will ensure ease of operation.
- iv] The samples of fixtures and fastenings shall be got approved as regards quality and shape before providing them in position.
- v] Brass and anodised aluminium fixtures and fastenings shall be bright finished.

Holdfasts :

- i] Holdfasts shall be made from mild steel flat 30 cm. length and one of the holdfasts shall be bent at right angle and two nos. of 6 mm. dia. hooles shall be made in it for fixing it to the frame with screws. At the other end, the holdfast shall be forked and bent at right angles in opposite directions.

Butt Hinges :

- i] Railway standard heavy type butt hinges shall be used when so specified.
- ii] Tee and strap hinges shall be manufactured from M.S. sheet.

Sliding Door Bolts (Aldrops) :

- i] The aldrops as specified in the item shall be used and shall be got approved.

Tower Bolts (Barrel Type) :

- i] Tower bolts as specified in the item shall be used and shall be got approved.

Door Latch :

- i] The size of door latch shall be taken as the length of latch.

Bathroom Latch :

- i] Bathroom latch shall be similar to tower bolt.

Handle :

- i] The size of the handles shall be determined by the inside grip length of the handles. Handles shall have a base plate of length 50 mm. more than the size of the handle.

Door Stoppers :

- i] Door stoppers shall be either floor door stopper type or door catch type. Floor stopper shall be of overall size as specified and shall have a rubber cushion.

Door Catch :

- i] Door catch shall be fixed at a height of about 900 mm. from the floor level such that one part of the catch is fitted on the inside of the shutter and other part is fixed in the wall with necessary wooden plug arrangements for appropriate fixity. The catch shall be fixed 20 mm. inside the face of the door for easy operation of catch.

Wooden Door Stop With Hinge :

- i] Wooden door stop of size 100 mm. x 60 mm. x 40 mm. shall be fixed on the door frame with a hinge of 75 mm. size and at a height of 900 mm. from the floor level. The wooden door stop shall be provided with 3 coats of approved oil paint.

Casement Window Fastner :

- i] Casement window fastener for single lead window shutter shall be left or right handed as directed.

Casement Stays (Straigot Peg.Stay) :

- i] The stays shall be made from a channel section having three holes at appropriate position so that the window can be opened either fully or partially as directed.
Size of the stay shall be 250 mm. to 300 mm. as directed.

Ventilator Catch :

- i] The pattern and shape of the catch shall be as approved.

Pivot :

- i] The base and socket plate shall be made from minimum 3 mm. thick plate, and projected pivot shall not be less than 12 mm. dia. and 12 mm. length and shall be firmly riveted to the base plate case of iron pivot and in single piece base in the case of brass pivot.

M-44 PAINTS :**44.1 Oil Paints :**

Oil paints shall be of the specified colour and shade, and shall be of Asian, ICI, Nerolac, Dulux or equivalent as approved by Engineer-In-Charge. The ready mixed paints shall only be used. However, if ready mixed paint or specified shade or tint is not available white ready mixed paint with approved stainer will be allowed. In such a case, the contractor shall ensure that the shade of the paint so allowed shall be uniform. All the paints shall meet with the following general requirements ---

- i] Paint shall not show excessive setting in a freshly opened full can and shall easily be redispersed with paddle to a smooth homogeneous state. The paint shall show no curdling, livering, caking or colour separation and shall be free from lumps and skins.
- ii] The paint as received shall brush easily, possess good levelling properties and show no running or sagging tendencies.
- iii] The paint shall not skin within 48 hours in a three quarters filled closed container.
- iv] The paint shall dry to a smooth uniform finish free from roughness, grit unevenness and other imperfections.

Ready mixed paint shall be used exactly as received from the manufacturers and generally according to their instructions and without any admixtures whatsoever.

44.2 Enamel Paints :

The enamel paint shall satisfy in general requirements as mentioned in specification of oil paints. Enamel paints shall conform to I.S. 2933-1975.

M-45 FRENCH POLISH :

The french polish of required tint and shade shall be prepared with the below mentioned ingredients and other necessary materials :

- i] Denatured spirit of approved quality.
- ii] Shellac.
- iii] Chandras.
- iv] Pigment.

The french polish so prepared shall conform to I.S. 348- 1968.

M-46 MARBLE CHIPS FOR MARBLE MOSAIC TERRAZZO :

- 46.1 The marble chips shall be of approved quality and shades. It shall be hard, sound, dense and homogeneous in texture with crystalline and coarse grains. It shall be uniform in colour and free from stains, cracks, decay and weathering.
- 46.2 The size of various colours of marble chips ranging from the smallest upto 20 mm. shall be used where the thickness of top wearing layers is 6 mm. in size. The marble chips of approved quality and colours only as per grading as decided by the Engineer-in-charge shall be used for marble mosaic tiles or works.
- 46.3 The marble chips shall be machine crushed. They shall be free from foreign matter, dust etc. Except as above the chips shall conform to I.S. 2114-1962.

M-47 FLOORING TILES :**A] Plain Cement Tiles –**

- 47.1.1 The plain cement tiles shall be of general purpose type. These are the tiles in the manufacture of which no pigments are used. Cement used in the manufacture of tiles shall be as per Indian Standards.
- 47.1.2 The tiles shall be manufactured from a mixture of cement and natural aggregates by pressure process. During manufacture, the tiles shall be subjected to a pressure of not less than 140 Kg./Sq.cm. The proportion of cement to aggregate in the backing of the tiles shall be not leaner than 1:3 by weight. The wearing face, though the tiles are of plain cement, shall be provided with stone chips of 1 to 2 mm size. The proportion of cement to the marble chips aggregate in the wearing layer of the tiles shall be three parts of cement to one part of chips by weight. The minimum thickness of wearing layer shall be 3 mm. The colour and texture of wearing layer shall be uniform throughout its face and thickness. On removal from mould, the tiles shall be kept in moist condition continuously atleast for seven days and subsequently, if necessary, for such long period as would ensure their conformity to requirements of I.S. 1237- 1980 requiring resistance to wear and water absorption.
- 47.1.3 The wearing face of the tiles shall be plain, free from projections, depressions and cracks and shall be reasonably parallel to the back face of the tile. All angles shall be right angle and all edges shall be sharp and true.
- 47.1.4 The tile sizes shall generally be square shape 24.85cm. x 24.85cm. or 25cm. x 25cm. The thickness of the tiles shall be 20 mm.
- 47.1.5 The tolerance of length and breadth shall be plus or minus 5 mm. The tolerance on thickness shall be plus 1 mm.
- 47.1.6 The tiles shall satisfy the tests as regards transverse strength, resistance to wear and water absorption as per I.S. 1237-1980.

47.2 B] Plain Coloured Tiles :

- 47.2.1 These tiles shall have the same specifications as for plain cement tiles as per (A) above except that they shall have a plain wearing surface wherein pigments are used. They shall conform to I.S. 1237-1980.

47.2.2 The pigment used for colouring cement shall not exceed 10% by weight of cement used in the mix. The pigments, synthetic or otherwise, used for colouring tiles shall have permanent colour and shall not contain materials detrimental to concrete.

47.2.3 The colour of the tiles shall be specified in the item or as directed.

47.3 C] Marble Mosaic Tiles :

47.3.1 These tiles have the same specifications as per plain cement tiles except the requirements as stated below ---

47.3.2 The marble mosaic tiles shall conform to I.S. 1237-1980. The wearing face of the tiles shall be mechanically ground and filled. The wearing face of tiles shall be free of projections, depressions and cracks and shall be reasonably parallel to the back face of the tiles. All angles shall be right angles and all edges shall be sharp and true.

47.3.3 Chips used in the tiles be from smallest upto 20 mm. size. The minimum thickness of wearing layer of tiles shall be 6 mm. For pattern of chips to be laid on the wearing face, a few samples with or without their full size photographs as directed shall be presented to the Engineer-in-charge for approval.

47.3.4 Any particular samples, if found suitable shall be approved by the Engineer-in-charge, of he may ask for particular sized chips to be more or less in the sample presented. The samples shall have to be made by the contractor till a suitable sample finally approved for use in the work. The contractor shall ensure that the tiles supplied for the work shall be in conformity with the approved sample only, in terms of its dimensions, thickness of backing layer and wearing surface, materials, ingredients, colour shade, chips, distribution etc. required.

47.3.5 The tiles shall be prepared from cement conforming to Indian Standards or coloured portland cement generally depending upon the colour of tiles to be used or as directed.

47.4 D] Chequered Tiles :

47.4.1 Chequered tiles shall be plain cement tiles or marble mosaic tiles. The former shall have the same specification as per (A) above and the latter as per marble mosaic tiles as per (C) except as mentioned below.

47.4.2 The tiles shall be of nominal size of 250mm. x 250mm. or as specified. The centre to centre distance of the chequer shall not less than 25mm. and not more than 50mm. The overall thickness of the tile shall be 22mm.

47.4.3 The grooves in the chequers shall be uniform and straight. The depth of the grooves shall not be less than 3mm. The chequered tiles shall be plain, coloured or mosaic as specified. The thickness of the upper layer measured from the top of the chequers shall not be less than 6mm. The tiles shall be given the first grinding with machine before delivery to site.

47.4.4 Tiles shall conform to relevant I.S. 1237-1980.

47.5 E] Chequered Tiles for Staircases & Parking :

47.5.1 The requirements of these tiles shall be the same as chequered tiles as per (D) above except in following respects :

i] The length of a tile including nose shall be 330 mm.

ii] The minimum thickness shall be 28 mm.

iii] The nosing shall have also the same wearing layer at the top.

iv] The nosing edge shall be rounded.

v] The front portion of the tile for a minimum length of 75mm. from and including the nosing shall have grooves running parallel to nosing and at centres not exceeding 25mm.

Beyond that the tiles shall have normal chequer pattern.

M-48 ROUGH KOTAH STONE :

48.1 The kotah stones shall be hard, even, sound and regular in shape and generally uniform in colour. The colour of the stone shall generally be green. Brown coloured stones shall not be allowed for use. They shall be without any soft veins, cracks or flaws.

- 48.2 The size of the stones to be used for flooring shall be size 600mm. x 60mm. and/or size 600mm. x 450mm. as directed. However, smaller sizes will be allowed to be used to the extent of maintaining the required pattern. Thickness shall be as specified.
- 48.3 Tolerance of minus 30 mm on account of chisel dressing of edges shall be permitted for length as well as breadth. Tolerance in thickness shall be plus 3mm.
- 48.4 The edges of stones shall be truly chiselled and table rubbed with coarse sand before paving. All angles and edges of the stone shall be true, square and free from chipping and the surface shall be true and plain.
- 48.5 When machine cut edges are specified, the exposed edges and the edges at joints shall be machine cut. The thickness of the exposed machine cut edges shall be uniform.

M-49 POLISHED KOTAH STONES :

- 49.1 Polish kotah stone shall have the same specifications as per rough kotah stone except as mentioned below.
- 49.2 The stone shall have machine polished smooth surface. When brought on site, the stones shall be single polished or double polished depending upon its use. The stones for paving shall generally be single polished. the stones to be used for dado, skirting, platforms sink, veneering, sills, steps etc. where machine polishing after the stones are fixed in situ is not possible shall be double polished.

M-50 DHOLPUR STONE SLAB :

- 50.1 Dholpur stone slab shall be of best quality as approved by the Engineer-in-charge. The stone slab shall be without any veins, cracks, and flaws. The stone slab shall be even, sound and durable, regular in shape and uniform colour.
- 50.2 The size of the stone shall be as specified in the item or detailed drawing or as approved by the Engineer-in-charge. The thickness of the stone shall be as specified in the item of work with the permissible tolerance of plus or minus 2 mm. The provisions in respect of polishing as for polished kotah stone shall apply to polished Dholpur stone also. All angles and edges of the face of stone slab shall be fine chiselled or polished as specified in the item of work and all the four edges shall be machine cut. All angles and edges of the stone slab shall be true and plane.
- 50.3 The sample of stone shall be got approved from the Engineer-in-charge for shade and tint for a particular work. It shall be ensured the stones to be used in a particular work shall not differ much in shade or tint from the approved sample.

M-51 MARBLE SLAB :

Marble slabs shall be white or of other colour and of best quality as approved by the Engineer-in-charge. Slab shall be hard, close, uniform and in texture. They shall also be free defects and cracks. The surface shall be machine polished to an even and perfectly plane surface and the edges, machine cut true and square. The rear face shall be rough enough to provide key for the mortar.

Marble slabs with natural veins, if selected shall have to be laid as per the pattern given by the Engineer-in-charge. Size of the slabs shall be minimum 450mm. x 450mm. and preferably 600mm. x 600mm. However, smaller sizes will be allowed to be used to the extent of maintaining required pattern.

The slab shall not be thinner than the specified thickness at its thinnest part. A few specimen of finished slab to be used shall be deposited by the contractor in the office for reference.

Except as above, the marble slabs shall conform to I.S. 1130-1969 or as revised from time to time.

M-52 GRANITE STONE SLAB :

- 52.1 Granite shall be of approved colour and quality, The stone shall be hard even, sound and regular in shape and generally uniform in colour. It shall be without and soft veins, cracks or flaws.
- 52.2 The thickness of the stone shall be specified in the item.
- 52.3 All exposed faces shall be double polished to tender truly smooth and even reflecting surface. The exposed edges and corners shall be rounded off as directed. The exposed edges shall be machine cut and shall have uniform thickness.

M-53 P.V.C. FLOORING :

- 53.1 P.V.C. sheets for P.V.C. floor covering shall be homogenous flexible type, conformint to I.S. 3462-1966. The P.V.C. covering shall neither develop any toxic effect while put to use not shall give off any disagreeable odour.
- 53.2 Thickness of flexible type covering or tiles shall be as specified in the description of the item.
- 53.3 The flexible type shall be backed with hessain or other woven fabric. The following tolerance shall be applicable on the nominal dimensions of the sheet rolls or tiles :
- | | | |
|-----|-------------------------|-------------------|
| (a) | Thickness | +/- 0.15 mm |
| (b) | Length or width | |
| | 1. 300 mm Square tiles | +/- 0.20 mm |
| | 2. 600 mm Square tiles. | +/- 0.40 mm |
| | 3. 900 mm Square tiles. | +/- 0.60 mm |
| | 4. Sheets and rolls. | +/- 0.10 percent. |
- 53.4 Adhesive :
- 53.4.1 The adhesive for PVC flooring shall be of the type and make recommended by the manufacturers of PVC sheets tiles.

M-54 FACING TILES :

- 54.1 The facing tiles (burnt clay facing bricks) shall be free from cracks, flaws, and nodules of free lime. They shall be thoroughly burnt and shall have plane rectangular faces with parallel sides and sharp stright right angled faces. The texture of the finished surface that will be exposed when in place, shall conform to an approved sample consisting not less than four stretcher bricks each representing resistance to penetration by rain and greater durability than common bricks. The tiles shall conform to I.S. 2691-1972.
- 54.2 The standard size of facing brick tiles shall be 19 x 9 x 4 cms. The facing brick tiles shall be provided with frog which shall conform to I.S. 1077-1976.
- 54.3 The permissible tolerance in dimensions specified above shall be as follows.

SizeTolerance for

	<u>1st class Brick</u>	<u>2nd Class Brick</u>
19 cm	+/- 6 mm	+/- 10 mm
9 cm	+/- 2 mm	+/- 7 mm
4 cm	+/- 1.5 mm	+/- 3 mm

The tolerance for distortion or warpage of face or edges of individual brick from a plane surface and from a straight line respectively shall be as follows :

Facing dimensions.Permissible tolerance.

Max. below 19 cms.	Max. 2.5 mm.
Max. above 19 cms.	Max. 3.0 mm

- 54.5 The average compressive strength obtained as a sample of five tiles when tested in accordances with the produre aid as per I.S. 1077-1976 shall be not less than 175 Kg/Sq.cm. The average compressive strength of any individual brick shall not less than 160 Kg/Sq.cm.
- 54.6 The average water absorption for five brick tiles shall not be exceed 12 percent of average weight of brick before testing. The absorption for each individual brick shall not exceed 25 percent.
- 54.7 The brick tiles when tested in accordance with I.S. 1077-1976 the rate of effloresence shall not be more than "Slightly effloresced".

M-55 White Glazed Tiles :

- 55.1 The tiles shall be of best quality as approved by the Engineer-in-charge. They shall be flat and true to shape. They shall be free from cracks, crazing, spots, chipped edges and corners. The glazing shall be of uniform shade.
- 55.2 The tiles shall be of nominal size of 150mm. x 150mm. unless otherwise specified. The maximum variation from the stated sizes, other than the thickness of tile, shall be plus or minus 1.5mm. The thickness of the tile shall be 6mm. except as above the tiles shall conform to I.S. 777-1970.

M-56 (A) GALVANISED IRON PIPES AND FITTINGS :

Galvanized iron pipe shall be of the medium type and of required diameter and shall comply with I.S. 1239-1979. The specified diameter of the pipes shall refer to the inside diameter of the bore. Clamps, screw and all galvanised iron fittings shall be of the standard 'R' or equivalent make.

M-56 (B) U-P.V.C. PIPES & FITTINGS :

1. All soil, waste and vent pipes & fittings shall conform to I.S. 4985-1988 & I.S. 13592:1992. The pipes are provided with an integral rubber ring type socket at one end while the other end is kept plain, smooth & free from burrs. The pipes and fittings shall be true to shape, smooth & cylindrical. They shall be free from cracks, laps, pinholes or other imperfection and shall be neatly dressed and carefully fettled.
2. The P.V.C. Pipes shall be of the diameter as specified in the description and shall be in length of 6.0, 3.0 & 1.8 m including socket ends of the pipe unless shorter length are either specified or required at junction etc. Tolerances on specified length shall be + 10 mm and - 0 mm.
3. Rubber seal rings for joints and Access Doors shall be manufactured in accordance with IS: 5382. They are made out of natural rubber with a shore 'A' hardness of 40+5.
4. The thickness of fittings and their socket & spigot dimensions shall conform to the thickness and dimensions specified for the corresponding sizes of straight pipes.

M-56 (C) C-P.V.C. PIPES & FITTINGS :

C-PVC (Chlorinated Poly Vinyl Chloride) SDR II should conform to ASTM F 442, specific to C-PVC in Iron Pipe size (IPS) dimension, which also can be applied to C-PVC pipe in Copper Tube Size (CTS) dimension. Fitting should conform to ASTM D 2846. Pipes and Fittings should be of ASTRAL make or as approved by Engineer-In-Charge.

M-57 BIB COCK AND STOP COCK :

- 57.1 A bib cock is a draw off tap with a horizontal inlet and a free outlet. A stop cock is a valve with a suitable means of connection for insertion in a pipe line for controlling or stopping the flow.
- 57.2 They shall be of screw down type and of brass chromium plated and of diameter as specified in the description of the item. They shall conform to I.S. 781-1977 and they shall be of best Indian make. They shall be polished bright.
- 57.3 The minimum finished weight of bib cock and stop shall be as given below ---

<u>Dia.</u>	<u>Bib Cock</u>	<u>Stop Cock</u>	<u>Dia.</u>	<u>Bib Cock</u>	<u>Stop Cock</u>
8 mm.	0.25 Kg.	0.25 Kg.	15 mm.	0.40 Kg.	0.40 Kg.
10 mm.	0.30 Kg.	0.35 Kg.	20 mm.	0.75 Kg.	0.75 Kg.

M-58 GUN METAL WHEEL VALVE :

- 58-1 The gun metal wheel valve shall be of approved quality. These shall be of gun metal fitted with wheel and shall be of gate valve opening full way and of the size as specified. These shall conform to I.S. 778-1971.

M-59 WHITE GLAZED PORCELAIN WASH BASIN :

- 59.1 Wash basin shall be of white porcelain first quality best Indian make and it shall conform to I.S. 2556-(Part-IV)-1972 and I.S. 771-1979. The size of the wash basin shall be as specified in the item. The wash basin shall be of one piece construction with continued over-flow arrangements. All internal angles shall be designed so as to facilitate cleaning. Wash basin shall have single tap hole or two holes as specified. Each basin shall have a circular waste hole which is either rebated or bevelled internally with 65 mm. dia. at top and 10 mm. depth to suit the waste fitting. The necessary stud slot to receive the bracket on the under side of the basin shall be provided. Basin shall have an internal soap holder recess which shall fully drain into the bowl.
- 59.2 White glazed pedestal of the quality and colour as that of
- 59.2.1 White glazed pedestal; of the quantity and colour as that of the basin shall be provided where specified in the item. It shall be completely recessed at the back for reception of supply and water pipe. It shall be capable of supporting the basin rigidly and adequately and shall be so designed as to make the height from the floor to top of the rim of basin 750 mm. to 800 mm. as directed.

M-60 EUROPEAN TYPE WATER COLSET/WITH LOW LEVEL FLUSHING :

- 60.1 The European type water closet shall be white glazed conforming to I.S. 2556-1973 and I.S. 771-1979.
- 60.2 'S' trap shall be provided as required with water seal not less than 50 mm. The solid plastic seat and cover shall be of the best Indian make conforming to I.S. 2548-1980. They shall be made of moulded synthetic materials which shall be tough and hard with high resistance to solvents and shall be free from blisters and other surface defects and shall have chromium plated brass hinges and rubber butter of suitable size.

M-61 ORISSA TYPE WATER CLOSET :

- 61.1 The specification of Orissa type white glazed water closet of first quality shall conform to I.S. 2556 (Part-III) 1981 and relevant specification of Indian type water closet except that pan will be with the integral squaring pan of size 580 mm x 440 mm. with raised footrest.

M-62 INDIAN TYPE WATER CLOSET :

The Indian type white glazed water closet of first class quality, size as specified in the item and conforming to I.S. 771-1979 and I.S. 2556-(Part-II)-1981. Each pan shall have integral flushing ring of suitable type with adequate number of holes all around as directed to have satisfactory flushing. It shall also have an inlet at back of front for connecting flush pipe as directed. The inside of the bottom of the pan shall have sufficient slope from the front towards the outlet and the surface shall be uniform and smooth. Pan shall be provided with 100 mm. diameter 'P' or 'S' trap with approximately 50 mm. water seal and 50 mm. diameter vent horn.

M-62 (A) FOOT RESTS :

A pair of white glazed earthen ware rectangular foot rests of minimum size 250 mm. x 130 mm. x 20 mm. shall be provided with the water closet.

M-63 GLAZED EARTHEN WARE SINK :

The glazed earthenware sink shall be of specified size, colour and quality. The sink shall conform to I.S. 771- Part-II-1979. The brackets for sinks shall conform to I.S. 775-1970. The pipes shall conform to I.S. 1239-Part-I-1973 and I.S. 404-1962 for steel and lead pipes respectively. 32 mm. brass waste coupling of standard pattern with brass chain and rubber plug shall be provided with sink.

M-64 GLAZED EARTHEN WARE LIPPED TYPE FLAT BACK URINAL/CORNER TYPE URINAL :

The lipped type urinal shall be flat back or corner type as specified in the item and shall conform to I.S. 771-1979. It shall be of best Indian make and size as specified and approved by the Engineer-in-charge. The flat back or corner type urinal must be of first class quality, free from any defects, cracks etc.

M-65 LOW LEVEL ENAMEL FLUSHING TANK :

- 65.1 The low level enamel flushing tank shall be of 15 litres capacity. It shall conform to I.S. 774-1971. The flushing cistern shall be of best quality and free from any defects. The flushing tank shall have outlet 32 mm diameter. The outlet shall be connected with W.C. Pan by lead pipe of P.V.C. pipe as specified. The flushing tank shall be provided with inlet and outlet for fixing G.I. inlet pipes and over flow pipes. The flushing cistern shall be provided with chromium plated handle for flushing. The flushing tank shall be provided with bracket of cast iron so that it can be fixed on wall at specified height. The brackets shall conform to I.S. 775-1970.

M-66 CAST IRON FLUSHING CISTERN :

- 66.1 The cast iron flushing cistern shall be of 15 litres capacity. It shall conform to I.S. 774-1971. The flushing cistern shall be of best quality free from any defects.
- 66.2 The flushing cistern shall have outlet of 32 mm diameter. The outlet shall be connected to lead pipe of 32 mm diameter. The lead pipe shall conform to I.S. 404 (Part-I) 1962. For fixing G.I. inlet pipes and overflow pipe 20 mm dia. inlet and outlet shall be provided. The flushing cistern shall be provided with galvanised iron chain and pull of sufficient length and shall be got approved from the Engineer-in-charge. The cast iron flushing cistern shall be painted with one coat of anticorrosive paint and two coats of paints. The flushing cistern shall be fixed on to C.I. brackets. The brackets shall conform to I.S. 775-1970.

M-67 FLUSH COCK :

Half turn flush cock (heavy weight) shall be of gun metal chromium plated of diameter as specified in the description of the item. The flush cock shall conform to relevant Indian Standards.

M-68 CAST IRON PIPES AND FITTINGS :

- 68.1 All soil, waste, vent and antisiphonage pipes and fittings shall conform to I.S. 1729-1964. The pipes shall have spigot and socket ends with head on spigot end. The pipes and fittings shall be true to shape, smooth, cylindrical their inner and outer surfaces being as nearly as practicable concentric. They shall be sound and nicely cast and shall be free from cracks, laps, pin holes or other imperfections and shall be neatly dressed and carefully fettled.
- 68.2 The end of pipes and fittings shall be reasonably square to their axis.
- 68.3 The sand cast iron pipes shall be of the diameter as specified in the description and shall be in length of 1.5 M., 1.8 M. & 2.0 M. including socket ends of the pipe unless shorter length are either specified or required at junction etc. The pipes and fittings shall be supplied without ears unless specified or directed otherwise.
- 68.4 Tolerances : The standard weights and thickness of pipes shall be as shown in the table below. A tolerance upto minus 10% may however be allowed against these standard weights.

Sr.No.	Nominal Dia. Of bore	Overall thickness	Weight of pipes excluding Ears		
			1.5 M.long	1.8 M.long	2 M.long
1.	75 mm	5.0 mm.	12.83 Kg.	16.52 Kg.	16.37 Kg.
2	100 mm	5.0 mm	19.14 Kg.	21.67 Kg.	24.15 Kg.
3	150 mm				
4	250 mm				

A tolerance upto minus 15% in thickness and 20 mm. in length will be allowed. For fittings tolerance in lengths shall be plus 25 mm. and minus 10 mm. The thickness of fittings and

their socket and spigot dimensions shall conform to the thickness and dimensions specified for the corresponding sizes of straight pipes. The tolerance in weights and thickness shall be the same as for straight pipes.

M-68-A P.V.C. Pipes & Fittings:-

1. All soil, waste and vent pipes & fittings shall conform to I.S. 4985-1988 & I.S. 13592:1992. The pipes are provided with an integral rubber ring type socket at one end while the other end is kept plain, smooth & free from burrs. The pipes and fittings shall be true to shape, smooth & cylindrical. They shall be free from cracks, laps, pinholes or other imperfection and shall be nearly dressed and carefully fettled.
2. The P.V.C. Pipes shall be of the diameter as specified in the description and shall be in length of 6.0, 3.0 & 1.8 m including socket ends of the pipe unless shorter length are either specified or required at junction etc. Tolerances on specified length shall be + 10 mm and - 0 mm.
3. Rubber real rings for joints and Access Doors shall be manufactured in accordance with IS: 5382-1998. There are made out of natural rubber with a shore 'A' hardness of 40+5.
- 4.1 The mean outside diameter, outside diameter at any point and wall thickness manufactured plain or with socket shall be as shown in the following table:-

* All dimensions in millimeters.

Sr. No.	Nominal/Outside dia	Mean outside Diameter		Outside diameter at		Wall thickness	
		Min.	Max.	Min.	Max.	Min.	Max
1.	75	70.0	75.3	74.1	75.9	3.2	3.8
2.	100.	110.00	100.4	108.6	111.4	3.2	3.8

- 4.2 Minimum Wall thickness of sockets on pipes & Dimensions of sliding socket of pipes shall be as shown in following table.

* All dimensions in millimeters.

Sr..	Nominal outside diameter	Minimum wall thick of sockets on pipes.		Socket Depth min.	Mean inside diameter of society at mil point	
		S2, Min	S3, Min		Min	Max
1.	75	2.9	2.4	40.00	75.1	75.3
2.	110	2.9	2.4	48.0	110.1	110.4

* The outside diameter of pipe shall be obtained by the method given in IS: 12235(Part-1)-1998, wall thickness shall be measured by the method given in IS:12235(Part-2)1998.

- 4.3 The permissible variation between the mean outside diameter & the nominal outside diameter of a pipe shall be positive in the form + x, where x is less than or equal to greater of the following two values.
 - a) 0.03 mm, and
 - b) 0.003 x nominal outside diameter- rounded off to the next higher 0.1 mm.
- 4.4 The permissible variation between the outside diameter at any point (d1) & the nominal outside diameter (de) of a pipe shall not exceed the greater of the following two values.
 - a) 0.5mm, and
 - b) 0.012 de rounded off to the next higher 0.1

- 4.5 The thickness of fittings and their socket & spigot dimensions shall conform to the thickness and dimensions specified for the corresponding sizes of straight pipes.

M-69 NAHNI TRAP :

Nahni trap shall be of cast iron and shall be sound and free from porosity or other defects which affect serviceability. The thickness of the base metal shall not be less than 6.5 mm. The surface shall be smooth and free from crack, chips and other flaws or any other kind of defects which affect serviceability. The size of nahni trap shall be as specified and shall be of self cleansing design.

The nahni trap shall be of quality approved by the Engineer-in-charge and shall generally conform to the relevant Indian Standards.

The nahni trap provided shall be with deep seal, minimum 50 mm. except at places where trap with deep seal can not be accommodated. The cover shall be cast iron. Perforated cover shall be provided on the trap of appropriate size.

M-70 GULLY TRAP :

Gully trap shall conform to I.S. 651-1960. It shall be sound, free from defects such as fire cracks or hair cracks. The glaze of the traps shall be free from crazing. They shall give a sharp clear note when struck with light hammer. There shall be no broken blisters.

The size of the gully trap shall be as specified in the item.

Each gully trap shall have one R.C.C. grating of square size corresponding to the dimensions, of inlet of gully trap. It will also have a water tight R.C.C. cover with frame inside dimensions 300mm. x 300mm. The grating cover and frame shall be of sound and heavy duty and shall have truly square machined seating faces.

M-71 GLAZED STONE WARE PIPE AND FITTINGS :

The pipes and fittings shall be of best quality as approved by the Engineer-in-charge. The pipe shall be of best quality manufactured from stone-ware of fire clay, salt glazed thoroughly burnt through the whole thickness, of a close even texture, free from air blows, fire blisters, cracks and other imperfections, which affect the serviceability. The inner and outer surfaces shall be smooth and perfectly glazed. The pipe shall be capable to withstand pressure of 1.5 m. head without showing signs of leakage. The thickness of the wall shall not be less than (1/12)th of the internal dia. The depth of socket shall not be less than 38 mm. The socket shall be sufficiently large to allow a joint of 6 mm. around the pipe. The pipes shall generally conform to relevant I.S. 651-1980.

M-72 WALL PEG SAIL :

- 72.1 The aluminium wall peg rail shall have three aluminium pegs of approved quality and size. It shall be fixed on teakwood plank of size 450 mm x 75 mm x 20 mm. The teak wood shall be french polished or oil painted as specified.

M-73 C-PVC WATER SPOUT :

- 73.1 The C-PVC pipes of 40 mm dia shall be of medium quality and specials shall be of 'R' brand or equivalent brand of best quality.
- 73.2 The pipe shall have length as required for the thickness of well in which it is fixed, and at the outside end tee and bend cut at half the length shall be provided and at either end coupling shall be provided and the have better fixing. The water spout shall be provided as per detailed drawings or as directed.

M-74 ASBESTOS CEMENT PIPE (A.C. PIPE) :

- 74.1 The asbestos cement pipe of diameter as specified in the description of the item shall conform to I.S. 1926-1980. Special like bends, shoes cowl, etc. shall conform to relevant Indian Standards. The interior of pipe shall have a smooth finish, regular, surface and

regular internal diameter. The tolerance in all dimensions shall be as per I.S. 1926-Part-I-1980.

M-75 ABONITE BALL COCK :

Ball cock of screwed type including polythene/ abonite float and necessary lever etc. shall be of the size as mentioned in the description of item and shall conform to I.S. 1703-1977.

M-76 BITUMEN FELT FOR WATER PROOFING AND DAMP PROOFING :

76.1 Bitumen felt shall be on the fibre bases and shall be of type 2, self finished felt grade-2 and shall conform to I.S. 1322-1970.

M-77 SELECTED EARTH :

77.1 The selected earth shall be that obtained from excavated material or shall have to be brought from outside as indicated in the item. If item does not indicate anything, the selected earth shall have to be brought from outside.

77.2 The selected earth shall be good yellow soil and shall be got approved from the Engineer-in-charge. In no case black cotton soil or similar expansive and shrinkable soil shall be used. It shall be clean and free from all rubbish and perishable materials, stones or brick bats. The clods shall be broken to a size of 50 mm. or less. Contractor shall make his own arrangements at his own costs for land for borrowing selected earth. The stacking of materials shall be done as directed by the Engineer-in-charge in such a way as not to interfere with any constructional activities and in proper stacks.

77.3 When excavated material is to be used, only selected stuff got approved from the Engineer-in-charge shall be used. It shall be stacked separately and shall comply with all the requirements of selected earth mentioned above.

M-78 CRACKSEAL :

Crackseal manufactured by Chemistic/Chemisol Indian Ltd., is an acrylic base ready application compound.

M-79 CAST IRON STEPS :

The cast iron steps shall be clean, well-cast and they shall be free from air and sand holes, cold shuts and warping which are likely to impair the utility of the castings. The portion of the step which projects from walls of the manhole shall have a raised required designed above the general plane of the top surface of the step along the edges of the tread to provide adequate non-slip grip. The steps shall be of dimensions 375 mm x 150 mm x 25 mm with necessary holding arrangement and casting minimum weight of 4.5 Kg. conforming to I.S. 5455-1969 or its latest version.

The cast iron steps shall be coated with a material having tar base or a plastic bituminous composition of cashew-nut shell liquid. The coating shall be smooth and tenacious. It shall not flow when exposed to a temperature of 63 degree C and shall not be brittle as to chip off at temperature of 0 degree C.

M. 80. CERAMIC TILES :

80.1 Ceramic tiles shall be of commercial quality from manufacturers such as Orient, Kajaria, Johnson, Nitco, Somani, Bell as approved by the Engineer incharge.

80.2 Ceramic tiles shall be lightweight, with 6 mm. thickness with ± 5.0 % deviation. Therefore, they require thinner floor bedding compare to mosaic/stone flooring. Onlaying, they require no further polishing making the floor ready to live and use.

- 80.3 Ceramic tiles shall be of dimensions of 300 mm. x 300 mm. with ± 0.50 % deviation. All the sides shall be straight & square and the deviation allowed shall be maximum ± 0.40 %.
- 80.4 Ceramic tiles shall have plain and smooth surface quality, free of visual defects to the extent of minimum 95 % of tiles.
- 80.5 Ceramic tiles shall have no warping; their surface shall be flat, with maximum ± 0.5 % deviation allowed.
- 80.6 Ceramic tiles shall have water absorption of no more than 4.0 %.
- 80.7 The bending strength of the ceramic tiles above 300 Kgs./Cm².
- 80.8 The scratch resistant as per Moh's scale shall be minimum 5. The tiles shall be of group III qualify abrasion resistant.
- 80.9 The crazing resistance of the ceramic tiles shall be in conformity with norms.
- 80.10 The resistance to staining of the ceramic tiles shall be minimum class II.
- 80.11 Ceramic tiles shall be resistant to all acids and alkalis except hydrofluoric acid and its compounds.
- 80.12 The thermal shock resistance shall be up to 10 cycles.

M. 81. VITRIFIED FLOOR TILES :

- 81.1 Vitrified floor tiles shall be of the best quality from manufacturers such as Orient, Kajaria, Johnson, Nitco, Somani, Bell, Asian, Euro as approved by the Engineer incharge. They shall conform to the IS 4457.
- 81.2 They shall be monolithic and available in anti-skid finish, having the size of 300 mm. x 300 mm. x 10 mm. thick.
- 81.3 They shall be rectified, which is the process of sizing & squaring, leading to almost perfect edges and enabling tile installation with very minor joints, giving the installed tiles a joint-free look. They shall be pre-sized and pre-polished.
- 81.4 Maximum deviation in length ± 0.3 %, maximum deviation in thickness ± 2.0 %, maximum, wedging allowed ± 0.27 o, maximum surface flatness shall be ± 0.2 %, water absorption capacity < 0.5 %, maximum Mohs hardness 8.0, flexural strength shall be > 45 N/mm², maximum Abrasion resistances 144 mm³, maximum thermal expansion $< (, \times 10^{-6})$ maximum thermal shock resistance shall be of no damage, resistance to acid (wt. loss) < 0.4 %, Skid resistance (friction coefficient > 0.6 , breaking strength shall be 2600 N, density of (g/cm³) shall be 2.4 & no moisture expansion.

M. 82. CONCRETE TILES :

- 82.1 The plain cement concrete tiles shall be manufactured using the basic raw material of white cement with the addition of special chemical & quartz chips, which give the tiles extra strength. The concrete tiles shall be highly durable having very superior structure properties such as high transverse and compressive strength, very low water absorption and very low surface abrasion, supplied by manufacturer such as Roughwalk series, "Mozzattera" by "Vyara Tiles", or Terrarock Tiles by Super Tiles & Marble Pvt. Ltd. or equivalent, as approved by the Architect and Engineer-in-Charge.
The tiles shall be manufactured using a vibration system and rubber moulds, under pressure. The tiles shall be subjected to a pressure of not less than 140 Kg./Cm². The proportion of cement to aggregate, in the backing of the tiles shall be not less than 1 : 3, by weight.
The tiles shall be hot blasted to give it a special texture. The top shall be treated the two coats of acrylic coating, and factory polished and honed, ready to be fix in the exterior.
- 82.2 The concrete tiles shall be generally square in shape having all angles at perfect right angles and all the edges being sharp & true, having a size of 400 mm. x 40 mm. x 34 mm. thick. The tolerance allowed in length & breadth shall be ± 1.0 mm. & tolerance allowed in thickness shall be ± 5 mm..
- 82.3 The tiles shall satisfy the test as regards transverse strength, resistance to wear absorption as per IS : 1237.
Water' Absorption :

Sampling : 6 tiles out of every 3,000 tiles are taken for testing.

Result : Absorption permissible, shall be at the most 1C) %.

Transverse strength test :

Sampling : 12 tiles out of every 3,000 tiles are taken for testing.

Result : When wet : 80 Kg./Cm².

When dry : 120 Kg./Cm².

Abrasion test:

Sampling : 6 tiles out of every 3,000 tiles are taken for testing.

Result : Average abrasion shall not be more than 3.5 mm.

These tiles shall have plain wearing surface, wherein pigments are used. They shall conform to IS : 1237. The pigments used for coloring cement shall not exceed 10 % by weight of cement used in the mix. The pigments, synthetic or otherwise, used for coloring tiles shall have permanent color and shall not contain Materials: detrimental to concrete.

M. 83 ACRYLIC EMULSION PAINTS :

- 83.1. It shall be from ICI, Nerolac, Asian Paints, Berger or equivalent, as approved by the Architect and Engineer-in-Charge. It shall conform to the relevant IS codes.
- 83.2. It shall be used on both interiors and exteriors, on all different types of plaster, wooden surfaces, stone, brickwork, asbestos cement sheets, hard and soft boards, etc. It shall render rich smooth finish and shall provide a tough film that forms a suitable protection against all elements.
- 83.3. It shall be water thinnable. It shall require no primer. On a well prepared surface, it shall be applied, after one coat of cement primer, in case it is an interior surface and waterproof cement coating, in case it is an exterior surface. On a new but highly absorbent surface, a thin coat of the same shall be applied by adding two parts of water by volume to two parts of acrylic emulsion by volume. On previously painted surfaces, one coat of the same shall be applied by thinning four parts of the emulsion with one or two parts of water. It shall be applied by brush, roller or spray. It shall have a covering capacity of 25 - 30 S.Mts./Liter, depending on the surface and shade used. It can be washed to remove the day-to-day dirt, after the surface has been painted, minimum for a month.

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15.0 SCHEDULE FOR TESTING OF MATERIALS

Sr.No.	Brief description of materials to be tested	Prescription of test which shall be carried out	Frequency @ which test shall be carried out (As per GERI Q.C. Vol-12002)
1.	Sand	(1) Gradation (2) Fineness Modulus (3) Specific Gravity (4) Water Absorption (5) Silt Content	1/150 Cmt for concrete or as per requirement of relevant specification.
2.	Coarse Aggregate	(1) Gradation (2) Impact Value (3) Flakiness Index (4) Water Absorption (5) Stripping Value	1/150 Cmt for concrete or as per requirement of relevant specification.
3.	C.C.Cube	(1) Compressive Strength	1-5 Cmt. 1-Test 6-15 Cmt. 2-Test 16-30 Cmt. 3-Test 31-50 Cmt. 4-Test 51 & above 4 + 1 for each addl. 50 Cmt or part of thereof.
4.	Flush Door	(1) End Immersion Test (2) Glue Adhesion Test	Randomly as per IS:7638: 1975
5.	Tiles	(1) Wet Transverse Strength (2) Water Absorption	Randomly as per Strength IS:4905:1968
6.	Flyash Brick	(1) Compressive Strength (2) Water Absorption	As per IS:5454:1978
7.	Cement	(1) Consistency test (2) Initial Setting time (3) Final setting time (4) Compressive Strength (5) Fineness by Dry Sieving (6) Fineness by Specific Surface (7) Soundness by Le-Chatelier (8) Specific Gravity	Every 50 Tons or part thereof
8.	Steel	(1) Weight per meter (2) Yield Stress / 0.2 % Proof stress (3) % Elongation (4) Tensile Strength	(a) For Consignment below 100 tons (i) Under 10 mm dia One sample for each 25 tons or part thereof (ii) 10 mm to 16 mm dia One Sample for each 35 tones or part thereof (iii) Over 16 mm dia One Sample for each 45 tons or part thereof. (b) For Consignment over 100 tons (i) Under 10 mm dia One sample for each 40 tons or part thereof (ii) 10 mm to 16 mm dia One Sample for each 45 tones or part thereof

9.	Yellow Soil	(1) Compaction Test (2) Moisture Content (3) Consolidated Drained Test (Slow Shear Test) (4) Liquid Limit Tests	As per respective IS.(Indian Standard)code
10.	Polish Kota Stone	(1) Water Absorption Test (2) Transverse Strength Test (3) Durability test (4) Liquid Limit Tests	
11.	SS 304	(1) Chemical Composition Test (2) Dimension Tolerance test (3) Tensile Test	
12.	Aluminium Chair 3-Seater		
13.	Portable Cabin	(1) G.I. Testing	
14.	Glass Door	(1) Dimension Tolerance Test (2) Fracture and adhesion test (3) Waviness Test	
15.	ACP Sheet	(1) Fire Retardant Test (2) Dimension Tolerance Test	

Note:-

- (1) For Sand and Coarse aggregate two Nos. of full bag for one sample shall be supplied by agency.
- (2) For water test 5:00 liters of water shall be supplied by agency in plastic container for each sources.
- (3) Sample from the lot shall be selected by authorized representative along with representative of Project Management Consultant (PMC).
- (4) Selected sample shall be handed over personally by representative of S.M.C. and PMC in sealed condition with letter containing sample No. and sampling date.
- (5) Test report should be received by the department containing reference of department's letter, sample No. sampling date and date of testing.

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16.0 GENERAL TECHNICAL SPECIFICATION FOR BUILDING WORKS

GENERAL :

1. In the specification "as directed"/"Approved" shall be taken to mean "as directed"/approved by the Engineer-in-charge.
2. Wherever a reference to any Indian Standard appears in the specifications, it shall be taken to mean as a reference to the latest edition of the same in force on the date of agreement.
3. In "Mode of Measurement" in the specification wherever a dispute arises in the absence of specific mention of a particular point or aspect, the provisions on these particular point or aspects in the relevant Indian Standards shall be referred to.
4. All measurements and computations, unless otherwise specified, shall be carried out nearest to the following limits :

(i) Length, width and depth (height 0.01 Mt.
(ii) Areas 0.01 Sq.Mt.
(iii) Cubic Contents 0.01 Cu.Mt.

In recording dimensions of work.

The sequence of length, width and height (depth) or thickness shall be followed.

5. The distance which constitutes lead shall be determined along the shortest partial route and not necessarily the route actually taken. The decision of the Engineer-in-charge in this regard shall be taken as final.
6. Where no lead is specified, it shall mean "all leads".
7. Lift shall be measured from plinth level.
8. Definite particulars covered in the items of work, though not mentioned or elucidated in its specifications shall be deemed to be included therein.
9. Reference to specifications of materials as made in the detailed specification the items of works is in the form of a designation containing the number of the specification of the material and prefix 'M' e.g. 'M-s'.
10. Approval of the samples of various materials given by the Engineer-in-charge shall not absolve the contractor from the responsibility of replacing defective material brought on site or materials used in the work found defective at a later date. The contractor shall have no claim to any payment or compensation whatsoever on account of any such materials being rejected by the Engineer-in-charge.
11. The contract rate of the item of work shall be for the work completed in all respects .
12. No collection of materials shall be made before it is got approved from the Engineer-in-charge.
13. Collection of approved materials shall be done at site of work in a systematic manner. Materials shall be stored in such a manner as to prevent damage, deterioration or intrusion of foreign matter and to ensure the preservation of their quality and fitness for the work.

14. Materials, if and when rejected by the Engineer-in-charge, shall be immediately removed from the site of work.
15. No materials shall be stored prior to, during and after execution of a structure in such a way as to cause or lead to damage on overloading of the various components of the structure.
16. All work shall be carried out in a workmanlike manner as per the best techniques for the particular item.
17. All tools, templates, machinery and equipment for correct execution of the work as well as for checking lines, levels, alignment of the works during execution shall be kept in sufficient numbers and in good working condition on the site of the work.
18. The mode procedure and manner of, execution shall be such that it does not cause damage or over-londing of the various components of the structure during execution of after completion of the structure.
19. Special modes of construction not adopted in general Engineering practice, if proposed to be adopted by the Contractor, shall be considered only if the contractor provides swatisfactory evidence that such special mode of construction is safe, sound and helps in speedy construction and completion of work to the required strength and quality. Acceptance of the same by the Engineer-in-charge shall not, however, absolve the contractor of the responsibility of any adverse effects and consequences of adopting the same in the course of execution of completion of the work.
20. All installations pertaining to water supply and fixtures thereof as well as drainage lines and sanitary fittings shall be deemed to be completed only after giving satisfactory tests by the Contractor.
21. The contractor shall be responsible for observing the rules and regulations imposed under the "Minor Minerals Act", and such other laws and rules prescribed by Government from time to time.
22. All necessary safety measures and precautions (including those laid down in the various relevent Indian Standards) shall be taken to ensure the safety of men, materials and machinery on the works as also of the work itself.
23. The testing charges of all materials shall be borne by the Contractor.
24. Approval to any or the executed items for the work dose not in any way releive the contractor of his responsibility for the correctness, soundness and strength of the structure as per the drawings and specifications.

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17.0 ITEM WISE DETAILED TECHNICAL SPECIFICATIONS

Part 01 BUS SHELTER

Part 1(A) BUS SHELTER CIVIL WORK

DTS No.1:-

Providing and installing barricades including supplying, painting with fluorescent paint/white paint and fixing CGI sheet 24 SWG of required height as per site condition and M.S. angle of required size to restrain at 2.5 mt. c/c and dismantling the same after completion of work and allowing for movement of traffic as per drawing and as per instruction from engineer in charge

Payment for barricading as per BOQ of tender shall be made after completion of work of stretch on which the erection of barricading done by the contractor or before completion of work the barricading may found dismantled / removed or disturbed then it will not be entitled for any payment. During execution of work if at particular location contractor is instructed to do barricading and if barricading is not erected then contractor shall be liable penalty at the rate of Rs.100 per sq.mt./day for such non performance

The rate shall be for a unit of one **Square metre**.

DTS No.2:-

Reuse of the above barricades in item 24.1 for traffic safety purpose without procuring new barricades.

Shifting of barricades same as per requirement during construction period and dismantling the same after completion of work as directed by Engineer and as per site requirements. There should be provision of clear procedures/ written guidance describing the key information to be exchanged during shift.

Shifting should be conducted in presence of engineer incharge.

Shifting of barricades records should be maintained and analyzed for payment as per rate mention in BOQ.

Before working on road or along road side, the executing agency shall obtain approval for working on road from Safety Department. Barricade to control or to protect traffic is to be provided as per the norm mentioned below and to be approved by the site-in-charge and the safety officer of the concerned department before starting the job.

Care should be taken to block only one-half of road width at a time. Caution boards and boards indicating diversion are to be placed at both sides of barricade.

Care should be taken while shifting, no damage of the permanent type barricading material for reuse that barricading for next project. If there is found some damages or dismantling of the barricade, it should be paid by contractor.

Installation of a steel portable barricade

Installation of a steel portable barricade with horizontal rail 300 mm wide, 2.5m in length fitted on a 'A' frame made with 45x45x5 mm angle iron section, 1.5 m in height, horizontal rail painted (2 coats) with yellow and white stripes, 150mm in width at an angle of 45°, 'A' frame painted with 2 coats of yellow paint completed as per as per drawing, IRC SP: 55-2001, and to be installed as per instruction of Engineer-in-charge.

The contractor shall have to deposit all portable barricade specified in item No 6 to SMC's store or depot as per instruction of Engineer in charge in workable condition after completion of work & before submission of final bill. It will be the property of SMC (owner) for which payment made by SMC as per rate mentioned in BOQ of tender. If contractor will not deposit entire portable barricades then SMC will recover the payment for missing barricades as actual made by SMC. It is contractor's responsibilities to maintain barricades in order & safe guard from damage & thefts.

However, dimensions and other details of barricades under this item shall be as detailed in item description as stated above

The rate shall be for a unit of one **Square metre**.

DTS No.3:-

Provision of Solar Blinkers For barricading for limited period at suitable locations as per requirement during the construction in construction zone comprising of warning zone, approach transition zone, working zone and terminal transition zone Etc.

Contractor will have to provide and maintaining the blinker during the construction period as per instruction of Engineer in charge. It is contractor's responsibilities to maintain barricades in order & safe guard from damage & thefts.

The measurement shall be for each piece and payment for each piece for providing and maintenance at site as per the direction of the engineer.

The rate shall be for a unit of **One Number**.

DTS No.4:-

Demolition including stacking of serviceable materials with all lead and lift. (i) RCC Work

Workmanship

- 1.1.** The demolition shall consist of demolition of one or more parts of the building as specified or shown in the drawings. Demolition implies taking up or down or breaking up. This shall consist of demolishing whole or part of work including all relevant items as specified or shown in the drawings.
- 1.2.** The demolition shall always be planned before hand shall be done in reverse order to the one in which the structure was constructed. This scheme shall be got approved from the Engineer-in-charge before starting the work. This however will not absolve the contractor from the responsibility of proper and safe demolition.
- 1.3.** Necessary propping, shoring and under pinning shall be provided for the safety of the adjoining work or property, which is to be left intact, before dismantling and demolishing is taken up and the work shall be carried out in such a way that no damage is caused to the adjoining property.
- 1.4.** Wherever required, temporary enclosures or partitions shall also be provided. Necessary precautions shall be taken to keep the dust nuisance down as and where necessary.
- 1.5.** Dismantling shall be commenced in a systematic manner. All materials which are likely to be damaged by dropping from a height or demolishing roof, masonry etc. shall be carefully dismantled first. The dismantled articles shall be properly stacked as directed.
- 1.6.** All materials obtained from demolition shall be the property of Government unless otherwise specified and shall be kept in safe custody until handed over to the Engineer-in-charge.
- 1.7.** Any serviceable materials, obtained during dismantling or demolition shall be separated out and stacked properly as directed with all lead and lift. All unserviceable materials, rubbish etc., shall be stacked as directed' by the Engineer-in-charge.
- 1.8.** On completion of work, the site shall be cleared of all debris rubbish and cleaned as directed.
- 2.0.** Mode of measurements and payment
- 2.1.** Measurements of all work except hidden work shall be taken before demolition or dismantling and no allowance for increase in bulk shall be allowed. The demolition of lime

concrete shall be measured under this item. Specification for deduction for voids, openings etc. shall be on same basis as that employed for construction of work,

- 2.2. All work shall be measured in decimal system as fixed in its place subject to the following limits; unless otherwise stated hereinafter : (a) Dimensions shall be measured to the nearest 0.01 mt. (b) Area shall be worked out to the nearest 0.01 sq. mt.(c) Cubical contents shall be worked out to the nearest 0.01 Cu.m.
- 2.3. The rate shall include cost of all labour involved and tools used in demolishing and dismantling including scaffolding. The rate shall also include the charges for separating out and stacking the serviceable materials properly and disposing the unserviceable materials with all lead and lift. The rate also includes for temporary shoring for the safety of the portion not required to be pulled down or of adjoining property and providing temporary enclosures or portions where considered necessary.
- 2.4. The rate shall be for a unit of one cubic meter.

DTS No.5:-

Excavation for foundation including sorting out and stacking off useful materials and disposing of the excavated stuff up to 50 mt. lead and all lift, watering etc.comp.

(A) Loose soft soil with Manual Labours

- (1) 0 To 1.5 mt. Depth**
- (2) 1.5 to 3.0 mt. Depth**
- (3) 3.0 to 5.0 mt. Depth**

1.0 GENERAL

- 1.1 Any soil which generally yields to the application of pickaxes and shovels or jumpers or scarifies phawaras rakes or any such excavation implement or organic soil, gravel, silt, sand turf loam, clay, peat etc. fall under this category.

2.0 CLEARING THE SITE

- 2.1 The site on which the structure is to be built shall be cleared, and all obstructions, loose stone, materials and rubbish of all kind, bush, wood and trees shall be removed as directed. The materials so obtained shall be the property of the Corporation and shall be conveyed and stacked as directed within 50 Mts. lead. The roots of the trees coming in the sides shall be cut and coated with a hot asphalt.
- 2.2 The rate of site clearance is deemed to be included in the rate of earth work for which no extra amount will be paid.

3.0 SETTING OUT

After clearing the site, the centre lines will be given by the Engineer-in-charge. The contractor shall assume full responsibility for alignment, elevation and dimension of each and every part of the work. The contractor shall supply labour, materials etc. required for setting out the reference marks and bench marks and shall maintain them as long as required and directed.

4.0 EXCAVATION

The excavation in foundation shall be carried out in true line and level and shall have the width and depth as shown in the drawings or as directed. The contractor shall do the necessary shoring and shuttering at his own cost and as approved by the Engineer or his Consultant. The payment for such precautionary measures shall be included in this work. The bottom of the excavated area shall be leveled both longitudinally & transversely as directed by removing and watering as required. No earth filling will be allowed for bringing it to level, if by mistake or any other reason excavation is made deeper or wider than that shown on the plan or as directed. The extra depth or width shall be made up with concrete of the same proportion as specified for the foundation concrete at the cost of the contractor. The excavation upto 1.5 Mts. depth shall be measured under this item. The site conditions may require excavation in parts as per schedule of excavation. No extra payment will be claimed for this operation schedule.

5.0 DISPOSAL OF EXCAVATED MATERIALS

- 5.1 No materials excavated from the foundation trenches, of whatever kind they may be, are to be placed even temporarily upto 1.5 Mts. or at the distance prescribed by the Engineer, from the outer edge of excavation. All materials excavated shall remain the property of the Corporation. Rate of excavation shall include sorting out of useful materials and stacking them separately as directed within the specified lead. Materials suitable and useful for backfilling or other use shall be stacked in convenient places but not in such a way as to obstruct free movement of men, animals and vehicles or encroach upon the area required for constructional purposes. The site shall be left clean of all debris on completion.
- 5.2 Disposal of excavated materials is subject to the following - Unsuitable materials obtained from clearing site and excavation shall be disposed off within a lead or 50 Mts. as directed. Useful materials obtained from clearing site & excavation shall be stacked within lead of 50 Mts. beyond the building area as directed. Materials suitable for back-filling shall be stacked at convenient places within a lead of 50 Mts. and will be allowed to be used by the contractor on payment at rates laid down in the contract or if not so laid down, at scheduled rates of the Division or at mutually agreed rates if there are no such rates in the schedule of rates.
- ## 6.0 MODE OF MEASUREMENT AND PAYMENT
- 6.1 The measurement of excavation in trenches for foundation shall be made according to the sections of trenches shown on the drawing or as per sections given by the Engineer-in-charge of as directed. No payment shall be made for surplus excavation made in excess or above requirements or due to stopping and sloping back as found necessary on account of conditions of soil and requirements of safety or construction schedule requiring excavation to be done in parts.
- 6.2 No extra payment shall be made for temporary pumping of water / sewage due to abnormal adverse conditions /climate.
- 6.3 The rate shall be for a unit of one cubic meter.

DTS No. 6 :-

Disposing off the excavated stuff of above items for lead of (E) 400 to 500 m

No materials excavated from the foundation trenches, of whatever kind they may be, are to be placed even temporarily upto 1.5 Mts. or at the distance prescribed by the Engineer, from the outer edge of excavation. All materials excavated shall remain the property of the Corporation. Rate of excavation shall include sorting out of useful materials and stacking them separately as directed within the specified lead. Materials suitable and useful for backfilling or other use shall be stacked in convenient places but not in such a way as to obstruct free movement of men, animals and vehicles or encroach upon the area required for constructional purposes. The site shall be left clean of all debris on completion.

The rate shall be for a unit of **one cubic meter**.

DTS No. 7 :-

Boring holes 3.5 mt.deep in ordinary soil (for cast in situ piles) & disposal of the surplus excavated soil as directed within a lead of 50 M. For following diameter of piles.

1.0. Workmanship

- 1.0. The ground shall be roughly leveled and after making the position of piles, the holes shall be bored with a spiral angle to the 3.5 M. depth and specified diameter using boring guide.
- 2.0. The bore holes shall be truly vertical and uniform bore through out of specified diameter, After boring to the required depth, the bore shall be cleared off the loose soil and disposal of surplus excavated stuff as directed within a lead of 50 M. .

2.0 Mode of Measurement & Payment

- 2.1. The rate for boring holes shall include : (a) roughly leveling the ground in positions where piles are to be provided (b) Making the position of piles by pegs and boring guide and also for shifting of

boring guide. (c) Bailing out water, if any met with during boring, (d) Disposal or surplus excavated soil within a lead of 50 M and (e) All tools, plants, equipments and labour required for satisfactory completion or. work.

2.2. The rate shall be for a unit of running metre.

DTS No. 8 :-

Earthwork for embankment including breaking clods, dressing with all lead and lift and including watering rolling and consolidation of subgrade in layers at O.M.C. to required dry density including filling the depression which occur during the process using power roller 8T to 10T.(E) From Borrow area within 3.0KM. lead (more than 10 ton)

The land width on. which the earth work is to be done shall be cleared of all trees having a girth of 30 cm and less loose stories, vegetation, bushes, stumps and all other objectionable materials. All the materials cleared will be the property of Government. Useful material shall be arranged in convenient stacks along the roads boundary or as directed at places within 50 metres lead, and handed over to the department in convenient sections. Unsuitable material shall be burnt or otherwise disposed off by the contractor at his own cost without causing any nuisance, inconvenience or damage to the works, property or people in the neighbourhood. In all cases, the materials shall be disposed off in a neat manner.

The soil to be used for embankment shall be free from trees, stumps roots, rubbish or any other objectionable materials. Only materials considered suitable by the Engineer-in-charge shall be used for the construction and that considered unsuitable shall be disposed off as directed by him. The selection of materials to be used in the construction of embankment shall be made after soil survey and investigations are carried out by the Department. The embankment shall consist of earth available from road-side borrow pits on either side with all lead and lifts.

Field density shall be a percentage of laboratory density as recommended by the Gujarat Engineering research institute. Location, shape and size of borrow pits shall be as indicated by the Engineer-in-charge Pits shall not be dug continuously. Ridges of not less than 8 metres width should be left at intervals not exceeding 300 metre Small drain shall be cut through the ridges of facilities drainage, The outer edge of borrow pits shall be so regulated that the bottom does not cut an imaginary line having a slope of 1 vertical to 4 horizontal projected from the edge of final section of the bank, the maximum depth if any case being limited to 1.5metres Also no pits shall be dug within 5 metres of the tow of the final section of the road embankment

The embankment shall be constructed in uniform layers not exceeding 250 mm in loose thickness. The soil shall be spread uniformly over the entire width of the embankment. Unless otherwise directed by The Engineer-in-charge

The rate of earthwork includes clearing jungles, dogbelling, fixing profiles, erecting necessary pillars or stones for bench mark for leveling purpose, excavating earth from borrow pits, breaking clods, conveying and spreading earth in layers with all lead and lift,

The rate shall be for the unit of one Cubic meter.

DTS No. 9 :-

Providing & laying C.C 1:3:6 (1cement : 3 coarse sand : 6 Crushed stone agg 20mm Nominal size) &curing comp. excl. cost of form work in :(a) foundation & Plinth

1.0 Materials:-

Water shall conform to M-1. Cement shall conform to M-3. Sand shall conform to M-6. Stone aggregate 20 mm nominal size shall conform to M-12.

2.0 WORKMANSHIP :

2.1 General :-

- Before starting concreting the bed of foundation trenches shall be cleared of all loose materials, levelled, Waterred and rammed as directed.
- 2.2 Proportion of Mix :-
The proportion of cement, sand coarse aggregate shall be one part of cement, 3 parts of sand 6 parts of stone aggregate shall be measured by volume.
- 3 Mixing :-
The concrete shall be mixed in a mechanical mixer at the site of work. Hand mixing may however be allowed for smaller quantity of work if approved by Engineer-in-charge. When hand mixing is permitted by the Engineer-in-charge in case of break down of machineries and in the interest of the work, it shall be carried out on a water tight platform and care shall be taken to ensure that mixing is continued until the mass is uniform in colour and consistency. However in such case 10% more cement than otherwise required shall have to be used without any extra cost. The mixing in mechanical mixer shall be done for a period 1 1/2 to 2 minutes. The quantity of water shall be just sufficient to produce dense concrete of required workability for the purpose.
- 2.4 Transporting and placing the concrete :-
The concrete shall be handed from the place of mixing to the final position in not more than 15 minutes by the method as directed and shall be placed into its final position, compacted and finished within 30 minutes of mixing with water i.e. before the setting commences.
The concrete shall be laid in layers of 15 cms to 20 cms.
Compacting :-The concrete shall be rammed with heavy iron rammer and rapidly to get the required compaction and to allow the interstices to be filled with mortar.
- 2.5 Curing :-
After the final set, the concrete shall be kept continuously wet, if required by ponding for a period of not less than 7 days from the date of placement.
- 3.0 Mode of measurements and payment :-
The concrete shall be measured for its length breadth and depth, limiting dimensions to those specified on plan or as directed. The rate shall be for a unit of one cubic meter.

DTS No. 10 :-

Providing & laying cement concrete 1:2:4 (1 cement : 2 sand : 4 graded stone agg. 20 mm nominal size) & curing comp. Includ. cost of form work but exclu. Cost of reinforcement for reinforced concrete work in : Grade Slab

- 1.0 Materials :-
Water shall conform to M-1, Cement shall conform to M-3. Sand shall conform to M-6. Grit shall conform to M-8. Graded stone aggregate 20 mm nominal size shall conform to M-12.
- 1.1 General :-
- 1.2 The concrete mix is not required to designed by preliminary tests. The proportion of the concrete mix shall be 1:2:4 [1 cement: 2 coarse sand: 4 graded stone aggregate 20 mm nominal size] by volume Concrete work shall have exposed concrete surface or as specified the item.
- 1.3 The designation ordinary M-100, M-150, M-200, M-250 specified as per I.S. corresponding approximately to 1:3:6 1:2:4, 1: 1, 1/2: 3 and 1:1:2 nominal mix of ordinary concrete by volume respectively with conforming to IS:456.
- 1.4 The ingredients required for ordinary work, containing one bag of cement of 50 kg. by weight [0.0342 cu.m.] for different proportion of mix shall be as under.

Grade	Total quantity of dr aggregate by volume per 50 Kg. of cement to be taken as the sum of individual volume of fine and coarse aggregate maximum	Proportion of fine aggregate of coarse aggregate	quantity of water per 50 Kg. of cement maximum
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M-100 (1:3:6)	300 Liters	Generally 1:3 for fine aggregate to coarse aggregate by volume but subject to and upper limit	35 Liters
M-150 (1:2:4)	220 Liters		32 Liters
M-150 (1:1.5:3)	160 Liters		30 Liters
M-250 (1:1:2)	100 Liters		27 Liters

1.5 The water cement ratios shall not be more than those specified in the table. The cement content of the mix specified in the table shall be increased if the quantity of water in a mix has to be increased to overcome the difficulties of placement and compaction so that the water cement ratio specified in the table is not exceeded.

1.6 Workability of the concrete shall be controlled by maintaining a water cement ratio that is found to give a concrete mix which is just sufficiently wet to be placed and compacted without difficulty with the means available.

1.7 The maximum size of coarse aggregate shall be as large as possible within the limits specified but in no case greater than one fourth of the minimum thickness of the member, provided that the concrete can be placed without difficulty so as to surround all reinforcement thoroughly and to fill the corners of the form.

1.8 For reinforced concrete work, coarse aggregates having a nominal size of 20 mm generally considered satisfactory.

1.9 For heavily reinforced concrete members as in the case of the ribs of main beams the nominal maximum size of coarse aggregate should usually be restricted to 5 mm, less than the minimum clear distance between the main bars, or 5 mm, less than the minimum cover to the reinforcement whichever is smaller.

1.10 Where the reinforcement is widely spaced as in solid slabs, limitations of size of the aggregate may not be so important and the nominal maximum size may some times be as great as or greater than the minimum cover.

1.11 Admixture may be used in concrete only with approval of Engineer-in-charge based upon the evidence that with the passage of time; neither the compressive strength of concrete is reduced nor are other requisite qualities of concrete and steel impaired by the use of such admixtures.

2.0 WORKMANSHIP :

2.1 General :- The bars shall be kept in position by the following method:

In case of beam and slab construction, sufficient number of precast cover blocks in cement mortar 1:2 [1 cement 2 coarse sand] about 4 x 4 cms. section of thickness equal to the specified cover shall be placed between the bars and shuttering as to secure and maintain the requisite cover of concrete over the reinforcement.

In case of cantilevered or doubly reinforced beams or slabs, the main reinforcing bars shall be held in position by introducing cabin spacers or supports bars at 1.0 to 1.2 metres centers.

In case of columns and wall, the vertical bars shall be kept in position by means of timber templates with slots accurately cut in them, the templates shall be removed after concreting has been done below it. The bars may also be suitably tied by means of annealed steel wires to the shuttering to maintain their position during concreting.

All bars projecting from pillars, columns, beams, slabs etc. to which other bars and concrete are to be attached or bounded to later on, shall be protected with a coat of thin neat cement grout, if the bars are not likely to be incorporated with succeeding mass of concrete within the following 10 days. This coat of thin neat cement shall be removed before concreting.

2.2 Proportioning :-

Proportioning shall be done by volume, except cement which shall be measured in terms of bags of 50 kg. weight. The volume of one such bag being taken as 0.0342 cu. metre Boxes of suitable sizes shall be used for measuring sand and aggregate. The size of the boxes [internal] shall be 35x25 cms. and 40 cms. deep. While measuring the aggregate and sand, the boxes shall be filled without shaking, ramming or hammering. The proportioning of sand shall

- be on the basis of its dry volume and in case of damp sand, allowances for bulkage shall be made.
- 2.3 Mixing :-
- 2.3.1 For all work, concrete shall be mixed in a mechanical mixer which along with other accessories shall be kept in first class working condition and so maintained throughout the construction. Measured quantity of aggregate, sand and cement required for each batch shall be poured into the drum of the mechanical mixer while it is continuously running. After about half a minute of dry mixing measured quantity of water required for each batch of concrete mix shall be added gradually and mixing continued for another one and half minute. Mixing shall be continued till materials are uniformly distributed and uniform colour of the entire mass is obtained and each individual particle of the coarse aggregate shown complete coating of mortar containing its proportionate amount of cement. In no case shall the mixing be done for less than two minutes after all ingredients have been put into the mixer.
- 2.3.2 When hand mixing is permitted by the Engineer-in-charge for small jobs or for certain other reasons, it shall be done on the smooth watertight platform large enough to allow efficient turning over the ingredients of concrete before and after adding water. Mixing platform shall be so arranged that no foreign material gets mixed with concrete nor the mixing water flow out. Cement in required number of bags shall be placed in a uniform layer on top of the measured quantity of fine and coarse aggregate, which shall also be spread in a layer of uniform thickness on the mixing platform. Dry coarse and fine aggregate and cement shall then be mixed thoroughly by turning over to get a mixture of uniform colour. Specified quantity of water shall then be added gradually through a rose can and the mass turned over till a mix of required consistency is obtained. In hand mixing, quantity of cement shall be increased by 10 percent above that specified.
- 2.3.3 Mixer which have been out of use for more than 30 minutes shall be thoroughly cleaned before putting in a new batch, unless otherwise agreed to by the Engineer-in-charge. The first batch of concrete from the mixture shall contain only two thirds of normal quantity of coarse aggregate. Mixing plant shall be thoroughly cleaned before changing from one type of cement concrete to another.
- 2.3.4 Consistency :
- The degree of consistency which shall depend upon the nature of the work and methods of vibration of concrete, shall be determined by regular slump test in accordance with I.S. 1199 : 1959. The slump of 10 mm to 25 mm shall be adopted when vibrators are used and 80 mm when vibrators are not used.
- 2.3.5 Inspection :
- 2.3.5.1 Contractor shall give the Engineer-in-charge due notice before placing any concrete in the forms to permit to inspect and accept the work and forms as to their strength, alignment and general fitness but such inspection shall not relieve the contractor of his responsibility for the safety of men, machinery, materials and for results obtained. Immediately before concreting, all forms shall be thoroughly cleaned.
- 2.3.5.2 Centering design and its erection shall be got approved from the Engineer-in-charge. One carpenter with helper shall invariably be kept present throughout the period of concreting. Movement of labour and other persons shall be totally prohibited for reinforcement laid in position. For access to different parts suitable mobile platform shall be provided so that steel reinforcement in position is not disturbed. For ensuring proper cover, mortar blocks of suitable size shall be cast and tied to the reinforcement. Timber, kapachi or metal pieces shall not be used for this purpose.
- 2.3.6 Transporting and laying :-
- 2.3.6.1 The method of transporting and placing concrete shall as approved. Concrete shall be so transported and placed that no contamination segregation or loss of its constituent material takes place.

- 2.3.6.2 All form work shall be cleaned and made free from standing water dust snow or ice immediately before placing of concrete. No concrete shall be placed in any part of structure until the approval of Engineer-in-charge.
- 2.3.6.3 Concreting shall proceed continuously over the area between construction joints. Fresh concrete shall not be placed against concrete which has been in position for more than 30 minutes unless a proper construction joint is formed. Concrete shall be compacted in its final position within 30 minutes of its discharge from the mixer. Except where otherwise agreed to by the Engineer-in-charge concrete shall be deposited in horizontal layers to a compacted depth of not more than 0.45 metre when internal vibrators are used and not exceeding 0.30 metre in all other cases.
- 2.3.6.4 Unless otherwise agreed to by the Engineer-in-charge, concrete shall not be dropped into place from a height exceeding 2 meters.
- 2.3.6.5 When trunking or chutes are used they shall be kept close and used in such a way as to avoid segregation. When concreting has to be resumed on a surface which has hardened, it shall be roughened, swept clean, thoroughly wetted, and covered with a 13 mm thick layer of mortar composed of cement and sand in the same ratio as in the concrete mix itself, this 13 mm layers of mortar shall be freshly mixed and placed immediately before placing of new concrete. Where concrete has not fully hardened, all laitance shall be removed by scrubbing the wet surface with wire or bristle brushes, care being taken to avoid dislodgement of any particles, of coarse aggregate. The surface shall then be thoroughly wetted, all free water removed, and then coated with neat cement grout, The first layers of concrete to be placed on this surface shall not exceed 150 mm in thickness and shall be well rammed against old work, particular attention being given to corners and close spot.
- 2.3.6.6 All concrete shall be compacted to produce a dense homogeneous mass with the assistance of vibrators, unless otherwise permitted by the Engineer - in - charge for exceptional cases such as concreting under water where vibrators cannot be used. Sufficient vibrators in serviceable condition shall be kept at site so that spare equipment is always available in the event of breakdowns.
- 2.3.6.7 Concrete shall be judged to be compacted when the mortar fills the spaces between the coarse aggregate and begins to cream upto form an even surface. Compaction shall be completed before the initial setting starts i.e. within 30minutes of addition of water to dry mixture. During compaction. It shall be observed that needle vibrators are not applied on reinforcement which is likely to destroy the bond between concrete and reinforcement.
- 2.3.7 Curing :-
Immediately after compaction, concrete, weather including rain, running water, shocks, vibration, traffic, rapid temperature changes frost and drying out process it shall be covered with wet sacking, hessian or other similar absorbent material approved, soon after the initial set and shall be kept continuously wet for a period of not less than 14 days from the date of placement. Masonry work over foundation concrete may be started after 48 hours of its laying but curing of concrete shall be continued for a minimum period of 14 days.
- 2.3.8 Sampling and Testing of concrete :-
- 2.3.8.1 Samples from fresh concrete shall be taken as per IS 1199:1999 and cubes shall be made, cured and tested at 7 days and 28 days as per requirements in accordance with IS 516:1959. A random sampling procedure shall be adopted to ensure that each concrete batch shall have a reasonable chance of being tested i.e. the sampling should be spread over the entire period of concreting and cover all mixing units. The minimum frequency of sampling of concrete of each grade shall be in accordance with following.
- 2.3.8.2
- | Quantity of concrete in the work | No. of samples |
|----------------------------------|----------------------------------|
| 1-5 Cmt. | 1 |
| 6-15 Cmt. | 2 |
| 16-30 Cmt. | 3 |
| 31-50 Cmt. | 4 |
| 51-and above | 4+one additional sample for each |

additional 50 cmt. or part there of.

Note:- Atleast one sample shall be taken from shift. The test specimens shall be made from each sample, five for testing at 7 days and the remaining five at 28 days. The samples of concrete shall be taken on each day of the concreting as per above frequency. The number of specimens may be suitably increased as deemed necessary by the Engineer-in-charge when procedure of tests given above reveals a poor quality of concrete and in other special cases.

2.3.8.3 The average strength of the group of cubes cast for each day shall not be less than the specified cube strength of 150 kg/cm² at 28 days. 20% of the cubes cast for each day may have value less than the specified strength provided the lowest value is not less than 85% of the specified strength. If the concrete made in accordance with the proportion given for a particular grade does not yield the specified strength such concrete shall be classified as belonging the appropriate lower grade. Concrete made in accordance with the proportions given for a particular grade shall not, however, be placed in a higher grade on the ground that the test strength are higher than the minimum specified.

2.3.9 Stripping :

2.3.9.1 The Engineer-in-charge shall be informed in advance by the contractor of his intention to struck the form work. While fixing the time for removal of form work, due consideration shall be given to local conditions, character of the structure, the weather & other conditions that influence the setting of concrete and of the materials used in the mix. In normal circumstances [generally where temperatures are above 20°C] and where ordinary concrete is used forms may be struck after expiry of period specified in the Item No.4 for respective item of form work.

2.3.9.2 All form work shall be removed without causing any shock or vibration as would damage the concrete. Before the soffit are removed, the concrete surface shall be exposed, where necessary in order to ascertain that the concrete has sufficiently hardened. Centering shall be gradually and uniformly lowered in such a manner as to permit the concrete to take stresses due to its own weight uniformly and gradually. Where internal metal ties are permitted they or their removable parts shall be extracted without causing any damage to the concrete and remaining holes filled with mortar. No permanently embedded metal part shall have less than 25 mm. Cover to the finished concrete surface. Where it is intended to re-use the form work, it shall be cleaned and made good to the satisfaction of the Engineer-in-charge. After removal of form work and shuttering, the EXECUTIVE ENGINEER shall inspect the work and satisfy by random checks that concrete produced is of good quality.

2.3.9.3 Immediately after the removal of forms all exposed bolts etc. Passing through the cement member and used for shuttering or any other purpose shall be cut inside the cement concrete member to a depth of at least 25 mm. below the surface of the concrete and, the resulting holder be filled by cement mortar. All fins caused by form joints, all cavities produced by the removal of form ties and all other holes and depression, honeycomb spots, broken edges or corners and other defects, shall be thoroughly cleaned, saturated with water and carefully pointed and rendered true with mortar of cement and fine aggregate mixed in the proportions used in the grade of concrete that is being finished and so as dry consistency as is possible to use. Considerable pressure shall be applied in filling and pointing to ensure thorough filling in all voids. Surfaces which are pointed shall be kept moist for a period of 24 hours.

2.3.9.4 If rock pockets/honeycombs in the opinion of the Engineer-in-charge are of such an extent or character as to effect the strength of the structure materially or to endanger the life of the steel reinforcement, he may declare portions of the structure affected.

3.0 Mode of measurement and payment :

3.1 The consolidated cubical contents of concrete work as specified in item shall be measured. The concrete laid in excess of section shown on drawings or as directed shall not be measured. No deductions shall be made for.

- [a] Ends of dis-similar materials such as joints, beams, posts, girders, rafters, purline, trusses, corbels and steps etc. upto 500 sq.cm. in section.
- [b] Opening upto 0.1 sq.m.
- [c] The volume occupied by reinforcement shall not be deducted from R.C.C.work.
- 3.2 The rate includes cost of all materials labour, tools and plant required for mixing, placing imposition vibrating and compacting, finishing as directed, curing and all other incidental expenses for producing concrete of specified strength. The rate excludes the cost of form work.
- 3.3 The rate shall be for a unit of one cubic metre.

DTS No. 11 :-

Providing, mixing, placing, compacting by machine vibrator, curing, testing M25 Design mix concrete as per IS 456:2000 (latest revision) and as per tender specification in all items including cost of form work and rendering but excluding cost of reinforcement (A) foundation, footing, base of columns and mass concrete

1.0 REINFORCED CEMENT CONCRETE (RCC) MIX DESIGN (M:25)

The Contractor shall get the concrete mix designed confirming to various design parameters given in these specifications and latest revision of IS:10262 for each grade of concrete mentioned above by a Government approved laboratory. The cost / charge of the MIX DESIGN work shall be borne by the Contractor.

The MIX DESIGN shall be got approved from the Structural Consultant. No volume batching shall be allowed at site. The concrete mix at site shall be done by Digital batch mixer only. The proportion of cement, sand and coarse aggregates, water and admixtures if any shall be determined by weight. The Contractor shall make arrangements to weigh water by an electronic device at the site.

The Contractor shall follow the following specifications for mix design reinforced cement concrete work.

1.1 Proportioning Mix:

The mix of fine and coarse aggregate, cement and water as per the DESIGN MIX shall give the most dense concrete confirming to minimum quantity of cement paste and maximum water cement ratio for binding the materials to give required strength, Water content and the water cement ratio shall give the specified strength with the materials proposed for use in actual work carried out before the work is started, adopting the consistency suitable for the work and method of compaction that will be actually used on site subject to the water cement Ratio as Tabulated separately.

Target strength for M25 and shall be 31.60 N/mm² .

1.2 Test:

Tests shall confirm to the specifications laid down in I.S. 456 – 2000. These tests shall be got done in an approved laboratory at the cost of Contractor.

a) Preliminary tests :

In preliminary test, three separate tests shall be carried out on samples collected from different stacks. Each test shall be carried out with six samples of 15 cm. (About 6”) cubes and 3 of these shall be tested at 7 days and 3 at 28 days. In preliminary tests the average crushing strength attained shall be 33 percent higher than that required on work tests.

b) Work test:

For each of the work test, 6 samples shall be prepared from the concrete being used on the site, 3 samples being tested at 7 days and the remaining 3 samples at 28 days. Work tests shall be carried out on each of the first six days and subsequently once in three working days or for every 60 cu.m. of concrete which ever is less and also whenever the quality or grading of the materials is changed. When a relation between the strengths at 7 days and 28 days is established, only 3 samples may be prepared and tested at 7 days only. This number of controlled specimen tests may be increased if the Engineer-in-charge considers it necessary.

1.3 Field Mix :

In the work tests, bulkage of sand due to moisture, if any, should be allowed for different batches according to the moisture actually present at the time of mixing. The moisture will be taken into account in controlling the mixing water also. The proportions once fixed by preliminary tests shall not be changed so long as the materials are the same, subject only to the quantities of fine aggregate and water being adjusted to compensate for bulkage due to the moisture in sand and free water in fine aggregate at the time of use.

No change of materials shall be allowed unless fresh tests with new materials show satisfactory results.

Water and cement content per batch or concrete as determined MIX DESIGN shall be maintained constant except for suitable allowances to be made for surface moisture of the aggregates at the time of actual use. Immediately upon the receipt of the award of the contract, the Contractor shall inform the Engineer-in-charge the exact location of the sources of the acceptable materials which he proposes to use and get approved materials to be used. The CONCRETE MIX shall be got designed in an approved laboratory by the Contractor with minimum water cement ratio to give specified strength in the preliminary tests and the proportions got approved by the Engineer-in-charge in writing. These proportions shall be used so long as the materials contains to be of the same quality and from the same source subject only to slight changes in the relative quantities of fine and coarse aggregates for the purpose of promoting workability provided the works tests require the same. If during the progress of the work, the Contractor wishes to change the materials, the proportion shall be fixed on the basis of fresh MIX DESIGN to give the required strength after the Engineer-in-charge is satisfied that the materials satisfy the specifications. No adjustment of cost shall be made for change of proportions of cement fixed in the original preliminary tests.

1.4 Maximum Water Cement Ratio :

Sr.No	Types of concrete	Mix Strength	Maximum water cement ratio
	Reinforced concrete	(a) M-35	0.40
		(b) M-30	0.45
		(c) M-25	0.50
		(d) M-20	0.55
		(e) M-15	0.60

2.0 DETAILED SPECIFICATONS FOR CONCRETE:

2.1 INGREDIENTS

1. Cement :

The cement shall be ordinary Portland Cement confirming to IS:269. Under special circumstances other cements may be used with prior approval of Engineer-in-charge. Cement shall conform to M-3

2. Aggregate:

Aggregates shall comply with the requirements of IS:383. Generally aggregates having a nominal size of 20 mm shall be used. Coarse and Fine aggregate shall be weigh batched separately. Sand shall conform to M-6, Grit shall conform to M-8, Graded stone aggregate of design size shall confirm to M-12

3. Water :

Water shall conform to M-1. Water used for mixing and curing shall be as per Clause 5.4 of IS:456-2000.

2.2 Grades of concrete to be used shall be M10, M15, M20, M25, M30,M35.

The Minimum cement content and maximum water cement ratio and min. grade of concrete shall be as follows :

Table-A

Concrete Grade	Minimum Cement (in Kg)	Maximum Water Cement Ratio
M15	250	0.45
M20	325	0.55
M25	350 - 380	0.50
M30	410	0.45
M35	425	0.40

For concrete with volumetric / nominal mix and other items with use of cement the same shall be as per prevailing standards of SMC.

Note:

1. The contractor shall have to carry out mix design with cement content for the relevant grade as per above table.
2. The contractor shall have to carry out mix design, for the relevant grades keeping in view the maximum cement content level (i.e. as far as possible the cement level shall be between the min. and max. cement content as above).
3. contractor will be allowed to use any admixtures of approved quality to achieve required strength and workability and up to maximum cement content.
- 2.3 All reinforcement shall be free from loose mill scale, loose rust, and coats of paints, oil, mud or other coatings. The Contractor shall get the reinforcement cleaned by using wire brush, rubbing with gunny bags, light acid itching etc. as required.
- 2.4 Workability of concrete shall be as per Clause 6.0 of IS:456.
- 2.5 Durability :
In order to provide / produce durable concrete with low permeability, it must have an adequate cement content and a low water cement ratio. By using strong dense, aggregates, sufficient low water cement ratio, ensuring thorough compaction and sufficient hydration of cement through proper curing methods, a sufficient low permeability is achieved. Therefore cement content shall be sufficient to provide adequate workability with a low water cement ratio so that concrete can be completely compacted with the means available.
The permissible limits of chlorides and sulphate in concrete shall be as per Table 1 of IS-456-2000.
- 3.0 CONCRETE MIX PROPORTIONING
The Concrete mix should be so proportioned that when the concrete is hardened it shall be of the required strength, durability and surface finish. For this purpose the Contractor shall establish a well equipped concrete testing laboratory at site. The results of these shall be sent to Consultant for their comments / approval / suggestion for modification of Design Mix.
- 3.1 Strength Requirement of Concrete :
Where ordinary Portland cement conforming to IS: 269 or Portland blast furnace cement conforming to IS:455 is used, the compressive strength requirements for various grades of concrete, controlled as well as ordinary shall be as given in Table-1. Where rapid hardening Portland cement is used, the 28 days compressive strength requirement specified in Table-1 shall be met at 7 days. For controlled concrete, the mix shall be so designed as to attain in preliminary tests, a strength at least 33 percent higher than that required on work tests, for concrete mix upto and including M-30 and 25 percent higher for higher strengths. Preliminary tests need not be made in case of "ordinary concrete".

TABLE-1

Grade of concrete	Compressive work strength in Kg/cm ² on 150 mm cubes as per Testing conducted in accordance with IS:516.	
	min.at 7 days	min.at 28 days

M-10	70	100
M-15	100	150
M-20	135	200
M-25	170	250
M-30	200	300
M-35	235	350

Note: In all cases, the 28 days compressive strength specified in Table-1 shall be the criterion for acceptance or rejection of the concrete.

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

Field Test cubes shall be taken as per IS 456 required / or directed by Engineer In Charge. The same shall be tested in approved laboratory & results shall comply with required strength of mix used. The cost of taking cubes and testing shall be included in rates quoted.

3.2 Nominal Mix Concrete:

Under special circumstances nominal mix concrete for grades of M20 or lower may be used with prior approval of Engineer-in-charge. Nominal Mix concrete shall be as per Table 9 of IS 456:2000

4.0 CONSTRUCTION TOLERANCES

(a) Length

(i) Members upto 3 mt length	+ 3mm to -6mm
3 mt to 4.5 mt length	+ 3mm to -8mm
More than 4.5 mt length	+ 3mm to -10mm

(b) Cross-Sectional Dimensions

Dimensions up to 15 cm	+ 2mm
Dimensions between 15 cm and 23 cm	+ 3mm
Dimensions greater than 23 cm	+ 4mm

Straightness : When a straight edge or line is applied to the member it shall not show concavity or convexity exceeding.

For length upto 4.5 mt	4.5 mm
For length between 4.5 mt	6.0 mm
For length exceeding 6 mt	8.0 mm

Shape of Cross Section – No line on the cross section of a member shall deviate from its correct position by an angle exceeding 1 Degree. Vertical members shall not deviate in verticality from its true position by more than 5% of vertical length subject to maximum of 20 mm.

Member which do not confirm to above mentioned constructional tolerances shall be removed and redone or modified / strengthened as per instructions of Engineer-in-charge / Consultant.

5.0 SPECIFICATIONS FOR FORMWORK, CENTERING AND SCAFFOLDING

Materials :

Formwork shall be in plywood, sawn timber or steel as required for walls, stairs, slab, beams, columns, parapets, etc. for all concrete work.

Workmanship :

The formwork shall conform to the shape, lines and dimensions as shown on the drawings and shall be so constructed so as to remain sufficiently rigid and water-tight, during placement and compaction of the concrete. Adequate arrangement shall be made by the Contractor to safe guard against any settlements of the formwork during the course of concreting and after concreting.

Centering :

The centering, which has been got approved should be sufficiently strong and safe before, during and after pouring concrete and should be so erected that it would allow removal of forms in proper sequence without damaging either the concrete or the forms to be removed.

The props of centering shall be provided on firm foundation or base of sufficient strength to carry the loads, without any settlement.

Scaffolding :

All scaffolding, hoisting arrangements and ladders etc, required for facilitating of concrete shall be provided and removed on completion work by Contractor, at his own expense. The scaffolding, hoisting arrangement, ladders etc shall be strong enough to withstand all live, dead and impact loads expected to act. The Contractor shall be solely responsible for the safety of the scaffolding, hoisting arrangement, ladders, work and workmen etc.

The scaffolding, hoisting arrangement and ladders shall allow easy approach to the work spot and afford easy inspection.

The rate shall be for a unit of one **cubic metre**.

DTS No. 12 :-

Providing, mixing, placing, compacting by machine vibrator, curing, testing M25 Design mix concrete as per IS 456:2000 (latest revision) and as per tender specification in all items including cost of form work and rendering but excluding cost of reinforcement

(A) COLUMNS:

(1) Having cross sectional area up to 0.085sq.mt.

(2) Having cross sectional area more than 0.085 sq. mt .up to 0.12 sqmt.

(3) Having cross sectional area more than 0.12 sq. mt.

(B) Beam:

(1) Having cross sectional area upto 0.08 sq.mt.

(2) Having cross sectional area more than 0.08 sq. mt and upto 0.12 sq.mt.

(3) Having cross sectional area more than 0.12 sq. mt .

(G) Vertical and horizontal fins

Detail Specifications for design mix concrete is as per item no.11.

The rate shall be for a unit of one **cubic metre**.

DTS No. 13 :-

Providing & laying C.C 1:3:6 (1cement :3 coarse sand :6 crushed stone agg. 20 m.m Nominal size)& curing comp. incl. cost of form work in: wall caps/ copings

Detail Specification as per item no.9.

The rate shall be for a unit of one cubic metre.

DTS No. 14 :-

Providing & fixing IS Mark TMT Bar FE 500D reinforcement for R.C.C. work incl. bending, binding & placing in position etc.comp.---Ground Floor

1.0 MATERIALS

1.1 Mild steel bars shall conform to M-18 Thermo Mechanically Treated steel bars (high yield strength steel deformed bars) shall conform to M-18, Mild steel binding wires shall conform to M-21.

2.0 WORKMANSHIP

2.1 The work shall consist of furnishing and placing reinforcement to the shape and dimensions shown as on the drawings or as directed.

2.2 Steel shall be clean and free from rust and loose mill scale at the time of fixing in position and subsequent concreting.

2.3 Reinforcing steel shall conform accurately to the dimensions given in the bar bending schedules shown on relevant drawings. Bars shall be bent cold to specified shape and dimensions or as directed, using a proper bar bender, operated by hand or power to attain proper radius of bends, bars shall not be bent or straightened in a manner that will injure the material. Bars bent during transportation or handling shall be straightened before being

used on the work. They shall not be heated to facilitate bending. Unless otherwise specified for mild steel a "U" type hook at the end of each bar shall invariably be provided to main reinforcement. The radius of the bend shall not be less than straight part of the bar beyond the end of the curve shall be at least four times the diameter of the bar. In case which are not round and in case of deformed bars, the diameter shall be taken as the diameter of the circle having an equivalent effective area. The hooks shall be suitably encased to prevent any splitting of the concrete. The cold twisted steel bars shall be used without hooks at the ends. Deformed bars without hooks shall, however, comply with relevant anchorage requirements.

- 2.4 All the reinforcement bars shall be accurately placed in exactly the same position as shown on the drawings, and shall be securely held in position during placing of concrete by annealed binding wire not less than 1 mm. in size, and by using stay blocks or metal chair spacers, metal handers, supporting wires or other approved devices at sufficiently close intervals. Bars shall not be allowed to sag between supports nor displaced during concreting or any other operations of the work. All devices used for positioning shall be of non-corrodible material. Wooden and metal supports shall not extend to the surface of the concrete, except where shown on the drawings. Placing bars on layers of freshly laid concrete as the work progresses for adjusting bar spacing shall not be allowed. Pieces of broken stone or brick wooden blocks shall not be used. Layers of bars shall be separated by spacer bars, precast mortar blocks or other approved devices. Reinforcement after being placed in position shall be maintained in a clean condition until completely embedded in concrete. Special care shall be exercised to prevent any displacement of reinforcement in concrete already placed. To prevent reinforcement from corrosion, concrete cover shall be provided as indicated on drawings. All the bars are to be spliced and which are likely to be exceeding 10 days shall be protected by a thick coat of neat cement grout.
- 2.5 Bars crossing each other where required shall be secured by binding wires (annealed) of size not less than 1 mm. in such a manner that they do not slip over each other at the time of fixing and concreting.
- 2.6 As far as possible, bars of full length shall be used, in case this is not possible, overlapping of bars shall be done as directed. when practicable, overlapping bars shall not touch each other, but be kept apart by 25 mm. or 125 times the maximum size of the coarse aggregate whichever is greater between them. Where not feasible, overlapping bars shall be bound with annealed wires, not less than 1 mm. thick twisted tight. The overlaps shall be staggered for different bars and located at points, along the span where neither shear nor bending moment is maximum.
- 2.7 Wherever indicated on the drawings or desired by the Engineer-in-charge, bars shall be joined by couplings which shall have a cross section sufficient to transmit the full stresses of bars. The ends of the bars that are joined by coupling shall be upset for sufficient length so that the effective cross section at the base of threads is not less than the normal cross section of the bar. Threads shall be standard threads. Steel for coupling shall conform to I.S-226.
- 2.8 When permitted or specified on the drawings, joints of reinforcement bars shall be welded so as to transmit their full stresses. Welded joints shall preferably be located at points when steel will not be subjected to more than 75% of the maximum permissible stresses and welds so staggered that at any one section not more than 20% of the rods are welded. Only electric welding using a process which excludes air from molten and conforms to any or all other special provisions for the work shall be accepted. Suitable means shall be provided for holding bars securely in position during welding. It shall be ensured that no voids are left in welding and when welding is done in two or three stages, previous surface shall be cleaned properly. Ends of the bars shall be cleaned of all loose scale, rust, grease, paint and other foreign matter before welding. Only competent welders shall be employed on the work. The M.S. electrodes used for welding shall conform to I.S. 814.

- Welded pieces of reinforcement shall be tested. Specimen shall be taken from the actual site and their number and frequency of test shall be as directed.
- 3.0 MODE OF MEASUREMENT & PAYMENT
- 3.1 For the purpose of calculating consumption, wastage shall not be permitted beyond 7.5%. Excess consumption over 7.5% will be charged at penalty rate.
- 3.2 Reinforcement shall be measured in length including overlaps, separately for different diameters as actually used in the work. Where welding or coupling is resorted to, in place do lap joints, such joints shall be measured for payment as equivalent length of overlap as per design requirement. From the length so measured, the weight of reinforcement shall be calculated in tonnes on the same basis of as per M-14 even though steel is supplied to the contractor by the department on actual weight. Length shall include hooks at the ends. Wastage and annealed steel wire for binding shall not be measured and the cost of these items shall be deemed to be included in the rate for reinforcement.
- 3.3 The rate for reinforcement includes cost of steel binding wires, its transporting from departmental store to work site, cutting, bending, placing and fixing in position as shown on the drawings and as directed. It shall also include all devices for keeping reinforcement in approved position, cost of joining as per approved method and all wastage and spacer bars.
- 3.4 The rate shall be for unit of one Kg.

DTS No. 15 :-

Providing & construction brick work using Fly Ash bricks having crushing strength not less than 35 Kg./sq.cm. in foundation & plinth in C.M. 1:6 (1 cement:6 sand) etc. comp. - Ground Floor,P.L.

- 1.0 MATERIALS
Water shall conform to M-1, Cement shall conform to M-3, Sand shall conform to M-6, Flyash Building Bricks shall conform to M-15(A), Cement mortar shall conform to M-11.
- 2.0 WORKMANSHIP
- 2.1 Proportion : The proportion of cement mortar shall be 1:6 (1 cement, 6 fine sand) by volume.
- 2.2 Wetting of bricks : The bricks required for masonry work shall be thoroughly wetted with clean water for about two hours before use or as directed. The cessation of bubbles, when the bricks are wetted with water, is an indication of thorough wetting of bricks.
- 2.3 Laying : Bricks shall be laid in English bond unless directed otherwise. Half or cut bricks shall not be used except when necessary to complete the bond. Closures in such case shall be cut to required size and used near the ends of the walls.
A layer of mortar shall be spread on full width for suitable length of the lower course. Each brick shall first be properly bedded and set home by gently tapping with handle of trowel or wooden mallet. Its inside face shall be flushed with mortar before the next brick is laid and pressed against it. On completion of course, the vertical joints shall be fully filled from the top with mortar.
The walls shall be taken up truly in plumb. All courses shall be truly horizontal and all vertical joint shall be truly vertical. Vertical joints in alternate course shall generally be directly one over the other. The thickness of brick course shall be kept in uniform.
The brick shall be laid with frogs up wards. A set of tools comprising of wooden straight edges, manson's spirit level, square half metre rub, and pins, string and plumb shall be kept on the site of work for frequent checking during the progress of work.
Both the faces of walls of thickness greater than 23 cms. shall be kept in proper place. All the connected brick work shall be kept not more than one metre over the rest of the work. Where this is not possible, the work shall be raked back according to bond (and not left toothed) at an angle not steeper than 45 degrees.
All fixtures, pipes, outlet of water, hold fasts of doors and windows etc. which are required to be built in wall shall be embedded in cement mortar.
- 2.4 Joints : Bricks shall be so laid that all joints are quite flush with mortar. Thickness of joints shall not exceed 12 mm. The face joints shall be raked out as directed by raking tool

- daily during the progress of work, when the mortar is still green so as to provide key for plaster or pointing to done.
- The face of brick shall be cleaned the very day on which the brick work is laid and all mortar dropping removed.
- 2.5 Curing : Green work shall be protected from rain suitably. Masonry work shall be kept moist on all the faces for a period of seven days. The top of masonry work shall be kept well wetted at the close of the day.
- 2.6 Preparation of Foundation Bed : If the foundation is to be laid, directly on the excavated bed, the bed shall be leveled, cleared of all loose materials, cleaned and wetted before starting masonry.
- If masonry is to be laid on concrete footing the top of concrete shall be cleaned and moistened. The contractor shall obtain the engineer's approval for the foundation bed, before foundation masonry is started. When pucca flooring is to be provided flush with the top to plinth, the inside plinth offset shall be kept lower than the outside plinth top by the thickness of the flooring.
- 2.7 Fixtures - The frames of doors, windows, cup-boards etc. shall be housed into the brick work at the correct location and level as directed. The heavy steel doors, window frames etc. shall be built in with brick work, but for ordinary steel doors and windows required opening for frames, hold-fasts etc. shall be left in the wall and frames embedded later on in order to avoid damage to the frames.
- 2.8 Scaffolding - Necessary scaffolding shall be provided. The supports of the scaffolding shall be sound and strong tied together with horizontal pieces, over which the scaffolding plunks shall be fixed. Simple scaffolding shall be allowed normally. In this case scaffolding hole shall rest in hole header horizontal course only. Minimum number of holes shall be left in brick work for supporting horizontal scaffolding poles. The contractor is responsible for providing and maintaining sufficiently strong scaffolding so as to withstand all loads likely to come upon it.
- 2.9 Packing out of Joints - For the face of brick work, where plastering is to be done, joints shall be raked out to a depth not less than thickness of joints. The face of brick work shall be cleaned and mortar dropping removed on very same day that brick work is laid.
- 3.0 MODE OF MEASUREMENTS & PAYMENT :
- 3.1 The measurements of this item shall be taken for the brick masonry fully completed for limiting dimensions not exceeding those shown on the plans or as directed shall be final.
- 3.2 No deductions shall be made from quantity of brick work. No extra payment will be made for embedding in masonry holes in respect of the following items ---
- i] Ends of joints, beams, posts, girders, rafters, purlins trusses corbel, steps etc. where cross sectional area does not exceed 500 Sq.Cm.
 - ii] Opening not exceeding 1000 Sq.Cm.
 - iii] Wall plate sand bed plates, bearing of slab, chajjas, and like whose thickness does not exceed 10 Cms. and the bearing does not extend the full thickness of wall.
 - iv] Drainage holes and recesses for cement concrete blocks to embed hold fasts for doors, windows etc.
 - v] Iron fixtures; pipes upto 300 mm. dia. hold fasts of doors and windows built into masonry and pipes etc. for concealed wiring.
 - vi] Forming charges of section not exceeding 350 Sq.Cm. in masonry.
 - vii] Apertures for fire places, shall not be deducted nor shall extra labour required to make splaying of jambs, throating and making arches over the aperture be paid for separately.
- 3.3 The rate shall be for a unit of one cubic metre.

DTS No. 16 :-

Filling available excavated earth (excluding rock) in trenches. plinth, sides of foundations etc. in layers not exceeding 20 cm. in depth consolidating each disposed layer by ramming and watering.

- 1.0 FILLING AND DISPOSAL OF THE EXCAVATED STUFF :

The excavated stuff of the selected type shall be used in filling the trenches and plinth or leveling the ground in layers. Under no circumstances black cotton soil shall be used for filling the trenches and plinth. The earth to be used for filling shall be free from salts organic or other foreign matter. All clods of earth shall be broken. As soon as the work in foundation has been completed and measured the site of foundation shall be cleared of the debris, brick bats, mortar dropping and filled with earth in-layers not exceeding 20cms. Each layer shall be adequately watered, rammed and consolidated before the succeeding layer is laid. The earth shall be rammed with iron rammers where feasible and with the butt ends of crow-bare where rammers cannot be used. When filling reaches finished level. The surface shall be flooded with water for at least 24 hours and allowed to dry and then rammed and consolidated.

The balance of the excavated quantity shall be removed by the contractor from the site of work to a place as directed with lead upto 50 M. and all lift.

2.0 MODE OF MEASUREMENTS AND PAYMENT :

- 2.1 The payment shall be made for filling in plinth and trenches. No deduction shall be made for shrinkage or voids. If consolidated as instructed above.
- 2.2 The rate shall be for a unit of one cubic metre.

DTS No. 17 :-

Filling in foundation and plinth with murrum or selected soil in layers of 20cm. thickness including watering, ramming and consolidating etc. complete.

1.0. Materials

- 1.1. Yellow soil or Selected soil shall be clean, of good binding quality and of approved quality obtained from approved pits/ quarries.
of disintegrated rocks which contain silicon material and natural mixture of clay of local origin. The size of murrum shall not be more than 20 mm³.

2.0. Workmanship

- 2.1. The relevant specifications shall be as per code 4006 followed except that the murrum or selected soil shall be filled in foundations and plinth in 20 cms layer including consolidating, ramming, watering, dressing etc. complete

3.0. Mode of Measurements & Payment

- 3.1. The relevant specifications of it code 4006 shall be followed-.
- 3.2. The rate includes cost of collecting and carting Yellow / or selected earth of approved quality with all lead and labour required for filling in trenches and plinth.
- 3.3. Rate shall be for a unit of one cubic meter.

DTS No. 18 :-

carrying out plinth treatment to post construction/existing structure by spraying chemical solution for termite control treatment including labour and material consisting with ISI specification using chlordane and chlorpyrifos 20 EC as per 6131 part II concentration weight one litre give 1% concentration inclusive of one litre chemicals emulsions application at the rate of 5 litre chemicals /sqmt of surface is recommended as per IS.

1.0. Materials :

The chemicals used for the soil treatment shall be only one of the following with concentration shown against each in aqueous emulsion. Chemicals Concentration

- 1. Aldrin 0.50% (by weight)
- 2. Heptachlor 0.50% (by weight)
- 3. Chlordane 1.00% (by weight)

2.0. Workmanship

- 2.1. The chemical barrier shall be complete and continuous under whole of the structure to be protected.

- 2.2. The bottom and the sides of foundations up to a height of 30 cms. from the bottom of excavation made for masonry foundation and for basement column pits shall be treated with the chemical emulsion at the rate 5 liters/ sq. meter of the surface area. .
- 2.3. The chemical treatment shall be-carried out when the surfaces is quite dry. Chemical treatment shall not be carried out when it is raining or when the soil wet with rain or sub soil water.
- 2.4. Once formed, treated soil barriers shall be not disturbed. If by chance, treated soil barriers are disturbed, immediate steps shall be taken to restore the continuing and compactness of the barrier system
- 2.5. The treatment against termite infection shall remain fully effective for a period not less than 10 years from date of issue of the final certificate to completion of work. If at any time during this period, any defects in treatment are revealed or any evidence of infection in any part of the building or structure is noticed, the contractor shall be rectify the concerned defects within 14 days on receipt of notice from Engineer-in-charge. On contractor's failure to do so, the Engineer-in-charge may get the same rectified through any other agency at contractor's risk and cost, and decision of Engineer-in-charge as to the cost payable by contractor for the same shall be final and binding to the contractor.

3.0. Mode of measurements & payment

- 3.1. The length and breadth shall be measured correct to a cm. as per the dimensions of sanctioned plans. No deduction shall be made nor extra paid for any opening for pipes etc. up to 0.1.sq. mt. The rate shall include the cost of all labour and materials required for the operation involved for satisfactory completion of this item. The sides of the trenches 30 cms, each side and bottom shall be measured under this item.
- 3.2. The rate shall be for a unit of One sq. meter

DTS No. 19 :-

Providing & Applying 20mm. Th. Heavy Roller plaster on walls or similar surfaces at all floor levels consisting of 12 mm av. Th. Backing coat of C.M. 1:3 (1 cement:3 sand) & 8 mm. th. Finishing coat of C.M. 1:1 (1cement: 1 sand) apply thick cement slurry and apply roller horizontal as well as vartical (two times) up to good quality and size of grain in elevation as per directed by engineer incharge.

- 1.0 Materials :-
Water shall conform to M-1 cement mortar shall conform to M-11.
- 2.0 Workmanship :-
- 2.1 The work shall be carried out in two coats. The backing coat [basecoat] shall be 12 mm. thick in C.M. 1:3. The relevant specifications of Item No.17 shall be followed except that the thickness of back coat shall be 12 mm. average and the proportion shall be of cement mortar 1:3 [1 cement:3 sand]. Before the first coat hardens its surface shall be beaten up by edges of wooden tappers and close dents shall be made on the surface subsequent coat shall be applied after this coat has been allowed to set for 3 to 5 days, depending upon the weather conditions. The surface shall not be allowed to dry during this period.
The second coat shall be completed to 8 mm thickness in C.M. 1:1 as described above, including raising sand facing by bushing. The sample of sand face shall be got approved before the work is started. The whole work shall be carried out uniformly as per sample approved.
- 2.2 Curing :-
The curing shall be started overnight after finishing of plaster. The plaster shall be kept wet for a period of 7 days. During this period, it shall be protected from all damages.
- 3.0 Mode of Measurements and payment :-
- 3.1 The rate shall be for a unit of one sq. metre.

DTS No. 20 :-

"Providing & applying two coats of weather shield max paint (3 coats may be required in case of darker colours.) of ICI Dulux or Apex Ultima of Asian Paint including applying exterior acrylic primer coat as per manufacturers specification and directions in shade and colour approved by architects, on exterior surfaces of the building including scaffolding, preparing the surface,

watering, curing etc. complete and as directed by the architects and manufacturers Surface Preparation : surface is thoroughly clean, dry and free from all loose dirt, chalk, grease, fungi,algae and flaking paint. This can be achieved by brushing with a wire/ stiff coir brush, followed by water jetting if required. Fill up all minor cracks and defects with white cement and sand mixture in the ratio 1:3. For application on previously painted wall, previous coatings of paint must be thoroughly scraped off and Clean the surface thoroughly using wire brushes.Priming: Apply a liberal coat of exterior acrylic primer and allow it to dry for 4-5 hours.Application of putty is not recommended.

Minimum 4-6 hours duration is required between each coat of weather shield max paint"

1.0. MATERIALS

The water shall conform to Material Specification. weather shield max paint shall conform to I.S. 2932-2003 (exterior paint)

2.0 WORKMANSHIP

2.1. SCAFFOLDING

Wherever scaffolding is necessary it shall be erected in such a way that as far as possible on part of scaffolding shall rest against the surface to be white or colour washed. A properly secured strong and well tied suspended platform (Zoola) may be used for white washing. Where ladders are used, pieces of old gunny bags shall be tied at top and bottom to prevent scratches to the floors and walls. For white washing of ceilings proper stage scaffolding shall be erected where necessary.

2.2. PREPARATION OF SURFACE

2.2.1 The surface shall be thoroughly cleaned of all dust, dirt, mortar cropping and other foreign matter before white wash is to be applied.

2.2.2 The surface spoiled by smoke soot shall be scraped with steel wire brushes or steel scrapers or shall be rubbed with over-burnt surkhi or brick bats. The surface shall be then broomed to remove all dust, dirt and shall be washed with clean water.

2.2.3 Oil or grease spots shall be removed by suitable chemical and smooth surface shall be rubbed with wire brushes.

2.2.4 All unsound portion of the surface plaster shall be removed to full depth of plaster rectangular patches and plastered again after raking the masonry joints properly. Such portion shall be wetted and allowed to dry. They shall then be given one coat of white wash.

2.2.5 All unnecessary nails shall be removed; the holes cracks patches etc. shall be made good with materials similar in composition to the surface to be prepared. The relevant specifications of shall be followed except that the word white wash colour wash shall be substituted with water proofing cement paint. The surface shall be thoroughly wetted with clean water before cement water proofing paint is applied.

2.3. PREPARATION OF PAINT

weather shield max paint shall be prepared by diluted to a brush-able consistency.. In all cases,the manufacturer's instructions shall be followed. The paint shall be mixed in such quantities as can be used up within an hour of mixing as otherwise the mixture will set and thickness, affecting flowing and finish. The lids of cement paint drums shall be kept tightly when not in use.

2.4 APPLICATION OF PAINT

2.4.1 No painting shall be done when the paint is likely to be exposed to a temperature of below 7° C within 48 hours after application.

2.4.2 When weather conditions are such as to cause damage the work shall be carried out "in the shadow" as far as possible; This helps the proper hardening of the paint film by keeping the surface moist for a longer period.

2.4.3 To maintain the uniform mixture and to prevent segregation, the paint shall be stirred frequently in the bucket.

2.4.4. Not less than 4 hours shall be allowed between two coats. Next coat shall not be started until the preceding first coat has been dried sufficiently hard to resist marking; by the brush being used. In hot dry weather, the preceding coat shall be allowed between two coats. Next coat shall

- not be started until the preceding coat has become sufficiently hard to resist marking by the brush being used. In hot dry weather; the preceding coat shall be slightly, moistened before applying the subsequent coat.
- 2.4.5 The finished surface shall be even and uniform in shade, without patches, brush marks, paint drops, etc.
- 2.4.6 The paint shall be brushed in uniform thickness and shall be free from excessive heavy brush marks. The lamps shall be well brushed out.
- 3.0. MODE OF MEASUREMENTS & PAYMENT
- 3.1. All the work shall be measured in the decimal system as under:
 (a) Dimensions shall be measured to the nearest 0.01 M.
 (b) Area in individual items shall be worked out to the nearest 0.01 Sq. M.
 All the work shall be measured in sq. mt. Deductions for jambs, soffits, sills etc. for opening not exceeding 0.5 sq. mt. each in area for ends of joints, posts, beams, girders, steps etc. not exceeding 0.5 sq. mt. each in: area and for opening exceeding 0.3 sq. mt. and not exceeding 3.0 sq. mt. each in area deductions and additions shall be made as under : -
- 3.2. No deductions shall be made for ends of joints beams, posts etc. and openings not exceeding 0.5 sq. mt each. No addition shall be made for reveals, jambs, soffits, sills etc. of these openings nor for finish around ends of joints, beams, posts etc.
- 3.3. Deductions for openings exceeding 0.5 sq. mt. but not exceeding 3 sq. mt. each shall be made follows and no addition shall be made for reveals, jambs, soffits etc. of these openings:
 (a) When both the faces of walls are provided with finish, deduction shall be made for one face only.
 (b) When each faces of wall is provided with different finish deduction shall be made for that side of frame for door, windows etc. on which width of reveals is less than that of the other side, where width of reveals on both faces of wall are equal, deduction of 50% of area of opening on each face shall be made from total area of finish.
 (c) When only one face of wall is treated and the other face is not treated, full deduction shall be made if the width of reveal on the treated side is less than that on the untreated side, but if the width of the surface is equal or more than on the untreated side neither deductions nor additions be made for reveals, jambs, soffits, sills etc.
- 3.4. In case of area of opening exceeding 3 sq. mt. each, deduction shall be made for openings but jambs, soffits, shall be measured.
- 3.5. No deduction shall be made for attachment such as casing, conducts, pipe, electric wiring and the like.
- 3.6. Corrugated surfaces shall be measured flat as fixed and not girth. The quantities so measured shall be increased by the following percentage and the resultant shall be included with the general areas.
 (a) Corrugated steel sheets 14%
 (b) Corrugated A. C. Shed 20%
 (c) Semi corrugated A. C. Sheets 10%
 (d) Nainital pattern roof (Plain sheeting with roils) 10%
 (e) Nainital pattern roof (with corrugated sheets) 25%
- 3.7. Cornices and other wall features, when they are not picked out in a different finish/colour shall be girthed and included in the general area.
- 3.8. The rate shall include the cost of all materials, labour, scaffolding, protective measures etc. involved in all the operations described above.
- 3.9. The rate shall be for a unit of one sq. meter.

DTS No. 21 :-

Providing, mixing, placing, compacting by machine vibrator, curing, testing M25 Design mix concrete as per IS 456:2000 (latest revision) and as per tender specification in all items including cost of form work and rendering but excluding cost of reinforcement

(A) Columns :

(1) Having cross sectional area up to 0.085sq.mt.

Ground Floor

(2) Having cross sectional area more than 0.085 sq. mt .up to 0.12 sqmt.

Ground Floor

(3) Having cross sectional area more than 0.12 sq.mt.

Ground Floor

(B) Beam:

(1) Having cross sectional area upto 0.08 sq.mt.

Ground Floor

(2) Having cross sectional area more than 0.08 sq. mt and upto 0.12 sq.mt.

Ground Floor

(3) Having cross sectional area more than 0.12 sq.mt.

Ground Floor

(C) Slab:

(2) Slabs having more than 8 Cm & upto 10 Cm thickness.

Ground Floor

(3) Slabs having more than 10 Cm & upto 13 Cm thickness.

Ground Floor

(4) Having more than 13 cm. Thickness

Ground Floor

(D) Lintels:

Ground Floor

(E) Chhajja

Ground Floor

Detail Specification as per item no.12.

The rate shall be for a unit of **one cubic metre**.

DTS No. 22 :-

Providing & fixing IS Mark TMT Bar FE 500d reinforcement for R.C.C. work incl. bending, binding & placing in position etc.comp.- Ground Floor

Detail Specification as per item no.14.

The rate shall be for a unit of **one Kg**.

DTS No. 23:-

Brick work using common burnt clay building bricks having crushing strength not less than 35 kg./Sq.Cm. in Cement Mortar 1:6 (1- Cement : 6 -fine sand)(C) Fly Ash Bricks

Detail Specification as per item no.15.

The rate shall be for a unit of **one cubic metre**.

DTS No. 24 :-

Half brick masonry in common burnt clay building bricks having crushing strength not less than 35 Kg/Sq.Cm. in Cement mortar 1:4 (1- Cement : 4 - coarse sand) in foundation and plinth (C)Fly Ash Bricks

1.0 MATERIALS

1.1 Flyash Building Brick shall conform to M-15, Water shall conform to M-1, Cement shall conform to M-3, Sand shall conform to M-6, Cement mortar shall conform to M-17.

2.0 WORKMANSHIP

2.1 Relevant specifications of bricks, wetting and laying of bricks, joints, curing etc. shall conform to item No.13 except the brick work of half bricks shall be carried out.

2.2 Cement mortar used in masonry work shall be in proportion of 1 part of cement and 3 parts of sand by volume.

2.3 All bricks shall be laid stretcher wise, breaking joints with those in the upper and lower courses. The wall shall be taken truly plumb. All courses shall be laid truly horizontal

- and all vertical joints shall be truly vertical. the bricks shall be laid with frogs upwards. A set of masons tools shall be maintained on work as required for frequent checking.
- 3.0 MODE OF MEASUREMENTS & PAYMENTS
- 3.1 The half brick masonry work in foundation and plinth shall be measured under this item, the limiting dimensions shall not exceed those shown in the plan or as directed. Any work done extra over the specified dimensions shall be ignored.
- 3.2 The relevant specifications of Item No.8 shall be followed. The length shall be measured nearest to 1 Cm.
- 3.3 The rate shall be for a unit of **one Sq.Mts.**

DTS No. 25 :-

Providing & Applying 10mm.th.cement plaster in single coat on brick/ concrete walls similar surfaces for plastering & finished even & smooth with a floating coat of cement slurry mixed with admixture of lime or neeru in required proportion etc. comp. in C.M 1:3 (1 cement : 3sand) (A) For wall and similar surfaces -- Ground Floor

(A) for wall and similar surfaces

Ground Floor

(B) for ceilings and soffits of stairs

Ground Floor

1.0 MATERIALS

Water shall conform to M-1. The cement mortar of proportion 1:3 shall conform to M-11.

2.0 WORKMANSHIP

2.1 Scaffolding - Wooden bellies, bamboos, planks, treatles and other scaffolding shall be sound. These shall be properly examined before erection and use. Stage scaffolding shall be provided for ceiling plaster which shall be independent of the walls.

2.2 Preparation of Background - The surface shall be cleaned of all dust, loose mortar droppings, traces of algae, afflorsence and other foreign matter by water or by brushing. Smooth surface be roughened by wire brushing if it is not hard and hacking if it is hard. In case of concrete surface, if a chemical retarder has been applied to the form work, the surface shall be roughened by wire brushing and all the resulting dust and loose particles cleaned off and care shall be taken that none of the retarders is left on the surface. Trimming of projections on brick/concrete surfaces where necessary shall be carried out to get an even surface.

Raking of joints in case of masonry work where necessary, shall be allowed to dry out for sufficient period before carrying out the plaster work.

The work shall not be soaked but only damped evenly before applying the plaster. If the surface becomes dry, such areas shall be moistened again.

For external plaster, the plastering operation shall be started from top floor and carried downwards. For internal plaster, the plastering operations may be started wherever the building frame and cladding work are ready and the temporary supports of the ceiling resting on the wall of the floor have been removed. Ceiling plaster shall be completed before starting plaster to walls.

2.3 APPLICATION OF PLASTER

The plaster about 15 x 15 Cms. shall be first applied horizontally and vertically at not more than 2 metres intervals over the entire surface to serve as gauge. The surface gauges shall be truly in place of the finished plastered surface. The mortar shall then be applied in uniform surface slightly more than the specified thickness then brought to a true surface by working a wooden straight edge reaching across the gauges with small upward and sideways movements at a time. Finally, the surface shall be finished off true with a trowel of wooden flat according as a smooth or a sandy granular texture is required. Excessive trowelling or overworking the float shall be avoided. All corners, arises, angles and junctions shall be truly vertical or horizontal as the case may be and shall be carefully

finished. Rounding or chamfering, corners, junctions etc. shall be carried out with proper templates to the size required.

Cement plaster shall be used within half an hour after addition of water. Any mortar or plaster which is partially set shall be rejected and removed forthwith from the site. In suspending the work at the end of the day, the plaster shall be left out clean to the line both horizontally and vertically. When recommending the plaster, the edges of the old work shall be scrapped clean and wetted with cement putty before plaster is applied to the adjacent areas to enable the two to properly join together. Plastering work shall be closed at the end of the day on the body of the wall and nearer that 15 cms. to any corners or arises. It shall not be closed on the body of features such as plaster bands and cornices not at the corners or arises. Horizontal points in plaster work shall not also occur on parapet tops and copings as those invariably lead to leakage. No portion of the surface shall be left out initially to be packed up later on.

Each coat shall be kept damp continuously till the next coat is applied for a minimum period of 7 days. Moistening shall commence as soon as plaster is hardened sufficiently. Soaking or walls shall be avoided and only as much water as can be readily absorbed shall be used, excessive evaporation on the sunny or windward side of building in hot air to dry weather shall be prevented by hanging mattings or gunny bags on the outside of the plaster and keeping them wet.

3.0 MODE OF MEASUREMENTS & PAYMENT

3.1 The rate shall include the cost of all materials, labour and scaffolding etc. involved in the operations described under workmanship.

3.2 All plastering shall be measured in square metres unless otherwise specified. Length, breadth or height shall be measured correct to a centimetre.

3.3 Thickness of the plaster shall be exclusive of the thickness of the key i.e. grooves or open joints in brick work, stone work etc. or space between laths. Thickness of plaster shall be average thickness with minimum 10 mm. at any point on this surface.

3.4 This item includes plastering upto floor two level.

3.5 The measurement of wall plastering shall be taken between the walls or partition (dimensions before plastering being taken) for length and from the top of floor or skirting to ceiling for height. Depth of cover of cornices if any, shall be deducted.

3.6 Soffits of stairs shall be measured as plastering on ceilings. Blowing soffits shall be measured separately.

3.7 For jambs, soffits, sills etc. for openings not exceeding 0.5 Sq.Mts. each in area for ends of joints, beams, posts, girders, step etc. not exceeding 0.5 Sq.Mts. each in area for and for openings exceeding 0.5 Sq.Mts. and not exceeding 3 Sq.Mts. in each area deductions and additions shall be made in the following manner ---

a] No deductions shall be made for ends of joints, beams, posts etc. and openings not exceeding 0.5 Sq.Mts. each and no addition shall be made for reveals, jambs, soffits, sills etc. of these openings for finish to plaster around ends of joints, beams, posts etc.

b] Deduction for openings exceeding 0.5 Sq.Mts. but not exceeding 3 Sq.Mts. each shall be made as follows and no additions shall be made for reveals, jambs, soffits sills etc. of these openings --

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

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

3.8 For openings having door frames equal to projecting beyond the thickness of wall, full deductions for opening shall be made from each plastered face of the wall.

- 3.9 In case of opening of area above 3 Sq.Mts. each deductions shall be made for opening but jambs, soffits and sills shall be measured.
- 3.10 The rate shall be for a unit of one Sq.Mts.

DTS No. 26 :-

Providing and fixing 150 mm wide, approved quality chicken wire mesh (FRP / PVC) at junction of brick work and RCC work or two dissimilar surfaces, at all heights fixed by nails, rowal plugs or tag by cement mortar 1:3 before applying the plaster, including curing, scaffolding all complete as directed.

1.0. Materials

Approved quality chicken wire mesh (FRP / PVC)

Water shall conform to M-1. The cement mortar of proportion 1:3 shall conform to M-11

2.0 Workmanship

The **chicken wire mesh** of size of 150mm width. shall be fixed at junction of brick work and RCC work or two dissimilar surfaces, at all heights fixed by nails, rowal plugs or tag by using cement mortar 1:3 before applying the plaster, including curing, scaffolding all complete as directed.

3.0. Mode of measurements & payment

3.1. The chicken wire mesh shall be measured in Square meter.

3.2. The rate shall be for a unit of one Square meter.

DTS No. 27 :-

Providing & Applying 20mm. Th. Heavy Roller plaster on walls or similar surfaces at all floor levels consisting of 12 mm av. Th. Backing coat of C.M. 1:3 (1 cement:3 sand) & 8 mm. th. Finishing coat of C.M. 1:1 (1 cement: 1 sand) apply thick cement slurry and apply roller horizontal as well as vertical (two times) up to good quality and size of grain in elevation as per directed by engineer in charge.-
Ground Floor

Details specification same as per Item no.-19

The rate shall be for a unit of one **Square metre**.

DTS No. 28 :-

Providing & applying single coat of textured finish at external surface at all floor levels with three coats of weather proof exterior paint of approved standard brands make (Asian/Dulux/Narolac) or Equivalent at outer side of the building on RCC or Masonary walls. Rate to include for all labour, materials, staging, scaffolding, cleaing, curing etc. application of texture after thoroughly brushing th`e surface to give an even shade free from mortar dropping/other foreign matter etc. complete. application of textures & paints must be as per company's standard instructions. Texture and colour selection as per approved by engineer in charge.

1.0. Materials

Approved quality textured finish

2.0 WORKMANSHIP

2.1. SCAFFOLDING

Wherever scaffolding is necessary it shall be erected in such a way that as far as possible on part of

scaffolding shall rest against the surface to be white or colour washed. A properly secured strong and well tied suspended platform (Zoola) may be used for white washing. Where ladders are used, pieces of old gunny bags shall be tied at top and bottom to prevent scratches to the floors and walls. For white washing of ceilings proper stage scaffolding shall be erected where necessary.

2.2. PREPARATION OF SURFACE

2.2.1 The surface shall be thoroughly cleaned of all dust, dirt, mortar cropping and other foreign matter before white wash is to be applied.

2.2.2 The surface spoiled by smoke soot shall be scraped with steel wire brushes or steel scrapers or shall be rubbed with over-burnt surkhi or brick bats. The surface shall be then broomed to remove all dust, dirt and shall be washed with clean water.

- 2.2.3 Oil or grease spots shall be removed by suitable chemical and smooth surface shall be rubbed with wire brushes.
- 2.2.4 All unsound portion of the surface plaster shall be removed to full depth of plaster rectangular patches and plastered again after raking the masonry joints properly. Such portion shall be wetted and allowed to dry. They shall then be given one coat of white wash.
- 2.2.5 All unnecessary nails shall be removed; the holes cracks patches etc. shall be made good with materials similar in composition to the surface to be prepared. The surface shall be thoroughly wetted with clean water before textured finish is applied.

The **chicken wire mesh** of size of 150mm width. shall be fixed at junction of brick work and RCC work or two dissimilar surfaces, at all heights fixed by nails, rowal plugs or tag by using cement mortar 1:3 before applying the plaster, including curing, scaffolding all complete as directed.

3.0. Mode of measurements & payment

3.1. The chicken wire mesh shall be measured in Square meter.

3.2. The rate shall be for a unit of one Square meter.

Details specification same as per Item description and as instruction by Engineer-in-charge.

The rate shall be for a unit of one **Square metre**.

DTS No. 29 :-

Providing throating or plaster drip and moulding it to R.C.C. chajja etc. comp.. For all floor

- 1.0 Materials :-
Water shall conform to M-1. Cement shall conform to M-3. Sand conform to M-6. Cement mortar shall conform to M-11.
- 2.0 Workmanship :-
The work shall be carried out as directed. The proportion of mix for finishing, touching shall be in C.M. 1:2 by volume. Curing shall be done for not less than 7 days. The work shall be carried out in best workman like manner. The throating or plaster drip and moulding shall be one centimetre in thickness.
- 3.0 Mode of Measurements and payment :-
- 3.1 The rate includes cost of all materials and labour required to complete the item.
- 3.2 The rate shall be for a unit of one running metre.

DTS No. 30 :-

Providing 20 mm deep finished groove in plaster in line and level etc. Comp. For all Floor (M.R.)

- 1.0 Materials :-
Water shall conform to M-1. Cement shall conform to M-3. Sand conform to M-6. Cement mortar shall conform to M-22.
- 2.0 Workmanship :-
The work shall be carried out as directed. The proportion of mix for finishing, touching shall be in C.M. 1:2 by volume. Curing shall be done for not less than 7 days. The work shall be carried out in best workman like manner. The throating or plaster drip and moulding shall be one centimetre in thickness.
- 3.0 Mode of Measurements and payment :-
- 3.1 The rate includes cost of all materials and labour required to complete the item.
- 3.2 The rate shall be for a unit of one running metre.

DTS No.31:-'Providing & applying two coats of weather shield max paint (3 coats may be required in case of darker colours.) of ICI Dulux or Apex Ultima of Asian Paint including applying exterior acrylic primer coat as per manufacturers specification and directions in shade and colour approved by architects, on exterior surfaces of the building including scaffolding, preparing the surface, watering, curing etc. complete and as directed by the architects and manufacturers Surface Preparation : surface is thoroughly clean, dry and free from all loose dirt, chalk, grease, fungi, algae and flaking paint. This can be achieved by brushing with a wire/ stiff coir brush, followed by water jetting if required. Fill up all minor cracks and defects with white cement and sand mixture in the ratio 1:3. For

application on previously painted wall, previous coatings of paint must be thoroughly scraped off and Clean the surface thoroughly using wire brushes. Priming: Apply a liberal coat of exterior acrylic primer and allow it to dry for 4-5 hours. Application of putty is not recommended.

Minimum 4-6 hours duration is required between each coat of weather shield max paint

Details specification same as per Item no.-20

The rate shall be for a unit of one Square metre.

DTS No.32:-

(B) Providing and laying integral cement based water proofing treatment including preparation of surface as required for treatment of roofs, balconies, terraces etc. consisting of following operations.

(a) Applying and grouting a slurry coat of neat cement using 2.75 kg/sqm of cement admixed with proprietary water proofing compound conforming to IS:2645 over the R.C.C. slab including cleaning the surface before treatment. (b) Laying cement concrete using broken bricks/brick bats 25 mm to 100 mm size with 50% of cement mortar 1:5 (1 Cement : 5 Coarse sand) admixed with proprietary water proofing compound conforming to IS:2645, brick bats is finally covered by jointless cement plaster 20mm th. in C.M. 1:4 added with special water proofing compound confirming to IS:2645 & top smooth finished with trowel with false chequered marking of 300 mm.size. The treatment is carried along the vertical surface of the parapet & other adjoining wall up to height of about 300 mm in a shape of quarter round vata Incl. curing etc. Comp. With average thickness of 120 mm and minimum thickness at khurra as 65 mm. (c) The whole terrace so finished shall be flooded with water for a minimum period of two weeks for curing and for final test. All above operations to be down in order and as directed and specified by the engineer-in-charge. With average thickness of 120 mm and minimum thickness at khurra as 65 mm. (Cement consumption 0.511 Bags / S.M.)

1.0 Materials :-

Water shall conform to M-1. Cement shall conform to M-3. Sand conform to M-6. Cement mortar shall conform to M-22

2.0 Workmanship :-

(a) Applying and grouting a slurry coat of neat cement using 2.75 kg/sqm of cement admixed with proprietary water proofing compound conforming to IS:2645 over the R.C.C. slab including cleaning the surface before treatment.

(b) Laying cement concrete using broken bricks/brick bats 25 mm to 100 mm size with 50% of cement mortar 1:5 (1 Cement : 5 Coarse sand) admixed with proprietary water proofing compound conforming to IS:2645, brick bats is finally covered by jointless cement plaster 20mm th. in C.M. 1:4 added with special water proofing compound confirming to IS:2645 & top smooth finished with trowel with false chequered marking of 300 mm.size. The treatment is carried along the vertical surface of the parapet & other adjoining wall up to height of about 300 mm in a shape of quarter round vata Incl. curing etc. Comp. With average thickness of 120 mm and minimum thickness at khurra as 65 mm.

(c) The whole terrace so finished shall be flooded with water for a minimum period of two weeks for curing and for final test.

All above operations to be down in order and as directed and specified by the engineer-in-charge. With average thickness of 120 mm and minimum thickness at khurra as 65 mm. (Cement consumption 0.511 Bags / S.M.)

3.0 Mode of Measurements and payment :-

3.1 The rate includes cost of all materials and labour required to complete the item.

3.2 The rate shall be for a unit of one Square metre.

DTS No.33:-

Providing and laying broken china mosaic flooring for terrace using 12mm to 20mm broken pieces of glazed tiles to be laid over cement mortar 1:3 to plain or slope and to be tempered to bring mortar creme out upto surface using white cement including rounding off junctions and extending them upto 15 cm along the wall clearing with water and oxalic acid etc. as directed.

1.0 MATERIAL - WATER

- 1.1 Water shall not be salty brackish and shall be clean, reasonably clear and free objectionable quantities of silt and traces of oil injurious alkalis salts organic matter and other deleterious material which will either weaken the mortar of concrete or cause efflorescence or attack the steel in R.C.C. container for transport storage and huddling of water shall be clean. Water shall confirm to the Standard Specification in I.S. 455 - 1978.
- 1.2 If required by the Engineer in charge, it shall be tested by comparison with distilled water compression shall be made by means of standard cement tests for soundness, time of setting and mortar strength as specified in I.S. 269 - 1976. Any indication of unsoundness change in time of setting by 50 minutes or more or decrease of more than 10 percent strength of mortar prepared with distilled water sample when compared with the result obtained with mortar prepared with distilled water shall be sufficient cause for rejection of water under test.
- 1.3 Water for curing, mortar concrete or masonry should not be too acidic/too alkaline.
- 1.4 It shall be free of elements which significantly affect the hydration reaction or otherwise interface with the hardening of mortar or concrete during curing or those which produce objectionable stains or other unsightly deposits on concrete or mortar surfaces.
- 1.5 Hard and bitter water shall not be used for curing.
- 1.6 Potable water will generally found suitable for curing mortar or concrete.

2.0 CEMENT

- 2.1 Cement shall be ordinary Portland slag cement as per I.S. 1624 - 1974 or Portland slag cement as per I.S.455-1976.
- 2.2 Cement shall be stored above the ground level in perfectly and dry and water tight sheds. Wherever bulk storage containers are used, there capacity should be sufficient to cater to the requirements at site and should be cleaned at least once every 3 to 4 months. The aggregate shall be stored in such a way as to prevent admixture of foreign materials. Different size of fine or coarse aggregate shall be stored in separate stock piles sufficiently away from the each other to prevent inter mixing the materials.

3.0 SAND

- 3.1 Sand shall be natural sand, clean, well graded, hared, strong, durable and gritty particular free from immures amounts of dust, clay, kankar, modules, soft or flaky particles shall alkali salts, organic matter, learn mica or other deleterious substance and shall be got approved from the Engineer in charge. The sand shall not contain more than 8 percent of slit as determined by field test if necessary, the sand
COARSE SAND - The fineness modules of coarse sand shall not be less than 2.5 and shall not exceed 3.0. The sieve analysis of coarse sand be as under :
- 3.2 FINE SAND : The fineness modules shall not exceed 1.0 the sieve analysis of fine sand be as under:
- 3.3 Materials shall be stored as to prevent their deterioration of their quality and fitness for the work. Any material which has deterioration or has been damaged or is otherwise considered defective by the Engineer in charge shall not be used in the work.
- 3.4 WATER PROOFING COMPOUND Water proofing compound shall be of approved quality and make as approved by Engineer in charge.
- 3.5 CHINA MOSAIC TILE PIECES China mosaic tiles pieces shall be of 50 mm to 90 mm nominal size, tiles pieces shall be made from hard and good quality of tiles.
- 3.6 WHITE CEMENT White cement shall be of approved make it shall confirm definition of I.S. 8042-E-1978 the sample of white cement shall be approved by Engineer in charge.

4.0 WORKMANSHIP

- A. First of all surface of the entire terrace shall be cleaned by thoroughly brooming and then by wire brushes. All the loose material, dust and debries shall be removed thoroughly from the entire surface of the terrace. All joints and cracks shall be racked off and cut in trench which shall be filled by neat cement slurry admixed with water proofing compound. The joints with parapet shall be racked up to 30 cm height and shall be applied by neat cement slurry admixed with water proofing compound. Neat cement slurry shall be prepared and a water proofing compound of

approved make shall be mixed with the slurry in proportion specified by the manufacturer of the compound and shall be laid through out the surface of the terrace by the use of brushes mala etc. Cement slurry shall be prepared by adding adequate quantity of water so as to spread it uniformly on the surface.

- B. 50mm thick Cement concrete 1:2:4 (1 part of cement and 2 part of coarse sand 4 part of coarse aggregate nominal 20mm) by volume admixed with water proofing compound of approved make in specified proportion). Of specified thickness shall be laid (Specification of C.C. 1:2:4 shall be followed for the execution of this layer) all over the surface of the terrace in true level and required slope including rounding of junctions of walls and slabs.
- C. After two days of proper curing applying a second coat of cement slurry on entire surface of the terrace.
- D. The entire surface shall be finished with 20 mm thick C.M. 1:3 and China mosaic tilling in true level and slope as directed by Engineer in charge and finally finishing the surface with trowel with white cement slurry (Specification of white glazed tiles flooring shall be followed for the execution of this item).
- E. Finishing the surface with 20 mm thick C.M. 1:3 and China mosaic tilling and finally finishing the surface with trowel with white cement slurry.
- F. After two days proper curing the terrace shall be flooded for 15 days.

5.0 MODE OF MEASUREMENT AND PAYMENT

- 5.1 The unit rate of flooring shall include the cost of all materials, tools and plant required for mixing, laying of base layer in true level and slope as required applying and placing broken pieces of china mosaic tile in position, compacting, finishing, curing, providing treatment of 30 cm high allover the length of parapets and corners and sill of doors etc. and all other incidental expenses for producing flooring work to complete the structure of its components as shown on the drawings and according to these specifications. They shall also include the cost of making, fixing of all scaffolding and forms required for the work. The rate of plastering shall include the cost of all labour, materials, tools and plants, scaffolding and all incidental expenses as described herein above.
- 5.2 The water proofing treating work shall be measured for its length and width, limiting dimensions to those specified on plan or as directed. The rate shall be for a unit of one Square Meter.
- 5.3 A guarantee bond on appropriately stamped paper shall be given by the contractor to the Department in the manner and form prescribed below.
- 5.4 The payment will be made on Square Meter basis of the finished work.
- 5.5 **MODE OF MEASUREMENT AND PAYMENT** The length and breadth shall be measured correct to cm. as per the dimension of the sanctioned plants. No deduction shall be made not extra for paid for any opening for pipes etc. upto 0.1 sq.mt. The rate shall include the cost of all labour and materials required for the operation involved. For satisfactory completion of work & measurement shall be paid on unit of Sq.m. of finished work

DTS No.34:-

Providing and laying polished Kota stone slab flooring over 20mm (Average) thick base of cement mortar 1:6 (1-cement : 6-coarse sand) or L.M. 1.1.5 (1-Lime putty :1.5 - coarse sand) laid over and jointed with grey cement slurry mixed with pigment to match the shade of slab including rubbing and polishing etc. complete. (A) 25mm thick

- 1.0 **Materials :-**
Water shall confirm to M-1, Lime Mortar shall confirm to M-10, Cement Mortar shall confirm to M-11, Polished Kota Stone shall confirm to M-49,
- 2.0 **Workmanship :-**
- 2.1 Each slab shall be cut to the required size and shape and fine chisel dressed at all the edges. The sides thus dressed shall have a full contact if a straight edge is laid along. The sides shall be table rubbed with on coarse sand before paving. All angles and edges of the slabs shall be true square and free iron chipping and giving a plane surface. The thickness shall be as specified in the item.

- 2.2 Bedding for the kotah stone slabs shall be cement mortar 1:6 [1 cement : 6 coarse sand] or L.M. 1:1.5 of thickness 20 mm as given in the description of the item. Subgrade shall be cleaned wetted and mopped. Mortar of the specified mix and thickness shall then be spread, on an area sufficient to receive one kotah stone slab. The slab shall be washed clean before laying. It shall be laid on top, pressed, tapped gently to bring it in level with the other slabs. It shall then be lifted and laid aside. Top surface of the mortar shall then be corrected by adding fresh mortar in hollows or depressions. The mortar then be allowed to harden bit. Over this surface, cement slurry of honey like consistency shall be applied. The slab shall then be gently placed in position and topped with wooden mallet till it is properly bedded in level with and close to the adjoining slab. The joint shall be as fine as possible. The slab fixed in the floor adjoining the wall shall enter not less than 10 mm. under the plaster, skirting or dedo. The junction between the wall and floor shall be finished neatly. The finished surface shall be in true levels and slopes as directed.
- 2.3 The floor shall be kept wet for a minimum period of 7 days so that bedding and joints set properly.
- 2.4 Polishing shall be normally commenced after 14 days of laying the stone slab. First polishing shall be done with carborundum stone, of 120 grade grit fitted in the heavy machine and then second polishing shall be done with carborundum stone 220 to 350 grade grit fitted in heavy machine. Water shall properly be used during polishing. The stone shall then be washed clean with water. When directed by the Engineer-in-charge wax polish of approved quality shall be applied on the surface with the help of soft cloth over clean and dry surface then the polishing machine fitted with beds shall be run over it.
- 2.5 The holes required for Nahni traps, pipes and any other fitting shall be made without extra cost.
- 3.0 Mode of Measurements & payments:-
The rate shall include the cost of all materials and labour involved in all the operations described above. The kotah stone flooring shall be measured in square metres correct to two places of decimal, length and breadth shall be measured correct to a centimeters and between the finished face of skirting dedo or wall plaster and no deduction shall be made nor extra paid for opening in floor of areas upto 0.1 Sq.Mt.
The rate shall be for a unit of one sq.metre.

DTS No. 35 :-

Providing and laying polished kota stone slab 25mm thick in risers of steps, skirting Dedo and pillars laid on 10mm thick cement mortar 1:3 (1- Cement : 3 coarse sand) and jointed with gray cement slurry mixed with pigment to match the shade of slab including rubbing and polishing etc. complete

- 1.0 Materials :-
Water shall conform to M-1. Lime mortar shall conform to M-10 cement mortar shall conform to M-11 polished kota stone shall conform to M-49 and consider 25mm th.
- 2.0 Workmanship :-
- 2.1 Each slab shall be cut to the required size and shape and fine chisel dressed at all the edges. The sides thus dressed shall have a full contact if a straight edge is laid along. The sides shall be table rubbed with on coarse sand before paving. All angles and edges of the slabs shall be true square and free iron chipping and giving a plane surface. The thickness shall be as specified in the item.
- 2.2 Bedding for the kotah stone slabs shall be cement mortar 1:3 [1 cement : 3 coarse sand] of thickness 20 mm as given in the description of the item. Subgrade shall be cleaned wetted and mopped. Mortar of the specified mix and thickness shall then be spread, on an area sufficient to receive one kotah stone slab. The slab shall be washed clean before laying. It shall be laid on top, pressed, tapped gently to bring it in level with the other slabs. It shall then be lifted and laid aside. Top surface of the mortar shall then be corrected by adding fresh mortar in hollows or depressions. The mortar then be allowed to harden bit. Over this surface, cement slurry of honey like consistency shall be applied. The slab shall then be gently

- placed in position and topped with wooden mallet till it is properly bedded in level with and close to the adjoining slab. The joint shall be as fine as possible. The slab fixed in the floor adjoining the wall shall enter not less than 10 mm. under the plaster, skirting or dado. The junction between the wall and floor shall be finished neatly. The finished surface shall be in true levels and slopes as directed.
- 2.3 The floor shall be kept wet for a minimum period of 7 days so that bedding and joints set properly.
 - 2.4 Polishing shall be normally commenced after 14 days of laying the stone slab. First polishing shall be done with carborundum stone, of 120 grade grit fitted in the heavy machine and then second polishing shall be done with carborundum stone 220 to 350 grade grit fitted in heavy machine. Water shall properly be used during polishing. The stone shall then be washed clean with water. When directed by the Engineer-in-charge wax polish of approved quality shall be applied on the surface with the help of soft cloth over clean and dry surface then the polishing machine fitted with beds shall be run over it.
 - 2.5 The holes required for Nahni traps, pipes and any other fitting shall be made without extra cost.
 - 3.0 Mode of Measurements & payments:-
The rate shall include the cost of all materials and labour involved in all the operations described above. The kotah stone flooring shall be measured in square metres correct to two places of decimal, length and breadth shall be measured correct to a centimeters and between the finished face of skirting dado or wall plaster and no deduction shall be made nor extra paid for opening in floor of areas upto 0.1 Sq.Mt.
The rate shall be for a unit of one sq.metre.

DTS No. 36 :-

Apply two coats of putty and two coats of primer of approved brand and manufacture on new wall surface to give an even shade including thoroughly brushing the surface free from mortar dropping and other matter and sand papered smooth.

General :

Scope of work includes cleaning off the entire surface, remove all loose particles, dust, scale, smoke, grease from the surface, sand the surface with Emery paper 180 and wipe clean, applying 2 coats of white birla putty.

Material:

manufacturer's standard guide line Putty Make.

Workmanship:

The Putty shall be of approved brand. Plaster filler to be used for filling up uneven surfaces, small cracks and holes etc and it should be done as per the manufacturer's standard guide line. The whole process of paint required 2 times sand with 180 emery paper wipe off and 1 time sand with 320 emery paper wipe off.

Mode of measurement:

All the measurement shall be taken on net surface area actually painted, deduction will be made from the area for fixtures, grills, ventilation, elect boxes and such obstructions not painted, if they are individually more than 0.05 sq.m.

Rate :

Rate is to include for All materials of putties, sand paper, etc with labour required for scaffolding, cleaning off the surfaces, cleaning the site after completion of job, etc as directed by engineer in charge. Rate is for the net surface area of Painted surfaces in Square metre.

DTS No. 37 :-

Wall painting (two coats) with plastic emulsion paint of approved brand and manufacture on undecorated wall surface to give an even shade including thoroughly brushing the surface free from mortar droppings and other foreign matter and sand papered smooth.

Material:

The brand of the paint shall be as specified and ready made paint of the required colours shall be used. If thinning is required pure potable water may be added to the required extent. The water used for thinning should be pure and free from floating or suspended debris. It should be free from any of impurity.

Workmanship:

The surface shall be made perfectly dry and smooth by rubbing with sand paper of the different grades. All holes and open joints in wood or walls shall be filled with strong putty or with a mixture of glues and plaster of paris and smoothened by rubbing with fine grade sand paper.

All the surface should be first painted with cement primer of approved over which three/two coats of Acrylic emulsion of approved quality and make to be applied so as to give smooth finished surface. The shade of the Acrylic Emulsion shall have to be get approved from the Engineer-in-charge or his representative.

The paint shall be applied with brushes evenly and smoothly. The paint should be stirred in the container immediately before use. The whole work shall have to be carried out to the entire satisfaction of the Engineer-in-charge or his representative.

Patch work or different in colour shades will not be tolerated in such case, extra one coat shall have be applied for which not extra payment shall be made.

Item includes preparation of base, scaffolding using every thing and dismantled with labour, materials, tools, paints required for satisfactorily completion of work.

Rate :

Rate is to include for All materials of putties, sand paper, etc with labour required for scaffolding, cleaning off the surfaces, cleaning the site after completion of job, etc as directed by engineer in charge. Rate is for the net surface area of Painted surfaces in Square metre.

DTS No. 38 :-

Providing and fixing precast Rubber Dye moulded TECTILE concrete flooring tiles, 25 to 30mm avg. thick with grade of concrete M250 pneumatic compressed and Mechanically vibreted and as per approved design over 20mm thick bed of cement mortar 1:6 jointed with neat cement slurry with pigment to match the shade of tiles in proper line & level etc.complete..

1.0. Materials

Water shall conform to M-1. Cement shall conform to M-2. Sand shall conform to M-6. Lime mortar 1:1.5 shall conform to M-10. Cement shall conform to M-11. Tiles shall conform to M-47 (A) cement concrete tiles shall conform to I.S. 1237-1959 and pigments to be admixed with mortar or for grouting shall conform to I.S. 2114-1962

2.0. Workmanship

- 2.1. The tiles shall be laid on the sub-grade of concrete of the R.C.C. slab. Bedding shall be in the mortar 1:1.5 or cement mortar (1:6). The amount of water added shall be minimum required for sufficient plasticity and workability C.M. or lime mortar where the ingredients shall be thoroughly mixed dry hard lumps removed and water added to give a good workability.
- 2.2. The base shall be cleaned of all dust, dirt and scum and properly wetted without allowing water pools. For a bedding of cement mortar shall be then spread evenly over the base of two rows of tiles and three to five meters in length. The top shall be kept rough so that cement slurry can be absorbed. The thickness of the bedding shall be not less than 10 mm. at any place. The laying of tiles shall be commenced with neat cement slurry of honey-like consistency and shall be spread over the mortar bed over an area sufficient to receive about 20 tiles. The tiles shall then be fixed in this grout one after the other, each tile being gently tapped and properly bedded in line and level with the adjoining tiles. The joints shall be as narrow as possible and normally shall not exceed 1.5 mm. After the day's work the excess cement slurry on top shall be cleaned as also the joints with a broom struck and washed before the slurry sets hard. Next day the joints shall be filled with the cement grout of the same shade as the matrix of the tiles. Tiles which are fixed in the floor adjoining the wall shall

go a minimum of 10 mm. under the wall plaster, skirting or dedo. For the purpose, plaster etc. may be left unfinished by about 50 mm. above the proposed finished level of the floor. The unfinished strip shall be plastered after laying the floor tiles. Where full tile cannot be used, tile shall be cut to the size to be used.

2.3. The flooring shall be cured for 7 days.

3.0. Mode of measurements and payment

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

3.2. The rate shall be for unit of one sq. meter.

DTS No. 39 :-

Providing & fixing U-PVC pipes Confirming to IS no. 13592 (Type "A") of Prince/Supreme/Jain/Astral/Tulsi/Finolex make for rain water at all floor levels incl. fixtures like bends, tees, shoe etc joined with resin of approved brand & manufacture etc. comp. (M.R.) (B) 110 mm. Dia.

1.0 MATERIALS :

The specified dia. P.V.C. spigot and socket soil or waste pipe shall conform M-68-A.

2.0 WORKMANSHIP :

2.1.0 The P.V.C. spigot and Socket soil or waster pipe shall be joint as per following procedure.

2.1.1 Cut the P.V.C. pipe with a fine to the saw to the required lenth pipe should be cut square.

2.1.2 Chamfer the edge of the pipe to be inserted at an angle of about 15 to about 1/3 rd. the wall thickness, using a coarse file.

2.1.3 Make sure the spigot and socket are the roughly clean and dry.

2.1.4 Insert the pipe into the socket without the seal ring and mark along the pipe, when it is fully inserted.

2.1.5 Fix the rubber ring into the groove without rtwisting it.

2.1.6 Apply jointing lubricant to the chanfered end of the pipe, upto the make made on spigot or to the socket end of the fitting.

2.1.7 Push the pipe firmly into the socket till the gap between the mark on the sprigot and socket is about 10mm to allow for thermal expansion.

2.2.0 The pipe clips should be spaced at intervals of no more then ten times the outsidde diameter of pipes for horizontal runs & for vartical lines are spaced at intervals of one meter to a maximum of two moters according to pipe diameter.

2.3.0 All entry to main stacks should be protected with minimum 50mm water seal trap. Wherever there is mixing of soil & waste lines.

2.4.0 Smoke just should be avoided and test plug/ socket plug should be used for testing the lines.

2.5.0 All soil pipes shall be carried up above the roof and shall have a wire ballon guard or a cowl.

2.6.0 The vantilation pipe or shaft shall be carried out to a height of atleast one metre above the outer covering of the roof of the building or in the case of windows in a gable wall or a dormer two meters above the top of the windows. In case of flat roof to which access for use is provided, it shall be carried out upto a height of atleast one meter above the parapet or two meters measured vertically from the top of any windows or opening which may exist upto a horizontal distance of five meters from the vent pipe into such building and in no case shall be carried out to a height less than three meters.

2.7.0 Where ventilating pipes are carried in pipe shafts, the shafts, shall be of a minimum size of one meter. If the shafts are also used to give light and air to rooms, the ventilating pipes must be carried out to a horizontal distance at roof level not less than five meter from the site of the saft.

- 2.8.0 The connection between the main pipe and branch pipes shall be made by using branches and bends with access doors for cleaning.
- 2.9.0 The waste from lavatories, kitchens basins, sinks, baths and other floor traps shall be separately connected to respective stacks of upper floors. The waste stack of lavatories shall be connected directly to main hole while the waste stack of other shall be separately discharged over gully trap.

3.0 MODE OF MEASUREMENTS & PAYMENT :

- 3.1 The length of pipe shall be measured including all fittings along its length in running meters correct to a centimetre. No allowance shall be made for the portion of pipe length entered in the sockets of the adjacent pipe or fittings.
- 3.2 The rate includes all labour and materials, tool and plant etc. required for satisfactory completion of this item.
- 3.3 The rate shall be for a unit of one running metre.

DTS No. 40 :-

Providing & fixing G.I./Aluminum Patti clamps at all floor levels of approved design to C.I. Or S.C.I pipes including the cost of cutting holes & making good the wall etc. Complete - 100 mm. dia.

1.0 MATERIALS :

The clamps shall be G.I.M.S. sheet/Aluminium sheet 3 mm. bent to required shape and size so as to fit tightly on the socket of pipe when tightened with screw bolts.

2.0 WORKMANSHIP :

The clamps shall be fixed to the walls. The clamps shall be kept above 25 mm. clear of finished face of wall so as to facilitate cleaning and painting the pipes

3.0 MODE OF MEASUREMENTS & PAYMENT :

The work shall be measured on number basis of clamps prescribed with accessories including cost of all materials and labour involved in all the operation including jointing etc. complete fixing in position etc. complete.

The rate shall be for a unit of one number.

DTS No. 41:-

Providing & Fixing Kathi around the vertical PVC drainage pipes for concealing with cement plaster 20 mm avg thickness(CM 1:3 [1 cement :3 coarse sand]) finishing as per instruction given by Eng. incharge. For (B) 100 mm /110 mm PVC PIPE

1.0 Materials :-

Water shall confirm to M-1,Lime Mortar shall confirm to M-10,Cement Mortar shall confirm to M-11,Kathi shall be of standers quality and fresh (not too old)

2.0 Workmanship :-

The work shall be carried out as directed. Kathi shall be wound around the pipe through out its complete length including fittings like Tee,Bend etc.The entire pipe shall be covered & no space shall be left to be covered by Kathi.

The cement plaster of 20 mm avg thickness in (CM 1:3 [1 cement :3 coarse sand]) shall be applied finishing as per instruction given by Eng. incharge.

3.0 Mode of Measurements and payment :-

- 3.1 The rate includes cost of all materials and labour required to complete the item.
- 3.2 The rate shall be for a unit of one running metre.

DTS No. 42:-

Providing and fixing stainless steel (Grade 304) railing made of Hollow tubes, channels, plates etc., including welding, grinding, buffing, polishing and making curvature (wherever required) and fitting

the same with necessary stainless steel nuts and bolts complete, i/c fixing the railing with necessary accessories & stainless steel dash fasteners , stainless steel bolts etc., of required size, on the top of the floor or the side of waist slab with suitable arrangement as per approval of Engineer-in-charge, (for payment purpose only weight of stainless steel members shall be considered excluding fixing accessories such as nuts, bolts, fasteners etc.).

1.0 Materials

- 1.1 Material shall be best approved quality obtaining and they shall comply with the respective ASTM specification.
- 1.2 If necessary samples of all material shall be accompanied by the manufactures test certificate or by a recognized test laboratory by vendors own cost.
- 1.3 The vendor shall submit samples of material before supply for our verification form the original raw materials.
- 1.4 Stainless steel shall be austenitic chromium nickel steel, possessing rust, acid and heat resistant properties confirming to IS : 6603 and IS : 6911. Mechanical properties / grade for such stainless steel shall be as specified by the accepting authority, but in grades. AISI 304 which is equivalent to grade 04Cr18Ni10 of IS : 6911 satisfies the requirements of mechanical properties of structural steel. Other grades of stainless steel for specific requirements. For application in adverse / corrosive environment, stainless steel shall confirm to AISI 316L or 02G17 Ni Mo2 of IS : 6911.

2.0 Workmanship

- 2.1 There shall be one vertical per step fixed along the edge of the stair.
- 2.2 The excess welding shall be properly smoothened and burrs removed. The whole railing shall be finished and fixed in true line and level.
- 2.3 All the railing should highly polished after grinding.
- 2.4 After the final finish the railing should be properly rapped by thin polythene.
- 2.5 The nature of railing should be straight or curved as per requirement.
- 2.6 Fixing on the ground should be with SS CSK screw, if necessary anchor fishnet may be used as per requirement.

3.0 TECHNICAL SPECIFICATIONS

- 3.1 Type : SS 304 grade
- 3.2 Size of pipes, 38 mm dia. 25 mm dia (14 guage) – matt polish
SS Hand rail – 50mm dia. Mid rail- 12mmdia Balustrade – 75mm
- 3.3 Nature of railing : the railing may be straight or curved as per requirement.
- 3.4 Manufactured conditions should be are as follows :
A – Annealed
H – Hardened and tempered at a relative low temperature.
T - Hardened and tempered at a relatively high temperature.
S – Stain hardened relatively high cold work.
B – Relatively severe cold work.
- 3.5 The specification covers stainless and heat resisting steel pipes, rods and sheets.

Chemical compositions of stainless steel: Alloy	C	Mn	P	S	Si	Cr	Ni
304	0.08	2.00	0.045	0.030	0.75-1.00	18.00 – 20.00	8.002 – 10.50

- 3.6 Mechanical properties of stainless steel pipes :
a. Type – 304 f. Elongation % in 50 MM - 40

- b. UNS Designation – S 30400 g. Hardness Brielle – 150,
- c. Condition – Annealed h. ASTM Specification – A240
- d. Tensile strength Mpa. – Annealed i. Rust Proof and Non Magnetic.
- e. % Proof strength Mpa. – 205 j. Polished outside.

4.0 Mode of Measurement & payment :

The measurements will be in running meter correct to a cm. The rate shall include all materials and labour involved in all the operations described and specified, including fixing in R.C.C. polishing, etc. complete.

The rate shall be for a unit one Kg.

DTS No. 43:-

Providing and fixing stainless steel (Grade 304) (Flat of size 30mm x 5mm. thick), grill with 10mm. Dia S.S.polished bar etc., including welding, grinding, buffing, polishing and making curvature (wherever required) and fitting the same with necessary stainless steel nuts and etc., of required size as per approval of Engineer-incharge, as per drawing .(for payment purpose only weight of stainless steel members shall be considered excluding fixing accessories such as nuts, bolts, fasteners etc.).

1.0 Materials

- 1.1 Material shall be best approved quality obtaining and they shall comply with the respective ASTM specification.
- 1.2 If necessary samples of all material shall be accompanied by the manufactures test certificate or by a recognized test laboratory by vendors own cost.
- 1.3 The vendor shall submit samples of material before supply for our verification form the original raw materials.
- 1.4 Stainless steel shall be austenitic chromium nickel steel, possessing rust, acid and heat resistant properties confirming to IS : 6603 and IS : 6911. Mechanical properties / grade for such stainless steel shall be as specified by the accepting authority, but in grades. AISI 304 which is equivalent to grade 04Cr18Ni10 of IS : 6911 satisfies the requirements of mechanical properties of structural steel. Other grades of stainless steel for specific requirements. For application in adverse / corrosive environment, stainless steel shall confirm to AISI 316L or 02G17 Ni Mo2 of IS : 6911.

2.0 Workmanship

- 2.1 The grill shall be fabricated using Grade 304) (Flat of size 30mm x 5mm. thick), grill with 10mm. Dia S.S.polished bar
- 2.2 The excess welding shall be properly smoothened and burrs removed. The whole grill shall be finished and fixed in true line and level.
- 2.3 All the grill should highly polished after grinding.
- 2.4 After the final finish the grill should be properly rapped by thin polythene.
- 2.5 Fixing on the ground should be with SS CSK screw, if necessary anchor fishnet may be used as per requirement.

3.0 Mode of Measurement & payment :

Weight of stainless steel members only shall be considered excluding fixing accessories such as nuts, bolts, fasteners etc.

The rate shall be for a unit one Kg.

DTS No. 44:-

Providing & fixing in position collapsible steel shutters with vertical channels 20 x10 x 2 mm. Braced with flat iron diagonals 20 x5mm size with top & bottom rails of T-iron 40x40x6mm. with 38mm dia. steel pulleys comp. with bolts, locking arrangements, stoppers, handles incl. applying a priming coat of Redlead paint etc. comp.

1.0 MATERIALS :

The collapsible steel gate shall conform to M-33.

2.0 WORKMANSHIP :

Rails shall be fixed to the floor and to the lintel at top by means of anchor bolts, embedded in cement concrete of floor and lintel. The anchor bolts shall be placed approximately at 45 mm. centers alternatively in the two flanges of the T-Iron. The bottom runner (T-Iron) shall be embedded in the floor and proper groove shall be formed along the runner for the purpose. The collapsible gate shall be fixed at the sites by fixed the end double channels in the T-Iron rail and also by holdfasts bolted to the end double channel and fixed in the masonry of the side walls or the otherwise.

In case where the collapsible gate is not require to the lintel, beams or slab above a tee iron suitable design may be fixed at the top embeded in masonry and provided mason with necessary clamps and roller agangement at the top.

All the adjoining work damaged while fixing of gate shall be made good to match the existing work without any extra payment.

All members of the collapsible gate including T-Iron shall be throughly cleaned to rust, scales, dust etc. and given a priming coat of red lead, before fixing them in position.

3.0 MODE OF MEASUREMENTS & PAYMENT :

The collapsible gate shall be measured in sq.mt.. The hight of the gate shall measured as the length of double channels and breadth from outside to outside of the end fixed double channels in open position of the gate. The rate including providing handles, locking arrangements, stoppers etc.

The rate shall be for a unit of one sq. metre.

DTS No. 45:-

Providing and fixing of 8 mm thick toughned GLASS DOORS using 75 mm C-channels in border and edge profile in between with powder coating with using Dorma XI-C 4001 Glass Door PKG EN 3 (Top Patch-1, Bottom patch-1, Heavy duty Floor Spring-1, Corner Lock-1); Dorma XI-C 4003 A Patch fitting for overpanel and sidelight; Dorma XI-C 4004 A Connector for overpanel and Sidelight; Dorma XI-C 4006 Central Connector; Dorma XI-C 4008 Side Connector; Dorma XI-C 3000 H Type Handle 400x22 CTC 300 AND AS PER DRAWING including all acccessories,locks, material, silicone,labour,installation, Hole & slote charges etc. and complete the work satisfactorily as per instruction of architect or Engineer-in charge.

1.0 Materials

- 1 8 MM GLASS TOUGHNED with Edge Polish
- 2 SLOTE & hole in 12 MM GLASS TOUGHNED as required
- 3 Dorma XI-C 4001 Glass Door PKG EN 3 Top Patch-1, Bottom patch-1, Floor Spring-1, Corner Lock-1
- 4 Dorma XI-C 4003 A Patch fitting for overpanel and sidelight
- 5 Dorma XI-C 4004 A Connector for overpanel and Sidelight
- 6 Dorma XI-C 4006 Central Connector
- 7 Dorma XI-C 4008 Side Connector
- 8 Dorma XI-C 3000 H Type Handle 400x22 CTC 300
- 9 Frosted film as per selection,including cutwork

2.0 Workmanship

entire work to be carried out as per drawings,instructions and supervision of the architect

3.0 Mode of measurement & Payment

The rate shall be consolidated for all above items including wastage. The rate shall include cost of all materials,fixtures, joineries,transport,FITTING CHARGE, cutting of flooring tiles or granite etc. & labour to complete the work satisfactorily as per instruction of Engineer-in charge.

No Extra payment will be given for any of the reasons.

The rate shall be for a unit of one number, including wastage.

DTS No. 46:-

Providing and constructing sandwich type Granite stone working platform 0.6 mt. wide & 0.75 mt. height, including one end side granite stone (Double Polish) of 1.25 mt. height & front granite stone patti of 10 cm wide, vertical partitions of half B.M. wall in C.M. 1:4 and 10mm th. plaster in 1:3 with finishing smooth with cement slurry as required etc. comp as per instruction given by site in charge at all floors. (Basic rate of Granite Rs.1,200.00 / S.M.)

1.0 MATERIALS

1.1 Flyash Building Brick shall conform to M-15, Water shall conform to M-1, Cement shall conform to M-3, Sand shall conform to M-6, Cement mortar shall conform to M-11, Granite shall conform to M-52

2.0 WORKMANSHIP

2.1 Relevant specifications of bricks, wetting and laying of bricks, joints, curing etc. shall conform to item No.13 except the brick work of half bricks shall be carried out.

2.2 Cement mortar used in masonry work shall be in proportion of 1 part of cement and 4 parts of sand by volume.

2.3 All bricks shall be laid stretcher wise, breaking joints with those in the upper and lower courses. The wall shall be taken truly plumb. All courses shall be laid truly horizontal and all vertical joints shall be truly vertical. the bricks shall be laid with frogs upwards. A set of masons tools shall be maintained on work as required for frequent checking.

2.4 Cement mortar used in 10mm. thick plaster work shall be in proportion of 1 part of cement and 3 parts of sand by volume.

2.5 Platform top shall be 0.6m. wide and 0.75m high including one end side granite stone (Double Polish) of 1.25 mt. height & front granite stone patti of 10 cm wide,

Detailed specification same as per item description and as directed by Engineer-in-charge.

Work shall be executed as per detail drawing.

The rate shall be for a unit of one Running metre.

DTS No. 47:-

Providing and fixing 8mm thick glass of approved make including toughening, edge diamond polishing, making necessary holes in glass, supporting system of good quality SS accessories of Ozone make ("D" clamp fittings) and joints to be filled where necessary by clear structural silicon sealant as specified by Engineer in Charge.

1.0 Materials

1 Hardware (Nail/Screw/silicon/U Channel/EPDM gasket etc) of approved quality

2 8 MM GLASS TOUGHED of AIS,sain gobain or modiguard with edge polish

3 18 to 25 mm black u channel as per detail

4 Frosted film as per selection,including cutwork

2.0 Workmanship

entire work to be carried out as per drawings,instructions and supervision of the architect

3.0 Mode of measurement & Payment

The rate shall be consolidated for all above items including wastage. The rate shall include cost of all materials,fixtures, joineries,transport,FITTING CHARGE, cutting of flooring tiles or granite etc. & labour to complete the work satisfactorily as per instruction of Engineer-in charge.

No Extra payment will be given for any of the reasons.

The rate shall be for a unit of one Square meter, including wastage.

DTS No. 48:-

Fire extinguisher - CO2 Gas type 4.5 kg. Supply, installation and testing of CO2 Gas fire extinguisher with necessary hardware and consumables. Standard - Confirming to IS:15683-2006 with ISI mark. UOM - Price per each No. Make - Kanex / Safex / Secure Zone

Same as per item description and as directed by Engineer-in-charge.
The rate shall be applied per number.

DTS No. 49:-

Fire extinguisher - ABC powder type 6 Kg. Supply, installation and testing of ABC powder fire extinguisher necessary hardware and consumables. Stored pressure mechanism. Charged with MAP-50% (ABC) Dry powder. with wall mounting clamp. UOM - Price per each No. Make - Kanex / Safex / Secure Zone

Same as per item description and as directed by Engineer-in-charge.
The rate shall be applied per number.

DTS No. 50:-

Providing and fixing 3-sitter S.S. Bench made of 32mm x 5mm thick S.S. Flat (SS 304 Grade) with top seating arrangement made of Polished Indian teak wood Sleeper of section size 200 mm x 25mm(W x H),and fixing the bench at the specified location as per detail drawing and instruction of architect or Engineer-in charge.

Detailed specification same as per item description and as directed by Engineer-in-charge
The rate shall be for a unit of **One Number**.

DTS No. 51:-

Providing and fixing of cement ceiling using 10 mm cement sheet of brand T.P.I,SHERA (single sides), etc. using aluminium framing of 25mm x 50mm x 1 mm in 600 x 600 mm grid,and same pipe for vertical framing, including all hardware item, aluminium L clits, 25 mm powder coated self drilling screws,groove (if shown) with all material, 75 mm anchor fastners,making of coves for indirect lighting, grooves,cutting ,labour,SCAFFOLDING, lead and wastage etc. complete. And Finished with satin finish wall color and complete the work satisfactorily as per instruction of architect or Engineer-in charge.

1.0 Materials

- 1 Aluminium Pipe for frame work (2"X2") of approved quality
- 2 Hardware (Nail/Screw) of approved quality
- 3 10 MM cement sheet of brand TPI or SHERA and fastners including scaffolding

2.0 Workmanship

entire work to be carried out as per drawings,instructions and supervision of thearchitect

3.0 Mode of measurement & Payment

The rate shall be consolidated for all above items including wastage. The rate shall include cost of all materials,fixtures, joineries,transport,FITTING CHARGE, cutting of flooring tiles or granite etc. & labour to complete the work satisfactorily as per instruction of Engineer-in charge.

No Extra payment will be given for any of the reasons.

The rate shall be for a unit of one Square meter, including wastage.

Detailed specification same as per item description and as directed by Engineer-in-charge
The rate shall be for a unit of **Square Meter**.

DTS No. 52:-

Steel work welded in built up sections, framed work including cutting, hoisting, fixing in position and applying a priming coat of red lead paint (A) in beams & joists channels angles, tees, flats with connection plates or angle cleats as in main & cross beams,hip & trussed purlins connected to common raffers & the like

LAYING OUT :

The steel structures, as shown in the drawings or as per directions of the Engineer-in-charge, shall be laid out on a level platform to full scale and to full size in parts. A steel type shall be used for measurements to ensure maximum accuracy.

Wooden templates 12 mm to 19 mm thick or steel templates shall be made to correspond to each connecting gusset plate and rivet holes shall be accurately marked on them and drilled. The templates shall be laid on the steel members and holes for rivetting and bolting marked on them. The ends of the steel members shall also be marked for cutting. The base of steel columns and the position of anchor bolts shall be carefully set out.

FABRICATION :

The steel sections as specified shall be straightened and cut square and accurately to correct lengths. The cut ends exposed to view shall be finished smooth. No. two pieces shall be welded or otherwise jointed to make up required length of a member except as indicated in the drawing or otherwise specifically permitted by the Engineer - in - charge. All straightening and shping to form shall be done by application of pressure and not by manning. Any bending or cutting shall be carried out in cold condition (unless otherwise directed) in such a manner as not to impair the strength of the metal.

All stiffeners shall be formed by pressure, and where practicable, the metal shall not be cut and welded in making these. In major works or where so specified, shop drawings giving complete details and information for the fabrication of the component parts of the structure, including the locating, type, size, length and details of rivets, bolts or welds shall be prepared in advanced of the actual fabrication and approved by the Engineer-in-charge. The drawing shall indicate the shop and filed rivets, bolts and welds. The steel members shall be distinctly marked or stencilled with paint with the identifica- tion marks as given in the shop drawings.

The bars shall be thickned at the ends so as to provide for screwed threads and gradually tapered off to meet their normal section.

Great accuracy shall be observed in the fabrication of various members. Do that these can be assembled without being unduly packed strained or forced into position and when built-up shall be true and free from twists, bricks buckles or open joints.

Before making holes in individual mambers, for fabrication the steel work intended to be rivetes or bolted to gather shall be assembled or clamped properly and tightly so as to ensure chose abutting or lapping of the surface of the different members. All stiffeners shall be tightly both at top and bottom without being drawn or caulled. The abutting joints shall be cut of dressed true and straight and fitted close together,

We splice plates and fillers under stiffeners shall be cut to fit within 3 mm of flange angles. We plated or girders which have no cover plates shall have their ends flush with the top of angles forming the flangesunless otherwise required. The we plates,when spliced shall have clearance of not more than 6 mm.

The erection clearance for cleated ends of members connecting steel to steel preferably be not grater than 1.5 mm. The erection clearance at the ends of beams without web cleats shall not be more than 3 mm. at each end but where for prectical reasons, greather cleance is necessary, suitably designed seating shall be provided.

Pins and rollers shall be accurately turned to gauge. These shall be straight and smooth and free from flaws. The roller bearing shall be provided with adequate arrangement for holding the girders or truss resting on it, from lateral displacement.

Expension bed plates shall be planed true and smooth. The planning of bed plates shall be done in the direction of the movement of the girder or truss resting on it.

Column splices and but joints of struts and impression members depending on contract for trees transmission shall be accurately machined and closebutted over the whole section. In column caps and bases, the ends of shafts together with the attached gussets, angles, channales etc. after riveting together shall be accurately machinised so that the parts connected but against each other over the entire surface of contract. Connecting angles or channels shall be fabricated and placed in position with great accuracy so that they are not unduly reduced in thickness by machining.

The ends of all bearing stiffeners shall be machined or ground to fit tightly both at the top and bottom.

All holes shall generally be drilled to the required size and at the required position. Sub-punching shall be permitted, provided it is done 3 mm. less in diameter and reamerred thereafter to the required size.

Holes for rivets and black bolts shall be large by 0.4 to 6 mm. as shown in appendix-I under column "Coarse" than the nominal diameter of the rivets or black bolts depending upon the dia of rivets. Holes for turned and fitted bolts shall be drilled or reamed large by 0.2 to 3 mm. depending upon the dia of bolts as shown in Appendix under column "Medium".

When the number of plates or sections to be riveted together exceeds three or when their total thickness is 90 mm or more, holes shall be drilled or reamed in position, after the members are assembled and the parts firmly hold together by clamps. Before riveting or bolting up or welding finally. The members shall be taken part and all burns removed.

Holes shall have their axis perpendicular to the surface bore through. The drilling or reaming shall be free from burrs and the holes shall be clean and accurate.

The work or fabrication shall be completed in the workshop as far as it is practicable to do so. Site jointing shall be done with rivets or turned and fitted bolts, or black bolts or welding as shown in drawings or as directed by the Engineer-in-charge. Generally, the following principles shall govern the use of rivets, turned and fitted bolts and black bolts :-

[i] Rivets or turned and fitted bolts shall be used where the connection is such that slip under load has or be avoided.

[ii] Black bolts may be used very sparingly where a force is carried through a connection without impact, vibration or reversal of stresses (unless such reversal is due to wind forces.)

In the case of welding, holes shall only be made for the bolts used for temporary fastening as shown in drawings.

WELDING :

Welding shall be generally be done by electric process. The electric arc method being economical, is usually adopted. Where public electricity is not available, a suitable generator shall be arranged. Gas welding shall be resorted to using oxyacetylene flame with specific prior approval of the Engineer-in-charge.

Gas welding shall not be permitted for structural steel work. Gas welding requires heating of the members to be welded along with the welding rod and is likely to create temperature stresses in the welded members. Precautions shall therefore be taken to avoid distortion of the members due to these temperature stresses.

The work shall be done as shown in the shop drawings which should clearly indicate various details of the joints to be welded, type of welds, shop and site welds, as well as the types of electrodes to be used. Symbols for welding on plans and shop drawings shall be according to IS : 813-1061. As far as possible, every effort shall be made to limit the welding that must be done after the structure is erected so as to avoid the improper welding that is likely to be done due to heights and difficult positions of scaffolding etc. as a part from the aspect of economy.

PREPARATION OF SURFACE :

Surfaces which are to be welded together, shall be free from loose mill-scale, rust, paint, grease or other foreign matter. A coating of boiled linseed oil shall be permitted.

PRECAUTIONS :

All operations connected with welding and cutting equipment shall conform to the safety requirements given in IS : 818-1968 for "Safety and Health requirements in Electric and Gas welding and Cutting Operations".

The following points shall be borne in mind during the process of welding :-

[a] Welds shall be made in the flat position. Wherever practicable.

[b] Arc length, voltage and amperage shall be suited to the thickness of materials, type of groove and other circumstance of the work.

[c] The sequence of welding shall be such that where possible, the members which offer the greatest resistance to compression are welded first.

All defective welds which shall be considered, harmful to the structural strength shall be cut out and rewelded.

Finished welds and adjacent parts shall be protected with clean boiled linseed oil and after all slag has been removed. Welds and adjacent parts shall be painted after the same are approved by the Engineer-in-charge.

All the members shall be thoroughly cleaned of rust, scales dust etc. and given a priming coat of lead painting before fixing then in position.

RATE :

The rate shall be for a unit of quintal.

DTS No. 53:-

Providing and fixing 12mm dia Fasternar bolts using HILTI chemical system including all material, labour, equipment required.

Detailed specification same as per item description and as directed by Engineer-in-charge

The rate shall be for a unit of **One Number**.

DTS No. 54:-

Providing and erecting on site 6mm thick colour acrylic sheet with 3M make Defuser film of UV resistant type with graphic profile cut in colour acrylic. The entire surface shall be water proof and air tight with necessary gaskets. The corners shall be properly made. The acrylic to acrylic joints at the corners shall be evenly chamfered before sticking. The item includes necessary hardware to fix the acrylic signage to the MS structure. Do as specified by Engineer in Charge.

1.0 Materials

Acrylic sheets shall be of thickness as specified in the item and of an specified shape and size as the case may be panels may be flat or curved It should be light in weight it shall be colourless or coloured or opaque as specified in the item. Colourless sheet shall be as transparent as the finest optical glass. Its light transmission rate shall be about 95% Transparency shall not be affected for the sheets of larger thickens, it shall be extremely resistant to sunlight weather and low temperatures.

It shall not show any significant yellowing or change in physical properties or loss of light transmission over a longer period of use. The sheet shall be impact resistant also Sheets should be of such quality that they can be cut, bent jointed as desired Solution for the joints shall be used as per the requirement of manufacturer.

2.0 Workmanship

6mm thick colour acrylic sheet with 3M make Defuser film of UV resistant type with graphic profile cut in colour acrylic.

The entire surface shall be water proof and air tight with necessary gaskets.

The corners shall be properly made. The acrylic to acrylic joints at the corners shall be evenly chamfered before sticking

3.0 Mode of measurement & Payment

The item includes necessary hardware to fix the acrylic signage to the MS structure. Do as specified by Engineer in Charge

The rate shall be for a unit of Square Meter.

DTS No. 55:-

Providing and fixing in position 10mm thick acrylic sheet UV resistant as per designs on ETM counters for signages. The acrylic sheet shall be firmly screwed to the M.S. members so as to withstand wind speeds upto 47m/s. The joints of the sheets shall be well champhered and jointed using silicone sealants of Dow corning. The rates shall be inclusive of all kinds of scaffolding, staging, tools, tackles, hardware and adhesives. The work shall be done to the complete satisfaction of the Engineer in charge.the complete satisfaction of the Engineer in charge.

Detailed specification same as per item no-54 above except 10mm. thick sheet shall be used.

The rate shall be for a unit of Square Meter.

DTS No. 56:-

Providing and fixing in position 8mm thick acrylic sheet UV resistant as per designs on ETM counters for signages. The acrylic sheet shall be firmly screwed to the M.S. members so as to withstand wind speeds upto 47m/s. The joints of the sheets shall be well champhered and jointed using silicone sealants of Dow corning. The rates shall be inclusive of all kinds of scaffolding, staging, tools, tackles,

hardware and adhesives. The work shall be done to the complete satisfaction of the Engineer in charge.

Detailed specification same as per **item no-54** above except **8mm.** thick sheet shall be used.

The rate shall be for a unit of Square Meter.

DTS No. 57 -

Providing and installing in position HDPE synthetic Fiber carry rollers of 100mm dia as instructed by Engineer in Charge. The rollers shall have seals which are with labyrinth seal components, non-rubbing polymer seal and attached with dust and water deflectors. The rollers shall be such that they shall have good rolling during impact and shall not damage the body of the bus nor shall get damaged during impact and shall act as a protecting mechanism for the bus and the surface of the bus shelter. The installation of the rollers shall be as per the instructions of the manufacturers. Samples shall be approved prior to installation. Roller shafts shall be made of stainless steel and multi labyrinth seals shall be filled with high grade lubricants.

Detailed specification same as per item description and as directed by Engineer-in-charge

The rate shall be for a unit of **One Number.**

DTS No. 58:-

Providing & Laying Cement concrete guardstone in proportion 1:2:4 (1 Cement : 2 Coarse sand : 4 Graded stone aggregate 20 mm nominal size) & shape as per the drawing including necessary excavation steel form work & white washing etc. complete (cement and steel contractor own supply.) 750 MM X 350 MM X 400 MM Size

Detail Specification for **Cement concrete(1:2:4)** as per item no.10

The rate shall be for a unit of **one Number.**

DTS No. 59:-

Providing & fixing interlocking type Cement Concrete paver block of approved shape & design having 60 mm thickness (M-40) purchased from SMC's approved paverblock manufacturer only on fine sand bedding. Item includes leveling by using vibratory plates compacted machine. Item also includes all materials, Labour, equipments, tools, plants, watering, cleaning etc. complete. For Road Junction 80 mm thick (M-50)

1.0 RAW MATERIAL

1.1 CEMENT:-

The cement used in the manufacture of high quality precast concrete paving block shall be conforming to IS 12269 (53 grade) ordinary Portland Cement or IS 8112 (43 grade ordinary Portland cement). The minimum cement content in concrete used for making paver blocks should be 310 kg/Cu.M. And the upper limit of cement shall not be more than 425kg/Cu.M.

1.2 AGGREGATES :-

The fine and coarse aggregates shall consist of naturally occurring crushed or uncrushed materials which, apart from the grading requirements comply with IS 383-1970. The fine aggregates used shall contain a minimum of 25% natural silicon sand. Lime stone aggregates shall not be used. Aggregates shall contain no more than 3% by weight of clay and shall be free from deleterious salts and contaminants.

1.3 WATER :-

The water shall be clean and free from any deleterious matter. It shall meet the requirements stipulated in IS:456-2000.

1.4 OTHER MATERIALS :-

Any other material/ingredients used in the concrete shall conform to latest IS specifications.

2.0 PAVER BLOCKS CHARACTERISTICS

The concrete pavers should have perpendicularities after release from the mould and the same should be retained until the laying.

The surface should be of anti-skid and anti glare type. The paver should have uniform chamfers to facilitate easy drainage of surface run off.

The pavers should have uniform interlocking space of 2 mm to 3 mm to ensure compacted sand filling after vibration on the paver surface.

The concrete mix design should be followed for each batch of materials separately and automatic batching plant is to be used to achieve uniformity in strength and quality.

The pavers shall be manufactured in single layer only.

Skilled labour should be employed for laying blocks to ensure line and level for laying, desired shape of the surface and adequate compaction of the sand in the joints.

The pavers are to be skirted all round with kerbing using solid concrete blocks of size 100 mm x 200 mm x 400 mm or as directed by the Engineer. The kerbing should be embedded for 100 mm depth. The concrete used for kerbing shall be cured properly for 7 days minimum.

3.0 LAYING OF PAVER BLOCKS :-

3.1 PRIMING :-

It will be responsibilities of the Contractors to ensure that the manhole/pipeline cable trenches/circular drainage system etc. raised to driveway level using the requisite materials as per instruction of Engg. The areas of potholes/deep depressions at the isolated locations also have to be filled up before laying the paver blocks. No extra payments will be made for this purpose.

It will be the responsibility of the Contractors to ensure that undulations on the paver blocks are eliminated after the traffic is allowed on it. Proper slope for drainage of water needs to be ensured by the Contractor. All necessary materials, tools, tackles are required to be arranged by the Contractor.

3.2 BEDDING SAND COURSE :-

The bedding sand shall consist of a clean well graded sand passing through 4.75 mm sieve and suitable for concrete. The bedding should be from either a single source or blended to achieve the following grading.

In Sieve Size	% Passed
9.52 mm	100
4.75 mm	95-100
2.36	80-100
1.18	60-100
600 Microns	25-60
300 Microns	10-30
150 Microns	5-15
75 Microns	0-10

Contractor shall be responsible to ensure that single-sized, gap graded sands or sands containing an excessive amount of fines or plastic fines are not used. The sand particles should preferably be sharp not rounded as sharp sand possess higher strength and resist the migration of sand from under the block to less frequently areas even though sharp sands are relatively more difficult to compact than rounded sands, the use of sharp sands is preferred for the more heavily trafficked driveways. The sand use for bedding shall be free of any deleterious soluble salts or other contaminants likely to cause efflorescence.

The sand shall be of uniform moisture content and within 4%-8% when spread and shall be protected against rain when stock piled prior to spreading. Saturated sand shall not be used. The bedding sand shall be spread loose in a uniform layer as per drawing. The compacted uniform thickness shall be of 45 mm and within +/- 5 mm. Thickness variation shall not be used to correct irregularities in the base course surface.

The spread sand shall be carefully maintained in a loose dry condition and protected against pre-compaction both prior to and following screeding. Any precompacted sand or screeded sand left overnight shall be loosened before further laying of paving blocks take place.

Sand shall be slightly screeded in a loose condition to the predetermined depth only slightly ahead of the laying of paving unit.

Any depressions in the screeded sand exceeding 5 mm shall be loosened, raked and rescreeded before laying of paving blocks.

4.0 LAYING OF INTERLOCKING PAVER BLOCKS :-

Paver blocks shall be laid in herringbone laying pattern throughout the pavement. Once the laying pattern has been established, it shall continue without interruption over the entire pavement surface. Cutting of blocks, the use of infill concrete or discontinuities in laying pattern is not be permitted in other than approved locations.

Paver blocks shall be placed on the uncompacted screeded sand bed to the nominated laying pattern, care being taken to maintain the specified bond through out the job. The first row shall be located next to an edge restraint. Specially manufactured edge paving blocks are permitted or edge blocks may be cut using a power saw, a mechanical or hydraulic guillotine, bolster or other approved cutting machine.

Paver blocks shall be placed to achieve gaps nominally 2 to 3 mm wide between adjacent paving joints. No joint shall be less 1.5 mm not more than 4 mm. Frequent use of string lines shall be used to check alignment. In this regard the "laying face" shall be checked at least every two meters as the face proceeds. Should the face become out of alignment, it must be corrected prior to initial compaction and before further laying job is proceeded with.

In each row, all full blocked shall be laid first. Closure blocks shall be cut and fitted subsequently. Such closer blocks shall consist of not less than 25% of a full blocks.

To infill spaces between 25 mm and 50 mm wide concrete having screened sand, coarse aggregate mix shall be used. Within such mix the nominal aggregate size shall not exceed one third the smallest dimension of the infill space. For smaller spaces dry packed mortar shall be used.

Except where it is necessary to correct any minor variations occurring in the laying bond, the paver blocks shall not be hammered into position. Where adjustment of paver blocks necessary care shall be taken to avoid premature compaction of the sand bedding.

4.1 INITIAL COMPACTION :-

After laying the paver blocks, they shall be compacted to achieve consolidation of the sand bedding and brought to design levels and profiles by not less than Two (2) passes of a suitable plate compactor.

The compactor shall be a high-frequency, low amplitude mechanical flat plate vibrator having plate area sufficient to cover a minimum of twelve paving blocks. Prior to compaction all debris shall be removed from the surface.

Compaction shall proceed as closely as possible following laying and prior to any traffic. Compaction shall not, however, be attempted within one metre of the laying face. Compaction shall continue until lipping has been eliminated between adjoining blocks. Joints shall then be filled and recompacted as described in Cl. 3.5.

All work further than one metre from the laying face shall be left fully compacted at the completion of each day's laying.

Any blocks that are structurally damaged prior to or during compaction shall be immediately removed and replaced.

Sufficient plate compactors shall be maintained at the paving site for both bedding compaction and joint filling.

4.2 JOINT FILLING AND FINAL COMPACTION :-

As soon as possible after compaction and in any case prior to the termination of work on that day and prior to the acceptance of vehicular traffic, sand for joint filling shall be spread over the pavement.

Joint sand shall pass a 2.36 mm (No.8) sieve and shall be free of soluble salts or contaminants likely to cause efflorescence. The same shall comply with the following grading limits.

In Sieve Size	% Passed
9.52 mm	100
4.75 mm	95-100
2.36	80-100
1.18	60-100
600 Microns	25-60
300 Microns	10-30
150 Microns	5-15
75 Microns	0-10

The Contractor shall supply a sample of the jointing sand to be used in the contract prior to delivering any such materials to site for incorporation into the works. Certificates of test results issued by a recognized testing laboratory confirming that the samples conform to the requirements of this specifications shall accompany the sample.

The jointing sand shall be broomed to fill the joints. Excess sand shall then be removed from the pavement surface and the jointing sand shall be compacted with not less than one (1) Pass by the plate vibrator and joints refilled with sand to full depth.

This procedure shall be repeated until all joints are completed filled with sand. No traffic shall be permitted to use the pavement until all joints have been completely filled with sand and compacted.

Both the sand and paver block shall be dry when sand is spread and broomed into the joints to prevent premature setting of sand.

The difference in level (lipping) between adjacent blocks shall not exceed 3 mm with not more than 1% in any 3 m x 3 mm area exceeding 2 mm. Pavement which is deformed beyond above limits after final compaction shall be taken out and reconstructed to the satisfaction of the Engineer.

MODE OF PAYMENT :-

Payment will be made on Sq.mt. of finished work.

DTS No. 60:-

Preparation of subgrade with Compacting, Levelling and consolidation of subgrade with miniroller /plate vibrator machine including watering and filling in depressions which occur during the process as directed by engineer in charge.

Details specification same as per Item description and as instruction by Engineer-in-charge.

The rate shall be for a unit of one Square metre.

DTS No. 61:-

Providing & laying Granular sub base (GSB)confirming to Grading-V of Table 400.0 of compacted thick of 150mm with specified graded stone metal and sand mixed in place and laid with mechanical means spreading with motor grader and compacting with vibratory roller having minimum 80-100 KN static weight to acheve desired density of 98% of MDD including all material, labour, machinery with all leads and lift etc. complete.

1.0 SCOPE

This work shall consist of laying and compacting well-graded material on prepared subgrade in accordance with the requirements of Specifications. The material shall be laid in one or more layers as sub-base or lower sub-base and upper sub-base (termed as sub base hereinafter) as necessary according to lines, grades and cross sections shown on the drawings or as directed by the Engineer.

2.0 MATERIALS

2.1 The material to be used for the work shall be natural sand, gravel, crushed stone, or combinations thereof depending upon the grading required. The material shall be free from

organic or other deleterious constituents and conform to grading (given below). While the gradings in Table -1 are in respect of close-graded granular sub-base materials, one each for maximum particle size of 75 mm, 53 mm and 26.5 mm, the corresponding gradings for the coarse-graded materials for each of the three maximum particle sizes are given at Table -2. The grading to be adopted for a project shall be as specified in the Contract.

- 2.2** Physical requirements The material shall have a 10 per cent fines value of 50 kN or more (for sample in soaked condition) when tested in compliance with BS : 812 (Part 111). The water absorption value of the coarse aggregate shall be determined as per IS :2386 (Part 3); if this value is greater than 2 per cent, the soundness test shall be carried out on the material delivered to site as per IS : 383. For Grading II and III materials, the CBR shall be determined at the density and moisture content likely to be developed in equilibrium conditions which shall be taken as being the density relating to a uniform air voids content of 5 per cent.

S. No.	Item	Ref. Code	Frequency
1	Granular Sub Base		
1.1	Gradation	IS:2720 (Part 4)	1 Tests/400 m ³
1.2	Atterberg's limits	IS:2720 (Part 5)	1 Tests/400 m ³
1.3	Moisture Content prior to compaction	IS:2720 (Part 2)	1 Tests/400 m ³
1.4	Field Density of compacted layer	IS:2720 (Part 28)	1 Tests/1000 m ²
1.5	Deleterious content test	IS:2720 (Part 27)	As required
1.6	CBR	IS:2720 (Part 16)	Minimum 30%, as required.

Table 400-1 : Grading for Granular Sub-base Materials

IS Sieve Designation	Percent by Weight Passing the IS Sieve					
	Grading I	Grading II	Grading III	Grading IV	Grading V	Grading VI
75.0 mm	100	-	-	-	100	-
53.0 mm	80-100	100	100	100	80-100	100
26.5 mm	55-90	70-100	55-75	50-80	55-90	75-100
9.50 mm	35-65	50-80	-	-	35-65	55-75
4.75 mm	25-55	40-65	10-30	15-35	25-50	30-55
2.36 mm	20-40	30-50	-	-	10-20	10-25
0.85 mm	-	-	-	-	2-10	-
0.425 mm	10-15	10-15	-	-	0-5	0-8
0.075 mm	<5	<5	<5	<5	-	0-3

3.0 STRENGTH OF SUBBASE

- 3.1** It shall be ensured prior to actual execution that the material to be used in the sub-base satisfies the requirements of CBR and other physical requirements when compacted and finished

- 3.2** When directed by the Engineer, this shall be verified by performing CBR tests in the laboratory as required on specimens remoulded at field dry density and moisture content and any other tests for the "quality" of materials, as may be necessary.

4.0 CONSTRUCTION OPERATIONS

4.1 Preparation of sub grade Immediately prior to the laying of sub-base, the subgrade already finished as applicable shall be prepared by removing all vegetation and other extraneous matter, lightly sprinkled with water if necessary and rolled with two passes of 8 -10 Ton smooth wheeled roller.

4.2 Spreading and compacting The sub-base material of grading specified in the Contract shall be spread on the prepared sub grade with the help of a motor grader of adequate capacity, its blade having hydraulic controls suitable for initial adjustment and for maintaining the required slope and grade during the operation or other means as approved by the Engineer.

When the sub-base material consists of combination of materials mentioned above, mixing shall be done mechanically by the mix-in-place method.

Manual mixing shall be permitted only where the width of laying is not adequate for mechanical operations. The equipment used for mix-in-place construction shall be a rotator or similar approved equipment capable of mixing the material to the desired degree. If so desired by the Engineer, trial runs with the equipment shall be carried out 9 of 9 to establish its suitability for the work.

Moisture content of the loose material shall be checked in accordance with IS : 2720 (Part II) and suitably adjusted by sprinkling additional water from a truck mounted or trailer mounted water tank and suitable for applying water uniformly and at controlled quantities to variable widths of surface or other means approved by the Engineer so that, at the time of compaction it is from 1 per cent above to 2 per cent below the optimum moisture content corresponding to IS : 2720 (Part VIII). While adding water, due allowance shall be made for evaporation losses. After water, has been added, the material shall be processed by mechanical or other approved means like disc harrows, rotators until the layer is uniformly wet.

Immediately thereafter, rolling shall start. If the thickness of the compacted layer does not exceed 100 mm, a smooth wheeled roller of 8 to 10 Ton weight may be used. For a compacted single layer upto 225 mm the compaction shall be done with the help of a vibratory roller of minimum 8 to 10 Ton static weight with plain drum or pad foot drum or heavy pneumatic tired roller of minimum 200 to 300 kN weight having a minimum tyre pressure of 0.7 MN/m² or equivalent capacity roller capable of achieving the required compaction. Rolling shall commence at the lower edge and proceed towards the upper edge longitudinally for portions having unidirectional cross fall and super elevation and shall commence at the edges and progress towards the center for portions having cross fall on the both sides.

Each pass of the roller shall uniformly overlap not less than one third of the track made in the preceding pass. During rolling, the grade and camber shall be checked and any high spots or depressions which become apparent corrected by removing or adding fresh material. The speed of the roller shall not exceed 5 km per hour.

Rolling shall be continued till the density achieved is at least 98% of the maximum dry density for the material determined as per IS : 2720 (Part 7). The surface of any layer of material on completion of compaction shall be well closed, free from movement under compaction equipment and from compaction planes, ridges, cracks or loose material. All loose, segregated or otherwise defective areas shall be made good to the full thickness of layer and re-compacted.

4.3 Surface Finish and quality Control of Work

The finished surface shall be checked for lines, levels and regularity. The surface evenness of completed surface in longitudinal and transverse direction shall be within the tolerances specified.

5.0 MODE OF MEASUREMENTS:

The surface finish of construction shall conform to the requirements. Granular sub-base shall be measured as finished work in position in cubic metre.

DTS No. 62:-**Providing and laying 200 micron plastic sheet on prepared sub base For V.D.S Concrete**

Details specification same as per Item description and as instruction by Engineer-in-charge.

The rate shall be for a unit of one square metre.

DTS No. 63:-**Providing & laying cement concrete Pavement using 1:1.5:3 (1 cement:1.5 sand:3 graded stone agg. 20 mm nominal size) & Vacuum Dewatering technique including floating surface with a skim powder floater, curing etc. complete.**

Detail Specification as per item no. 10 including applying Vacuum Dewatering technique including floating surface with a skim powder floater, curing etc. complete.

The rate shall be for a unit of one Cubic metre.

DTS No. 64:-**Cutting of Groove 5 to 7 mm thick in VDS for depth 1/3 of total thickness with filling of epoxy sealant as directed by engineer in charge**

Details specification same as per Item description and as instruction by Engineer-in-charge.

The rate shall be for a unit of one Running metre

DTS No. 65:-**Providing 100mm thick readymade C.C. kerb of strength M-20 (size 300mm x 380mm) purchased from SMC's approved paverblock manufacturer & setting in line, level and in truly vertical position, including filling joints in C.M. 1:1 (1 part of cement : 1 part of stone dust) smooth pointing in C.M. 1:1 (1 part of cement : 1 part of coarse sand) including watering etc. complete and as directed by engineer in charge.**

RAW MATERIAL:

CEMENT:-

The cement used in the manufacture of high quality precast concrete paving block shall be conforming to IS 12269 (53 grade) ordinary Portland Cement or IS 8112 (43 grade ordinary Portland cement). The minimum cement content in concrete used for making paver blocks should be 310 kg/Cu.M. And the upper limit of cement shall not be more than 425kg/Cu.M.

AGGREGATES :-

The fine and coarse aggregates shall consist of naturally occurring crushed or uncrushed materials which, apart from the grading requirements comply with IS 383-1970. The fine aggregates used shall contain a minimum of 25% natural silicon sand. Lime stone aggregates shall not be used. Aggregates shall contain no more than 3% by weight of clay and shall be free from deleterious salts and contaminants.

WATER :-

The water shall be clean and free from any deleterious matter. It shall meet the requirements stipulated in IS:456-2000.

OTHER MATERIALS :-

Any other material/ingredients used in the concrete shall conform to latest IS specifications.

C.C.BLOCK CHARACTERISTICS:

The C.C. block should have perpendicularities after release from the mould and the same should be retained until the laying.

The concrete mix design should be followed for each batch of materials separately and automatic batching plant is to be used to achieve uniformity in strength and quality.

The C.C. block shall be manufactured in single layer only. Skilled labours should be employed for laying blocks to ensure line and level, for laying, desired shape of the surface and adequate compaction of the sand in joint.

The C.C. block must be of size 300 mm x 100 mm x 380 mm and casted in M-200 Grade with 4" (110 mm) radius rounding at the top and 2 (two) nos. 12 mm keys at the other vertical face as directed by Engineer-in-charge.

When foot path meets with a junction or approach road at the end of foot path, a turning radius equal to the width of foot path should be made as per below and as directed by Engineer-in-charge.

Sr No.	Turning Radius	No. of C.C. Block to be fix	Size of C.C. Block in rounding
1.	1.00 mt.	4 Nos.	Outer 370 mm x inner 340 mm x thickness 100 mm x Height 380 mm
2.	1.50 mt.	6 Nos.	
3.	2.00 mt.	8 Nos.	

Strength is measure of the ability of the concrete kerb unit to withstand load. It is determined under laboratory conditions using bending strength. A load is uniformly applied through a 401mm swivel parallel and rigid bearers rounded to a radius of 201mm until its failure is reached. For each kerb the individual strength in MPa is determined using the second moment of area. For each of calculation, the second moment of area and distance from the centroid to the extreme tensile fibre are incorporated for the profiles specified within the standard. For other profiles please refer to individual manufacturers who will supply the relevant information. The bending strength in MPa is recovered to check compliance with BS EN, The number of the kerbs per sample will vary depending on previous production performance assessed statistically by attributes of variables.

The characteristic bending strength shall not be less than the value corresponding to the class in the table that follows. None of the individual results shall be less than the corresponding minimum bending strength in the table. Where kerbs, due to their geometry, cannot be tested according to this standard they shall be considered to be in the same class as tested kerbs provided they have at least the Bending strength classes.

Class Strength	Marking (MPa)	Characteristic Bending (MPa)	Minimum Bending Strength
1	S	3.5	2.8
2	T	5.0	4.0
3	U	6.0	4.8

WEATHERING RESISTANCE:

Is a measure of the ability of the concrete kerb to withstand weathering specific conditions exist such as frequent contact of the surface with de-icing salt under frost conditions. It can be assessed under laboratory conditions by measuring the amount of spalled material from a surface under the cycle of freezing thawing action using a de-icing salt solution, or, if non-de-icing salt is used, then the measurement of the porosity by measuring the water absorption of the kerb could be used.

ABRASION RESISTANCE:

Is a measure of the ability of the concrete kerb to withstand erosion caused by trafficking in service. It is assessed under laboratory conditions by abrading the surface of the kerb with a flow of a hard abrasive material while applying a known force. The resulting loss of material from the kerb surface is measured by determining the abraded width.

SLIP/SLIP RESISTANCE:

Is a measure of the ability of the concrete kerb laid in service to withstand slipping for pedestrians and skidding for vehicles. The unpolished slip resistance value is determined using standard rubber material attached to a pendulum friction tester and tested under wet conditions. To determine the polished value (PPV) for all paving units BS 7932:1988 should be used. This test method measures the slip resistance of the kerb after it has been synthetically trafficked (or polished) under laboratory conditions to replicate the performance of kerb during their life under traffic conditions. For more details please contact Interpave.

Kerb and edgings are mainly used as edge restraints to paved surfaces or where changes in surface materials or levels occur. They retain any unbound construction material, e.g. laying course material, within the paved area and help support the applied loads by preventing horizontal displacement of the pavement construction. Channels may be used in these applications as well but can also be used to intercept and transport surface water. In vehicular areas kerb, edging and channel units will inevitably be overrun or suffer side impact from vehicle tyres sometime in their service life. By selecting the appropriate units and ensuring correct installation they will give long and durable service.

TOLERANCES:

Performance deviations the value for possible deviation from manufacturer's declared values are as follows.

Length:

1% to the nearest mm, with a minimum of 4mm and not exceeding 10mm.

Other dimensions:

Other faces : 3% to the nearest mm, with a minimum 3 mm not exceeding 5 mm.

Other parts : 5% to nearest mm, with a minimum of 3 mm not exceeding 10 mm.

Flatness and straightness:

Length of gauge mm	Permissible deviation mm
300	1.5
400	2.0
500	2.5
800	4.0

The difference between any two measurements of single kerb shall be $\leq \pm 5$ mm.

Installation of concrete kerbs, edging and channel units has five main stages:

- Preparation of support layers.
- Construction of unit foundation.
- Laying to line and level.
- Bedding of units.
- Haunching of units.

The unit foundation itself must be supported, either on an extension to the underlying pavement sub layers or, for thin pavements (e.g. edgings on pedestrian footways), directly on an adequate subgrade. The depth of the unit and that of the pavement construction will determine on which pavement layer the kerb foundation will sit.

Products should be laid using one of the following alternative methods:

1. Units set on a base of freshly mixed concrete.
2. Units bedded on a mortar bed on top of a hardened concrete base or onto a mortar bedding on a carriageway.
3. Units bonded to the pavement surface.

LAYING OF C.C. BLOCK AS KERB :

C.C. block shall be placed in line, level and in true vertical position with 12 mm gap including filling joints in C.M. 1:1 (1 Part of cement : 1 part of stone dust) and smooth pointing in C.M. 1:1 (1 cement of cement : 1 part of stone dust) including watering.

At the Residential units, it shall be kept 8" (200 mm) open above water table and at the commercial complex, it shall be kept 3" (75 mm) open above water table and as directed by Engineer-in-charge.

SAMPLING AND TESTING PROCEDURE FOR C.C. BLOCK:

Sample size:

- Internal : Average of minimum 3 samples per 3000 blocks - for paver block manufacturers.
- External : Minimum 3 blocks per 3000 blocks.

Sampling for testing :

Sampling for testing of C.C. kerb shall be done in accordance with Appendix-A in item no.6.

Compressive strength : testing for 28 days compressive strength shall be undertaken.

Abrasion Resistant: It is assessed under laboratory conditions by abrading the surface of the kerb with a flow of a hard abrasive material applying a known force. The resulting loss of material from the kerb surface is measured by determining the abraded width.

Bending strength : The characteristic bending strength shall be less than the value corresponding to the class. None of the individual results shall be less than the corresponding minimum bending strength. The rate shall be for a unit of one R.M.

For ensuring quality control and workmanship, above test shall be taken at 01 (One) test per each 1000 (One thousand) Nos. of C.C. block.

The C.C. block shall be got tested at (R&B) field laboratory of GERI (R&B) or S.V.N.I.T., or Govt. approved laboratory.

Laying on pavement surface:

The units may be laid directly onto a suitable pavement surface which should extend to a width to fully support the units and any required haunching. The units are bonded to the surface using a suitable synthetic resin compound or with a modified strengthened mortar.

Jointing:

Concrete kerbs are generally laid with unfilled, close joints with a minimum joint width of 12 mm they must not be butt-jointed. Mortar joints should be filled by 1:1 (1 Cement : 1 stone dust) and finished with the mortar which should be freshly mixed, consisting of 1:1 (1 Cement : stone dust) where mortar joints are used, they should be completely filled and fully compacted. Joint width should be 12 mm.

Where units are laid over or adjacent to a jointed concrete pavement, suitable joints should extend through the line of the units at the joints and continue through the kerb face. When mortar joints are used, movement joints should be provided. These movement joints should be formed of 12 mm thick easily compressible material, extend through the kerb face. Mortar should be used as soon as possible and any material that has begun to set or has been mixed for more than two hours discarded.

Contractors need to plan the work to ensure risk is kept to an acceptable level. This may involve the following actions.

- Rethink the phasing of the kerb installation to maximise the number of kerbs being laid at one time.
- Lay direct from the pack rather than double handling by stringing out ahead of final laying.
- Use machinery capable of handling both packs and individual kerbs.
- Use machinery solutions for the handling of non standard kerb details such as feature kerbs, transition kerbs, drop kerbs, quadrants (cheeses) and radius kerbs.
- Ensure that workers are trained in the safe use of mechanical lifting equipment.
- Provide training in safe lifting techniques for works involved with kerb laying.
- Consider use of alternative lightweight kerb components for certain circumstances.

Kerb laying by hand involves a serious risk of injury to those who are doing the work and therefore employers need to take action to control this risk. When taking the risk, the best solutions will be those which address all three main hazards, the weight of the kerb, the repetitive nature of the operation and poor posture during work. To help find the best solution, the manual handling hierarchy of control measures is suggested. You should try to adopt the solution nearest the top of hierarchy first, as these will give the best level of risk control. In rare cases, where it is not possible to use any mechanical solutions, short stretches of kerb may be laid manually. Where this is necessary workers should be trained in good handling techniques. The use of lighter weight kerbs or devices that allow two people to share the lift will reduce the risk of injury.

GENERAL GUIDANCE:

It is important that work procedures are drawn up before commencement to identify any hazards.

Failure to do this can result in lack of co-ordination of materials and multiple handling of product.

Correct personal protective clothing should be provided.

Planning the work:

Work should be planned and coordinated to avoid unnecessary handling.

For operations where fork lift vehicles are used, kerbs should be stacked onto timber pallets. Ensure that pallets are robust as the failure of a pallet could allow kerbs to fall.

Stripping and wrapping of packs should only be removed just prior to use of the kerbs.

Care should be taken when cutting bands and/or removing wrapping to avoid kerbs falling.

Accurate placement of the concrete bed will minimise shovelling operations.

Accurate preparation of the concrete bed and any excavated trench will reduce the amount of adjustment to kerbs once laid.

Where power tools are used for cutting these should be concrete cutters with diamond blades and water flow lubrication for cooling and dust suppression.

The rate should be for a unit of running metre.

DTS No. 66:-

Providing and fixing Eco Solvent Vinyl Sticker (120 gsm) with Lamination (100 gsm)

Details specification same as per Item description and as instruction by Engineer-in-charge.

The rate shall be for a unit of one Square Feet.

SIGNATURE OF THE CONTRACTOR WITH SEAL

EXECUTIVE ENGINEER
BRTS PROJECT
SURAT MUNICIPAL CORPORATION,

18.0 SPECIFICATION FOR ELECTRICAL INSTALLATION WORK

SUPPLY :

The supply mains will be brought in at places marked drawing and will be 3 Phase 50, cycles, 4 wires system 415 volts between phase and 230 volts between phase and neutral.

SAMPLES :

The Contractor shall submit to the Engineer-in-charge for approval samples of accessories and apparatus they (the contractor) propose to use for the installation.

The tenderer shall submit a list of important contracts carried out by them to the Engineer-in-charge.

DRAWINGS :

Samples to be submitted by the contractor and this specifications shall not be departed from without the instructions of the Engineer-in-charge in writing. No approval given by the Engineer-in-charge approval to any drawings or samples submitted by the contractor shall in any way exonerate the contractor from his liability out the work in accordance with the terms of this contract.

SUPERVISION :

The whole of the work, shall be carried out to the satisfaction of the Municipal Engineer and under the constant supervision of the contractor's competent qualified and experience Electrical Engineer. The contractor shall if require, furnish the full details of the Engineer's qualification.

EXECUTIVE ENGINEER
BRTS PROJECT
SURAT MUNICIPAL CORPORATION,

SIGNATURE OF THE CONTRACTOR WITH SEAL

STANDARD

SPECIFICATION

FOR

INTERNAL ELECTRIFICATION WORK

DTS No - 68

Point wiring for Light / Bell with 2-1.5 sq.mm & earth wire of 1.5 sq.mm (Green) both are of ISI marked 1.1 KV grade FRLS PVC insulated multi strand copper wires up to 10 mtr length , in below type of pipe erected with 6A Modular type switch / bell push & accessories and earth continuity of following type, erected on PVC / Metallic/Wooden box, single mounting base frame covered with textured/metallic/white front plate modules erected on / in wall / ceiling as per pipe erected, with necessary Lamp holder/ceiling rose / H.D.Connector as directed. (f) with medium class Rigid PVC pipe and accessories erected concealed in wall/ceiling complete Cat. III

The rate shall be for a unit of one Pt.

TECHNICAL SPECIFICATIONS FOR INSTALLATION OF INTERNAL WIRING G The following standards and rules

1.0 SCOPE OF WORK

1.1 This section covers, definition of point wiring, system of wiring and, installation, connection, testing and commissioning of point wiring for light points, ceiling fan points, exhaust fan points, convenience socket outlet points, power socket outlet points, bell outlet point etc. including fixing of light fixtures, ceiling fan, exhaust fan, wall fan, bell etc.

2.0 CODES & STANDARDS

2.1

IS:732	Code of practice for electrical wiring installation (System voltage not exceeding 650V)
IS:1646	Code of practice for fire safety of buildings (General) Electrical installation.
IS:9537 (Part-2)	Rigid steel conduits for electrical wiring.
IS:2667	Fittings for rigid steel conduits for electrical wiring.
IS:3480	Flexible steel conduits for electrical wiring.
IS:3837	Accessories for rigid steel conduit for electrical wiring.
IS:694	PVC insulated cables.
IS:9537 (Part-3)	Rigid non-metallic conduits for electrical wiring.
IS:6946	Flexible (Pliable) non-metallic conduits for electrical installation.
IS:1293	3 pin plugs and sockets.
IS:8130	Specification of conduits for electrical installation.
IS:3854	Switches for domestic purpose.
IS:3419	Fittings for rigid non-metallic conduits.
IS:4648	Guide for electrical layout in residential buildings and electricity act and rules

All standard and codes mean the latest.

3.0 MATERIALS REQUIRED

3.1 REFER SUPPLY SPECS

4.0 INSTALLATION OF THE SYSTEM

4.1 CONCEALED INSTALLATION WITH RIGID PVC CONDUIT

4.1.1 All the rigid PVC conduit used for concealed installations shall be as per IS:9537 and its accessories shall be as per IS:3419 (Small Wire Ropes).

4.1.2 Whenever necessary bends or diversion may be achieved by bending the conduits with the help of bending spring. No other method of bending is allowed

4.1.3 Conduit pipes shall be joined with the help of plain coupler fixed at the end with the help of vinyl solvent cement. No other method of joining is permissible

4.1.4 All other methods, nowire through conduit, bunching, etc. Shall be as specified in the concealed installation

4.1.5 Prior to fixing the conduits, the complete routes shall be marked on site for the approval of consultant

4.2 CONCEALED WIRING SYSTEM WITH RIGID PVC CONDUIT

4.2.1 The rigid PVC conduit shall be used for concealed wiring system. The conduit shall be concealed in the concrete slab, floor, walls, beams, column etc

4.2.2 FIXING OF CONDUIT

1. Conduit embedded in concrete shall be installed in the frame work before pouring concrete. The conduit shall be installed above the bottom reinforcing bars, and shall provide positive wire fastening of the conduit to the reinforcing rods at an interval of not more than one meter, but on either side of couplers or bends or outlet/pull/junction boxes or similar fittings, proper hold fast shall be fixed at a distance of 30 cm from the center of such fittings. Conduits embedded in the wall shall be fixed inside the chase. The chase in the wall shall be neatly made and be fixed in the manner desired. In the case of building under construction, chase shall be provided in the wall at the time of their construction and shall be filled up neatly with cement mortar 1:4 after erection of conduit and brought to the original finish of the wall. Cutting of horizontal chases in walls is prohibited. The conduit shall be fixed inside the chase by means of staples or by means of saddles not more than 60 cm apart.

2. Conduit shall be so arranged as to facilitate easy drawing of wires through them. Entire conduit layout shall be done in such a way as to avoid additional junction boxes other than light points. The wiring shall be done in a looping manner. All the loopings shall be done in either switch boxes or outlet boxes. Looping in junction or pull boxes are strictly not allowed. Where conduits cross building expansion joints, adequate expansion fittings or other approved devices shall be used to take care of any relative movement

3. All conduit shall be installed so as to avoid steam and hot water pipes

4. Conduit shall be installed in such a way that the junction, derivation and pull boxes shall always be accessible for repairs and maintenance work. The location of junction/pull boxes shall be marked on the shop drawings and approved by the client

5. A separation of 200 mm shall be maintained between electrical conduits and hot water lines in the building

6. No run of conduit shall exceed ten mtr. between adjacent drawing points nor shall it contain more than two right angle bends, or other derivation from the straight line

7. Cautions shall be exercised in using the PVC conduits in location where ambient temperature is 50 degree cel. or above. Use of PVC conduits in places where ambient temperature is not more than 60 deg. cel. is

- prohibited. The entire conduits system including boxes shall be thoroughly cleaned after completion of installations and before drawing of wires. Conduit system shall be erect and straight as far as possible. Traps where water may accumulate from condensation are to be avoided and if unavoidable, suitable provision for draining the water shall be made.
7. All jointing methods shall be subject to the approval of the client
 8. Separate conduits shall be provided for the following system.
 - 15A power outlets.
 - 5A outlets and lighting system.
 - Low voltage system.
 - Telephone/intercom system.
 - C.C.T.V. system
 - Sound system
 - Computer data cabling system
 - Equipment wiring
- #### 4.3 CONDUIT JOINT
- 4.3.1 1. Conduits shall be joined by means of plain couplers vinyl and/or solvent cement. Where there are long runs of straight conduit, inspection type couplers shall be provided at intervals, as approved by the client
 2. The conduits shall be thoroughly cleaned before making the joints
 3. In case of plain coupler joints, proper jointing material like a vinyl solvent cement (gray in color) or any material as recommended by the manufacturer shall be used.
- #### 4.4 BENDS IN CONDUIT
- 4.4.1 Wherever necessary, bends or diversions may be achieved by bending the conduits or by employing normal bends. No bends shall have a radius less than 2.5 times outside dia. of the conduit
 - 4.4.2 Heat may be used to soften the PVC conduit for bending, but while applying heat to conduit, the conduit shall be filled with sand to avoid any damage to the conduit
- #### 4.3 OUTLETS
- 4.3.1 All the outlets for fittings, switches etc. shall be boxes of substantial construction
 - 4.3.2 In order to minimize condensation or sweating inside the conduits, all outlets of conduits system shall be properly drained and ventilated, but in such a manner as to prevent the entry of insects
 - 4.3.3 Fixing between conduit and boxes, outlet boxes, switch boxes and the like must be provided with entry spouts and smooth PVC bushes.
 - 4.3.4 Joints between conduit and any type of boxes shall be affected by means of conduit couplers in to each of which shall be coupled smooth PVC bush from inside the box. In any case all the joints shall be fully watertight.
- #### 4.4 BUNCHING OF CABLES
- 4.4.1 Cables of AC supply of different phases shall be bunched in separate conduits
 - 4.4.2 The number of insulated wires/cable that may be drawn into the conduit shall be as per the following table. In this table, the space factor does not exceed 40%. However, in any case conduits having lesser than 19mm dia. shall not be used.

MAXIMUM PERMISSIBLE

NUMBER OF 650VOLT

GRADE SINGLE CORE CABLES THAT MAY BE DRAWN INTO RIGID PVC CONDUITS.

CABLE SIZE IN MM SQ.	SIZE OF CONDUITS (MM)			
	MAXIMUM NO. OF CABLES			
	25	32	38/40	51/50

1.5	8	15	---	---
2.5	6	10	---	---
4.0	4	8	12	---

4.5 WIRING WITH RIGID STEEL CONDUIT

4.5.1 All conduits and its accessories shall be of threaded type and under no circumstances spigot type or clamp type accessories be used

4.6 FIXING OF CONDUIT

4.6.1 Conduit pipes shall be fixed by heavy gauge spacer bar saddles. The saddles shall be of 3 mm x 19 mm galvanized mild steel flat, properly treated and securely fixed to support by means of nuts and bolts raw bolts, brass machine screws, as mentioned, at an interval of not more than one meter but on either side of couplers, or bends, or junction/pull/outlet boxes or similar fittings, saddles shall be fixed at a distance of 30 cm from the centre of such fittings.

4.6.2 Draw boxes shall be located at convenient location for easy drawing of wires

4.6.3 Every main and submain shall run in independent conduits with an independent earth wire of specified capacity along the entire length of conduit

4.6.4 The conduit to be installed shall be of ample cross section area to facilitate the drawing of wires. The diameter of the conduit shall be selected as per tables specified in these specifications. But in no case it shall be less than 25 mm diameter

4.6.5 Entire conduit layout shall be done such as to avoid additional junction boxes other than for outlet points. Conduit shall be free from sharp edge and burrs. Conduit shall be laid in a neat and organized manner as directed and approved by the client. Conduit run shall be planned so as not to conflict with any other services pipe, lines/ducts.

4.6.6 The entire conduit system shall be electrically and mechanically continuous and shall be bonded together by means of approved type earthing clamp and earthed through a bare copper conductor of 14 SWG to the earthing terminals on the nearest distribution board

4.6.7 If required, connection between PVC and steel conduits shall be through a junction box. Direct connection between PVC and steel conduits are not allowed

4.6.8 Where exposed conduits are suspended from the structure, they shall be clamped firmly and rigidly to hangers of design to be approved by client. Where hangers are to be anchored to reinforced concrete, appropriate inserts and necessary devices for their fixing shall be left in position at the time of concreting, making holes and opening in the concrete will generally not be allowed. In case, it is unavoidable, prior permission of the client shall be obtained

4.7 CONDUIT JOINTS

4.7.1 Conduit pipes shall be joined by means of screwed couplers and screwed accessories, as per IS: 2667

4.7.2 The threads shall be free from grease or oil

4.7.3 In long distanced straight run of conduit, inspection type coupler two way junction boxes at reasonable intervals shall be provided or running threads with couplers and lock nut shall be provided. The bare threaded portions shall be treated with anti-corrosive paints. Thread on conduit pipes in all cases shall be between 11 mm to 27 mm long, sufficient to accommodate pipe to full threaded portion of couplers or accessories. Cut ends of conduit pipes shall have no sharp edges nor any burrs left, to avoid damage to the insulation of conductors while pulling them through such pipes

4.7.4 Brass female bushes shall be used in each conduit termination in a switch box, outlet box, electrical panel or any other box

4.7.5 Conduit shall be secured in each outlet box switch box, electrical panel or any other box by means of one brass hexagonal lock nut and bush, outside and inside the box

4.7.6 At each building, expansion joints approved oil tight double wire wound flexible steel conduit or any other approved method shall be used. This shall be united on both sides with the rigid conduits by suitable union

4.7.7 Conduits installed in the plant room for mechanical equipment shall be properly clamped with the mechanical supports, but in no case, it shall be fixed with the body of the equipment

4.7.8 The connection of conduit to the mechanical equipment shall be through oil tight double wire wound flexible steel conduit. In any case the length of the flexible conduit shall not exceed one meter. The flexible conduit shall be properly clamped with the body of the equipment. They shall not in any case be clamped with any cover or any removable part of the equipment

4.8 BENDS IN CONDUIT

4.8.1 All necessary bends in the system including diversions shall be done by bending pipes or by inserting suitable solid or circular inspection type normal boxes or similar fittings.

4.8.2 Conduit fittings shall be avoided as far as possible on conduit system exposed to weather, where necessary, solid type fittings shall be used. Radius of such bends in conduit pipes shall be not less than 75mm. No length of conduit shall have more than the equivalent of four quarter bends from outlet, the bends at the outlets not being counted

4.9 PROTECTION AGAINST DAMPNESS

4.9.1 In order to minimize condensation or sweating inside the conduit, all outlets of conduit system shall be properly drained and ventilated, but in such a manner as to prevent the entry of insects, as far as possible

4.10 PROTECTION OF CONDUIT AGAINST RUST

4.10.1 The outer surface of the conduits including bends, junction boxes, etc., forming part of the conduit system shall be adequately protected against rust, particularly when such system is exposed to weather. In all cases, no bare/threaded portion of conduit pipes shall be allowed unless such bare threaded portion is treated with anti-corrosive coating or covered with approved plastic compound

4.11 BUNCHING OF CABLES

4.11.1 Unless otherwise specified, insulated conductors of different phases shall be bunched in separate conduit.

Wires carrying current shall be so bunched in the conduit that the outgoing and return wires are drawn into the same conduit. Wires originating from two different phases shall not be run in the same conduit

4.11.2 The number of insulated wires/cables that be drawn into the conduit shall be as per the following table.

MAXIMUM PERMISSIBLE NUMBER OF 650/1100 VOLTS GRADE SINGLE CORE CABLE THAT CAN BE DRAWN INTO RIGID STEEL CONDUITS.

CABLE SIZE IN MMSQ.	SIZE OF CONDUITS (MM)			
	MAXIMUM NO. OF CABLES			
	25	32	38	51
1.5	10	14	---	---
2.5	8	12	---	---
4.0	6	10	---	---

4.12 SWITCH AND SOCKET

- 4.12.1 Switches shall be installed at 900 mm above finished floor level unless otherwise indicated on the drawings.
- 4.12.2 The switch controlling the light point or fan shall be connected on to the phase wire of the circuit and neutral shall be continuous, having no fuse or switch installed in the line except at the D.B. All fan regulators shall be fixed inside the switch boxes on adjustable flat M.S. strips/plates with tapped holes and brass machine screws, leaving ample space at the back and side for accommodating wires.
- 4.12.3 The cover plate to the switch box shall be fixed by means of sunk head brass cadmium screws.
- 4.12.4 Where two or more switches and fan regulators are installed together, they shall be provided with one gang cover plate with knockouts to accommodate required number of switches, sockets and regulators.
- 4.12.5 The switch controlling the socket outlet shall be on the phase wire of the circuit. The third pin of the socket shall be connected to the earth continuity conductor of the circuit.
- 4.12.6 The switch boxes, installed back-to-back in the same wall shall be offset from each other, 150 mm horizontally, to preclude noise transmission.
- 4.13 DRAWING OF CONDUCTORS
- 4.13.1 The drawing and joining of copper conductor or wires shall be executed with due regard to the following precautions. While drawing insulated wires into the conduits, care shall be taken to avoid scratches and kinks which may cause breakage of conductors. There shall be no sharp bends.
- 4.13.2 Insulation shall be shaved off for a length of 15 mm at the end of wire like sharpening of a pencil and it shall not be removed by cutting its square or ringing.
- 4.13.3 FRLS insulated copper conductor wire ends before connection shall be properly soldered (at least 15 mm length) with soldering flux/copper solder, for copper conductor. Strands of wire shall not be cut for connecting to the terminals. All strands of wires shall be soldered at the terminals. All strands of wires shall be soldered at the end before connection. The connecting brass screws shall have flat ends. All looped joints shall be soldered and connected through terminals block/connectors. The pressure applied to tighten terminal screws shall be just adequate, neither too much nor too less. Conductors having nominal cross section exceeding 4 sq. mm shall always be provided with crimping type cable sockets. At all bolted terminals, brass flat washer of large area and approved steel spring washers shall be used. Brass nuts and bolts shall be used for all connections.
- 4.13.4 Only certified wiremen and cable jointers shall be employed to do joining work.
- 4.13.5 For all internal wiring FRLS insulated wires of 650/1100 volts grade shall be used. The sub-circuit wiring for point shall be carried out in loop system and no joint shall be allowed in the length of the conductors. No wire shall be drawn in to any conduit, until all work of any nature that may cause injury to wire is completed. Care shall be taken in pulling the wires so that no damage occurs to the insulation of the wire. Before the wires are drawn into the conduits, the conduits shall be thoroughly cleaned of moisture, dust, and dirt or any other obstruction by forcing compressed air through the conduits.
- 4.14 JOINTS
- 4.14.1 The wiring shall be by looping back system, and hence all joints shall be made at main switches, distribution boards, socket outlets, lighting outlets and switch boxes only. No joint shall be made inside conduits and junction boxes.
- 4.14.2 Contractor shall be continuous from outlet to outlet. For joints where unavoidable, due to any specified reasons, prior permission in writing shall be obtained from the client before making such connections. Joints by twisting conductors are prohibited.

4.15 LOADBALANCING

4.15.1 Balancing of circuit in three phase installati shall be planned before the commencement of wiring and shall be strictly adhered to

4.16 EARTHING

4.16.1 All earthing systems shall be in accordance with IS:3043-1985 code of practice for earthing

Item no. - 69

Primary light point controlled by one SP MCB

The rate shall be for a unit of one Nos

Details specification same as per Item no 68

DTS No - 70

Secondary light point controlled by same switch / MCB

The rate shall be for a unit of one Nos

Details specification same as per Item no 68

DTS No - 71

Point wiring for Tissino / Modular secondary light point with 2-1.5 sq.mm & earth wire of 1.5 sq.mm (green) both are of ISI marked 1.1 KV grade FRLS PVC insulated multi strand copper wires, in below type of pipe to be erected complete with earth continuity and necessary connection with primary light with accessories erected on Metal / PVC / wooden box covered with 3 mm thick PC (Polycarbonate) / Acrylic sheet for open / concealed wiring, with necessary Lamp holder / ceiling rose / H.D. Connector as directed. (f) with medium class Rigid PVC pipe and accessories erected concealed in wall/ceiling complete

The rate shall be for a unit of one Pt.

Details specification same as per Item no 68

DTS No - 72

Point wiring for FAN with 2-1.5 sq.mm & earth wire of 1.5 sq.mm (Green) both are of .ISI marked 1.1 KV Grade FRLS PVC insulated multi strand copper wires up to 10 mtr length, in below type of pipe erected with 6A Modular type switch and hum free EME step type electronic fan regulator mounted and accessories with earth continuity of following type erected on PVC / Metallic/Wooden box, single mounting base frame covered with textured/metallic/white front plate modules erected on / in wall / ceiling as per pipe erected. with necessary ceiling rose / H.D. Connector as directed. (f) with medium class Rigid PVC pipe and accessories erected concealed in wall/ceiling complete Cat. III

The rate shall be for a unit of one Pt.

Details specification same as per Item no 68

DTS No - 73

Point wiring for Individual Plug with & earth wire of 1.5 sq.mm (Green) both are of ISI marked 1.1 KV grade FRLS PVC insulated multi strand copper wires up to 10 mtr length, in below type of pipe erected complete with Modular type switch & 5 pin Plug erected on PVC / Metallic/Wooden box covered with appropriate front plate modules erected on / in wall / ceiling as per pipe erected with following type of accessories.[I] For 6A Plug and 6 a switch with 2-1.5 sq.mm Cu. Wire from nearby switchboard/mcb db board.(f) with medium class Rigid PVC pipe and accessories erected concealed in wall/ceiling complete Cat. III

The rate shall be for a unit of one Pt.

Details specification same as per Item no 68

DTS No - 74

Point wiring for Individual Plug with & earth wire of 1.5 sq.mm (Green) both are of ISI marked 1.1 KV grade FRLS PVC insulated multi strand copper wires up to 10 mtr length, in below type of pipe erected complete with Modular type switch & 5 pin Plug erected on PVC / Metallic/Wooden box covered with appropriate front plate modules erected on / in wall / ceiling as per pipe erected with following type of accessories.[II] For 16A Plug and 16 amp switch with 2-2.5 sq.mm Cu. Wire from mcb db board.(f) with medium class Rigid PVC pipe and accessories erected concealed in wall/ceiling complete Cat. III

The rate shall be for a unit of one Pt.

Details specification same as per Item no 68

DTS No - 75

DO - as 1.1.5 but with 4 sq.mm wire for phase & Neutral & 2.5 sq. mm for Earthing

The rate shall be for a unit of one Nos

Details specification same as per Item no 68

DTS No - 76

-Do- as 1.1.6 but With 20 Amp DP switch and socket at different location

The rate shall be for a unit of one Nos

Details specification same as per Item no 68

DTS No - 77

Point wiring for on board Looped Plug with 6A Modular type switch & 5 pin socket erected on PVC / Metallic/Wooden box, single mounting base frame covered with textured /metallic/white front plate modules erected on / in wall / ceiling with following type accessories Cat. III

The rate shall be for a unit of one Pt.

Details specification same as per Item no 68

DTS No - 78

Wiring for the UPS / Comp. / Raw Power outlet with 2 nos. of 250 volts single phase and neutral 16 amps switched socket outlet with 4 sq mm x 3 core FRLS Round flexible copper conductor 1100 volts grade wires of approved make in concealed or surface mounted Prelaid 25 mm dia medium guage PVC Conduit / Race ways including providing and fixing of 2 no.s of 16 amps 5 pin switch socket outlet of approved quality colour make & design in 2 mm thick GI box and earthing of fixtures and the outlet box . (Maximum 2 nos. of Plugs can be looped in 1 Circuit)

The rate shall be for a unit of one Nos

Details specification same as per Item no 68

DTS No - 79

Providing following type of Modular Type Accessories mounted with PVC / metallic/Wooden box, single mounting base frame covered with textured / metallic/white front plate , modules erected with necessary connections as per site situation directed by Engineer In charge. (4) TV Co-axial Socket outlet Cat. III

The rate shall be for a unit of one Each

Details specification same as per Item no 68

DTS No - 80

"Providing & erecting Switch board for Computer or electric apparatus consisting of following modular type accessories mounted with PVC / Metallic concealed/open box with single mounting base frame covered with textured/metallic /white front plate,modules erected with necessary connections as directed.

1 no. 6A/16A universal plug-switch combined.

3 nos. 6A Switch

3 nos. 6A 5 pin Plug Cat.III "

The rate shall be for a unit of one Each

Details specification same as per Item no 68

DTS No - 81

Supplying & erecting approved make LAN cable of following size in existing pipe as per direction [C] CAT - 6

The rate shall be for a unit of one Mtr

Details specification same as per Item no 68

DTS No - 82

Providing and erecting ISI mark Medium class RIGID PVC PIPES of following size complete to be erected on/in wall or ceiling erected with necessary PVC fittings & Junction boxes fixed with adhesive solution & Clamps with following dia of pipes, in approved manner as directed.(a)20 mm

The rate shall be for a unit of one Mtr

Details specification same as per Item no 68

DTS No - 83

Providing and erecting ISI mark Medium class RIGID PVC PIPES of following size complete to be erected on/in wall or ceiling erected with necessary PVC fittings & Junction boxes fixed with adhesive solution & Clamps with following dia of pipes, in approved manner as directed.(b) 25 mm

The rate shall be for a unit of one Mtr

Details specification same as per Item no 68

DTS No - 84

Providing and fixing 350 x 350 x 40 mm deep 2 mm thick GI sheet junction box including providing 3 mm thick stainless steel cover as per specification.

The rate shall be for a unit of one Nos

Details specification same as per Item no 68

DTS No - 85

Supplying, Fabricating, Installation, Testing & Commissioning of the 2 mm thick CRCA sheet Steel Powder Coated MS box as per the approved Design with locking Arrangement

The rate shall be for a unit of one Kgs

Details specification same as per Item no 68

DTS No - 86

Supplying and laying UPVC cable trunking system comprising unplasticised polyvinyl chloride rigid material with ignition free and flame proof confirming BS with necessary end caps Internal and external bend, flat bends, coupler, tee etc..All necessary accessories and measuring of following sizes (2) 100 mm x 50 mm trunking

The rate shall be for a unit of one Mtr

Details specification same as per Item no 68

DTS No - 87

Supplying and erecting LED street light / Flood light fittings with High power White LEDs wattage of 3 Watt and above assembled on single MCPCB, efficiency more than 130 lm/w and corrosion free High pressure die cast aluminum housing with smooth finish powder coated and heat sink extruded aluminium with diffuser and Polycarbonate optics/ lenses, with toughened glass with company mark/name engraved or embossed 160 to 270 V, Power Factor more than 0.95, THD < 10 %, CCT 3000 K to 5700K, Uniformity ratio >0.45, Luminaire efficacy > 100 lumens/watt . LED driver efficiency > 85 %.(fittings required LM-79 & LM-80 certificates)(NOTE: Below description have shown ranges of Wattage capacity of LED fittings. The Engineer incharge may select any wattage capacity between the ranges shown.) (A) Street Light (IP-65), Surge protection -4KV integral and ,Light must have 440VAC line supply with over-voltage protection. (i) above 36 to 48 watts Cat-III

The rate shall be for a unit of one Each.

LED LIGHT TECHNICAL SPECIFICATIONS

LED LIGHT SPECIFICATIONS

SUPPLY, LAYING, TESTING AND CONNECTING UNARMORED CABLE:

The item includes supply, laying, testing and commissioning of round 3 X 1.5 sq. mm for LED luminaires flexible unarmored single PVC insulated copper conductor cable 1100 V grade to be laid through the pole from luminaries to junction box by experienced technician without any damage. The cable joint shall not be allowed. Termination glands/lugs etc shall be included in the item.

SITE OF LED LIGHT LUMINAIRES:-

TECHNICAL SPECIFICATION FOR ENERGY EFFICIENT LED BASED LUMINAIRE UNIT FOR LED LIGHT:-

This specification is for technical and general requirements design, development, manufacturing, testing and supply of energy efficient LED luminaire complete with all accessories, LED lamps with suitable current control driver circuit and required optics including mounting arrangement.

CODES&STANDARDS:-

IEC 60529 Classification of degree of protections provided by enclosures (IP Codes) EN55015, CISPR15 Limits and methods of measurement of radio disturbance characteristic of electrical lighting and similar equipment.

IEC 62031 LED modules for general lighting-Safety requirements IEC61547-EMC Immunity requirement

IEC60598-2-1 Fixed general purpose luminaires

IEC60598-1 Luminaires-General requirement and tests

IEC61000-3-2 ElectroMagnetic compatibility (EMC)-Limits for Harmonic current emission—(equipment input current ≤ 16 A per phase.

IEC60068-2-38 Environmental Testing: Test Z-AD: composite temperature/humidity cyclic test

IEC61347-2-13 Lamp control gear: particular requirements for DC or AC supplied electronic control gear for LED modules.

IS 10322 Specification for the luminaires IS4905 Method for random sampling

LM 79 LED luminaire photometry measurement. LM80 Lumen Maintenance

IEC62384 DC or AC supplied electronic control gear for LED modules performance requirements

IEC/PAS62612 Self-ballasted LED lamps for general lighting services-Performance requirements

CONSTRUCTIONAL FEATURES:

General:

- a) Luminaries shall be made of die cast aluminium/ extruded Aluminium body with powdercoated finish having safety.
- b) Heat sink used should be aluminium extrusion having high conductivity. Heat sink should be integrated within luminaries and efforts shall be made to keep the overall outer dimensions optimum such that it permits sufficient heat dissipation through the body itself so as to prevent abnormal temperature inside the luminaries and consequential damage to cover, gasket material, LEDs, lenses and drivers.
- d) LED must be mounted on Metal core PCB with suitable large area surface by means of fins to dissipate the conduct heat. The fins must be exposed to ambient flowing air.
- e) All luminaries shall be provided with toughened glass of min. 0.8 mm thickness of sufficient strength. UV stabilized Poly carbonate material is also acceptable. High efficiency prismatic diffuser/ Lens under the LED chamber to protect the LED and luminaries shall be provided.
- f) The minimum IK protection of optic cover shall be IK 05. The test material certificate shall be provided.
- g) Suitable number of LED lamps shall be used in the luminaries. The manufacturer shall submit the proof of procurement of LEDs from OEMs at the time of testing.
- h) Suitable reflector/ lenses may also be provided to increase the illumination uniformity and distribution.
- i) The electrical component of the LED and LED driver must be suitably enclosed in sealed unit to function in environment conditions mentioned earlier.
- j) The connecting wires used inside the luminaries, shall be low smoke halogen free, fire retardant, cable and fuse protection shall be provided in input side.
- k) Design of the thermal management shall be done in such a way that it shall not affect the properties of the diffuser.
- l) The equipment should be compliant to IEC 60598-1, IEC 62031 and IEC/PAS 62612 depending on the type of luminary.
- m) The LED Module(s), Driver gear, etc. shall be designed in such a way so that temperature of heat sink shall not exceed 70° C.
- n) All the material used in the luminaries shall be halogen free and fire retardant confirming to standard.
- o) The infrastructure for Quality Assurance facilities to verify/ test/ prove above specifications must be available at the manufacturing facility. The compliance shall be indicated clearly in the tender itself.
- p) All fasteners must be of stainless steel.
- q) All glands inside/ outside luminaries must be metallic
- r) Heat sink must be thermally connected to MCPCB/ LED light source.

High power and high lumen efficient LED suitable for following features shall be used:

- a) The working life of the lamp at junction temperature of 85° C (max) at operating current shall be more than 50,000 working hours of accumulative operation and shall be suitable for continuous operation of 24 hours per day. These features shall be supported with data sheet.
- b) Adequate heat sink with proper thermal management shall be provided.
- c) Lumen maintenance report as per LM80 guideline shall be produced for the power LEDs used.
- d) Thermal management shall be in such a way that LED soldering point temperatures shall not go beyond 75°C.
- e) The LED luminaires shall be free of glare.

LED DRIVER specification:

- a) Current waveform should meet relevant national and international standard.
- b) LED Driver shall withstand, withstand voltage up to level mentioned elsewhere in tender and restore on normal working when normal voltage is applied.
- c) The life of the driver should be more than 25,000 Hrs.
- d) Maximum Temperature rise $\leq 30^{\circ}\text{C}$ @ 45°C Tamb. With safety margin of 10°C .
- e) The control gear should be compliant to IEC 61347-2-13, IEC 62031 and IEC 62384 as per the requirements.
- f) The driver of the luminaires should have Short Circuit, Over Voltage, over current, over temperature, Under Voltage, String Open protections.

The electronic components used shall be as follows:-

- a) The protective cum adhesive coating used on PCBs should be cleared and transparent and should not affect colour code of electronic components or the product code of the company.
- b) The construction of PCBs and the assembly for components for PCBs should be as per IS standards.

Illumination Level:

The luminaires shall be so designed that the illumination level shall be evenly distributed and shall be free from glare. The lux distribution curve/graph/spatial distribution shall be submitted.

GENERAL DATA SHEET

Sr. No.	Parameter	Value/Detail
•	Rated Supply Voltage	230 V ~, 50 Hz
•	Input supply voltage range	120-270V
•	Expected Input Frequency	50Hz +/-3%
•	Working Temperature	+5° to +50° C
•	Working Humidity	10%-90% RH
•	Usage hours	Dusk to dawn

•	PowerFactor	≥0.90
•	Index ofProtectionLevel	IP 66 as per IEC 60529.
•	SurgeProtection	4 KV
•	LEDChipefficacy	≥120 lm/W
•	DriverEfficiency	>85%
•	JunctionTemperatureofLED	< 85° C
•	Rated Life@ L70	50,000 burning hours at 35° C ambient
•	Nominal Correlated ColourTemperature	5000°K to 6000°K
•	DispersionAngle	Minimum 120°
•	Tiltingangle	Adjustable
•	Maintenance factor of	0.85
•	ColourRenderingIndex	≥75
•	TotalHarmonicDistortion	<10%(EMI/EMCCertification)
•	LEDMAKE	Cree/Osram/Nichia/Philips Lumileds

Particulars and Details to be submitted by the bidder:

In order to properly assess and due diligence on submissions, the Bidders should provide following information on the quality and photometric of proposed luminaries.

1. General Description

Following details of the proposed luminary shall be submitted

2. Electrical specifications

Electrical ratings of the proposed luminary products shall be submitted

3. LED chip and driver information

LED chip and driver information of the proposed luminary products shall be submitted

4. Photometric information to be submitted TESTS & CERTIFICATES:

Tests are classified as:-

Type test Acceptance test

Routine test.

The luminaries' should be tested as per IEC 60598-2-3: 2002 standards and following test reports should be submitted:-

- (i) Heat Resistance Test
- (ii) Thermal In Situ Test
- (iii) Ingress Protection Test
- (iv) Drop Test
- (v) Electrical/Insulation Resistance Test,
- (vi) Endurance Test,
- (vii) Humidity Test,

- (viii) Electrical and Photometric Measurements Test Report (IESLM79)
- (ix) LED Lumen Maintenance Test Report (IESLM80)
- (x) Vibration test as per ANSI

Type Test: -

Type test certificates for both the luminaries shall be provided with the technical bid.

Acceptance Tests:-

These tests are carried out by an inspecting authority at the supplier's premises on sample taken from a lot for the purpose of acceptance of a lot. Acceptance tests shall not be carried out from particular size from the lot on which type tests have already been conducted. Recommended sampling plan is given below.

Sample size and criteria for conformity

The luminaries shall be selected from the lot at random. In order to ensure randomness of selection, procedures given in IS 4905-1968 (Reaffirmed 2001) may be followed.

Routine Tests:

These tests shall be performed by the manufacturer on each complete unit of the same type and the results shall be submitted to the inspecting agency, prior to offering the lot for acceptance test. The firm shall maintain the records with traceability.

Test Scheme & Quality Assurance

Method of Testing:-

Visual and Dimensional Check:

The unit shall be checked visually for all dimensions as per approved design and drawing.

General workmanship should be good; all the components properly secured and sharp edges shall be rounded off. Check the marking and quality of the workmanship visually. Check the rating and make of electronic/electrical items.

Checking of documents of purchase of LED

Check Document of purchase of LED lamps of approved sources viz. NICHIA/OSRAM/PHILIPS LUMILEDS/CREE.

Resistance to humidity test

This is carried out by suspending the painted panels in corrosion chamber maintained at 100% RH and temperature cycle of 42 to 48° C for 7 days and examining it for any sign of deterioration and corrosion of metal surface.

Insulation resistance test

The insulation resistance of the unit between earth and current carrying parts shorted together shall not be less than 2 MΩ when measured with 500V megger.

HV test

Immediately after insulation resistance test, an AC voltage of 1.72 KV rms (1500 + 2 x rated voltage) of sine wave form of 50 Hz shall be applied for one minute between the live parts and frame. There shall not be any kind of break down, flashover or tripping of supply.

Overvoltage protection

The LED Driver Shall be cut off once voltage exceeds 288 V AC. It shall be reconnected when supply comes within limit.

Surge protection

It shall withstand a surge of 4KV at the input terminals for all types.

Reverse polarity

The Luminaries shall withstand polarity reversal. It shall be operated with reverse voltage for Min. 1 minute at maximum value of voltage range. At the end of this period, the supply shall be made correct polarity and Luminary shall operate in a normal way.

Temperature rise Test:

Temperature rise Test shall be conducted at 100 V ~ with full load. The temperature rise shall be recorded by temperature detectors mounted at the specified reference points on the body of semiconductors, capacitors and other components as agreed between purchaser and manufacturer. The maximum-recorded temperature under worst conditions shall be corrected to 55°C and compared with maximum permissible temperature (for power devices at junction). Under loading conditions as specified above, the corrected temperature of the power devices shall have a safety margin of minimum 10°C.

Temperature at junction shall not exceed 100°C when corrected to 55°C. The Luminaries shall also be subjected for short timerating after continuous loading to

ensure the temperature rise is within the permissible limit. The maximum temperature rise of the electronics devices on the PCB shall be in limit for industrial grade components suitable for 85° C environment. In case of exceeding limit, use of MIL-grade components shall be considered keeping RDSO informed.

Ra (Colour Rendering Index) measurement test

The lumen is the unit of luminous flux, which is equal to the flux emitted in a solid angle of one steradian by a uniform point source of one candela.

The initial reading of the chromaticity co-ordinates x & y shall be within 5SDCM (Standard Deviation for Colour matching) from the standardised rated value as per Annex: D of IEC 60081-1997.

The initial reading of the general colour-rendering index (Ra) shall not be less than the rated value decreased by 3.

The lumen maintenance of the lamp shall not be less than 80% of the initial lumen after 20,000 burning hours and 70% of the initial lumen after 50,000 hours. The initial lumen will be taken after 100 hours aging.

Photometric tests shall be conducted as per Annexure: B of IEC 60081-97.

The lumen maintenance test shall be done as per Annexure: C of IEC 60081-97.

Fire retardant Test

Fire Retardant tests shall be conducted as per IEC 60332-1 of the wire used in the luminaries.

Test for IP65 protection

This test shall be conducted as per IEC 60529.

Environmental tests (Prototype Test)

The Luminary shall meet the following tests as prescribed in IEC-60571.

- (i) Dry heat test.
- (ii) Damp heat test
- (iii) Test in corrosive atmosphere
- (iv) Combined dust, humidity and heat test

Reliability Test

The reliability can only be determined in actual service. However, the following tests shall be carried out on the prototype to simulate as close as possible, the service conditions.

There shall be no failure during this test.

- (i) The light unit shall be mounted in an oven maintained at 45°C.
- (ii) The light will be operated at the specified maximum voltage and at 45° C for a period of 100 hours.

Photometry Test:-

The test shall be carried out for Total Luminous Flux, Luminous Intensity Distribution, Electrical Power, Luminous Efficacy (calculation), Color Characteristics– Chromaticity, CCT & CRI etc. as per IES LM 79.

Life Test

The lumen maintenance & life test shall be done as per IES LM 80 for

LEDs Endurance Test

The Luminaire shall be kept “ON” with input voltage of 250 V ~ for 200 hours. After this the Luminaire is subjected to 20,000 cycles of “ON” and “OFF”, each cycle consisting of 3 seconds “ON” and 10 seconds “OFF” period. Luminaire should survive this test. Test is to be continued for 20,000 cycles, followed by performance test.

Safety:

The Luminaire shall comply with the safety requirements as per IEC 61195.

All Tests defined for acceptance other than LM 79 and LM 80 are allowed to carry out at Manufacturer works.

4. INFRINGEMENT OF PATENT RIGHTS

Client shall not be responsible for infringement of patent rights arising due to similarity in design, manufacturing process, use of the components, used in design, development and manufacturing of these light luminaires and any other factor which may cause such dispute. The responsibility to settle any issue rises with the manufacturer.

5. MARKING:

The following information shall be distinctly and indelibly marked on the housing: Year of manufacture / Batch Number / Serial Number
Name of Manufacturer (Engraving only, stickers not allowed)
Rated watt and voltage / Input frequency

6. METHOD OF MEASUREMENT

Supply of the fixture including transport to site, loading and unloading etc. as specified will be treated as one unit for measurement and payment.

7. TRANSPORT, DELIVERY AND STORAGE

The prices shall be F.O.R. site basis including packing & forwarding charges. The quoted price must include all the costs for necessary mode of transportation up to the final location of fixture or site store. The fixtures should be supplied with required storage arrangements suitable for placing in open storage yard. All incidental expenses during transportation shall be part of quoted prices including transit insurance. The charges for loading and unloading of equipments at site should form part of offer.

8. GUARANTEE AND WARRANTY

The Bidder shall stand guarantee for the performance of entire fixtures and components for twenty four (24) months from the date of commissioning or from issuance date of completion certificate, whichever is earlier, as agreed upon and as reproduced in the purchase order within the tolerance specified or as permitted by the relevant standards for the equipment in his scope of supply. The Purchaser also reserves the right to use the rejected equipment or part thereof until the new equipment meeting the guaranteed performance is supplied by the Bidder.

9. SPARES

The bidder shall quote for minimum spares required for two years safe operation of light fixtures along with the offer separately.

DTS No - 87

Supplying and erecting LED street light / Flood light fittings with High power White LEDs wattage of 3 Watt and above assembled on single MCPCB, efficiency more than 130 lm/w and corrosion free High pressure die cast aluminum housing with smooth finish powder coated and heat sink extruded aluminium with diffuser and Polycarbonate optics/ lenses, with toughened glass with company mark/name engraved or embossed 160 to 270 V, Power Factor more than 0.95, THD < 10 %, CCT 3000 K to 5700K, Uniformity ratio > 0.45, Luminaire efficacy > 100 lumens/watt. LED driver efficiency > 85 %.(fittings required LM-79 & LM-80 certificates)(NOTE: Below description have shown ranges of Wattage capacity of LED fittings. The Engineer in charge may select any wattage capacity between the ranges shown.) (A) Street Light (IP-65), Surge protection -4KV integral and, Light must have 440VAC line supply with over-voltage protection. (i) above 36 to 48 watts Cat-III

The rate shall be for a unit of one Each.

DTS No - 88

Supplying and erecting Street light pole bracket comprising main B Class GI pipe of 4.2 cm/require outside dia. complete with suitable B Class G.I. sleeve tubing of approx. 45cms.length and suitable for 76.5mm/80mm/require size of pole top having nuts and bolts for fixing the brackets and having spread of 0.5 mtr. Length with 110 deg. with vertical plane and suitable welded stiffener reducer and nipple with check nut complete painted with one coat of Red oxide / PU base primer and two coats of Aluminium / PU paint, paint with following nos of arms. [A] Single Arm bracket 0.5 Mtr

The rate shall be for a unit of one Each

Details specification same as per Item no 86

DTS No - 89

"Supplying and erecting LED indoor fittings with LEDs of wattage 0.2 Watt to 0.5 Watt assembled on single MCPCB, with housing used as a heat sink shall be made of thick sheet Steel conforming to IS:

513/CRCA/aluminium pressure die cast powder coated and high U.V. & corrosion resistance with diffuser housed in aluminium casted body with company mark/name

160V to 270V, Power Factor more than 0.9, THD < 15 %, CCT 3000 K to 6500K, Luminaire efficacy > 85 lumens/watt, LED driver efficiency > 85 % (fitting required LM-79 & LM-80 Certificates)(NOTE: Below description have shown ranges of Wattage capacity of LED fittings. The Engineer incharge may select any wattage capacity between the ranges shown.) (A) Square/ Circular shaped Surface/Recessed Mount Downlight with provision for spring loaded mounting clips complete. IP65 (iv) 22-24 watts, Surge-2 KV Cat-III"

The rate shall be for a unit of one Ea.

Details specification same as per Item no 86

DTS No - 90

Supplying and erecting LED indoor fittings with LEDs of wattage 0.2 Watt to 0.5 Watt assembled on single MCPCB, with housing used as a heat sink shall be made of thick sheet Steel conforming to IS: 513/CRCA/

aluminium die cast powder coated and high U.V. & corrosion resistance with diffuser with company mark/name 120 to 300 V, Power Factor more than 0.9, THD < 10 %, CCT 3000 K to 6500K, Luminaire efficacy > 85 lumens/watt, LED efficiency 110 lumens/watt LED driver efficiency > 85 % CREE / OSRAM / PHILIPS Lumileds / NICHIA / SEOUL/Bridgelux make LED used for luminaire. (fitting required LM-79 & LM-80 Certificates)(NOTE: Below description have shown ranges of Wattage capacity of LED fittings. The Engineer incharge may select any wattage capacity between the ranges shown.) (A) LED Lamps integral type, cool white with PC diffuser suitable for B22 LAMP holder (b) 5 to 8 watts cat-III

The rate shall be for a unit of one Each

Details specification same as per Item no 86

DTS No - 91

"Supplying and erecting LED indoor fittings with LEDs of wattage 0.2 Watt to 0.5 Watt assembled on single MCPCB, with housing used as a heat sink shall be made of thick sheet Steel conforming to IS:

513/CRCA/aluminium pressure die cast powder coated and high U.V. & corrosion resistance with diffuser housed in aluminium casted body with company mark/name

160V to 270V, Power Factor more than 0.95, THD < 15 %, CCT 3000 K to 6500K,

Luminaire efficacy > 85 lumens/watt,

LED driver efficiency > 85 %
(fitting required LM-79 & LM-80 Certificates)(NOTE: Below description have shown ranges of Wattage capacity of LED fittings. The Engineer incharge may select any wattage capacity between the ranges shown.)

(A) Square/ Circular shaped Surface/Recessed Mount Downlight with provision for spring loaded mounting clips complete. IP20
Cat-III

(ii) 11-15 watts, Surge-2 KV"
The rate shall be for a unit of one Each

Details specification same as per Item no 86

DTS No - 92

Providing & erecting Approved make Ceiling Fan with double ball bearing with Condenser 230 volt A.C. 50 Hz. 900 mm sweep complete having 3 Aluminium blades, canopy erected complete. [Make shall be approved by Engineer in Charge]

The rate shall be for a unit of one Ea.

TECHNICAL SPECIFICATIONS FOR ERECTION, TESTING & COMMISSIONING OF ELECTRICAL INSTALLATIONS

ERECTION, TESTING & COMMISSIONING OF ELECTRICAL INSTALLATIONS

1.0 SCOPE OF WORK

- 1.1 The intent of this specification is to define the requirements for the installation, testing and commissioning of the electrical system like H.T.V.C.B. panel, transformer, L.T. panels, Cables, earthing network, Internal and External lighting, Light fixtures etc.. Requirement of this project shall be as specified in bill of quantities / approved drawings / general specifications or as per the battery limits fixed by the owner/consultant.

2.0 STANDARDS

- 2.1 1. The work shall be carried out in the best workman like manner in conformity with this specification, the relevant specification / codes of practice of the Indian Standards Institution, approved drawings and the instructions issued by the authorised representative, from time to time. Some of the relevant Indian Standards are listed elsewhere in this tender document.
2. In addition to the standards mentioned in 2.1, all works shall also conform to the requirement of the following:
3. Indian Electricity Act and Rules framed thereunder.
4. Fire Insurance Regulations.
5. Regulations laid down by the Chief Electrical Inspector of the State / State Electricity Board / Union Territory.
6. Regulations laid down by the Factory Inspector of the State / Union Territory.
7. Any other regulations laid down by the local authorities.
8. Installation & operation manuals of original manufacturers of equipment.

3.0 ERECTION

- 3.1 The contractor shall make his own arrangement for safe transportation of all the items to the erection site and also carry out complete loading / unloading during transportation. Equipment shall not be removed from packing cases unless the floor has been made ready for installing them. The cases shall be opened in presence of the client / consultant or his authorised representative. The empty packing cases shall be returned to the stores and any document if found with the equipment shall be handed over to the client's representative. Any damage or shortage noticed shall be reported to the client / consultant in writing immediately after opening of packing cases.

3.2 ON ANTYPE TRANSFORMER

1. Erection Transformer complete with radiators, bushings, conservator and miscellaneous accessories shall be thoroughly inspected and any damage noticed shall be reported to the client / consultant. Before erection of transformer, the level of rails on foundation shall be checked and minor corrections if necessary shall be carried out. After the completion of erection, necessary stoppers shall be provided at the wheels. All loosely supplied fittings / accessories shall be cleaned and mounted on the transformer and connections made. After completely assembling & installation, the transformer shall be cleaned and touched up with a paint supplied by the manufacturer applied wherever necessary. All cover bolts shall be checked for proper tightness. (The foundation of transformer and rail fixing will be made by some other agency).

2. Testing Winding insulation resistances shall be measured from primary and secondary to ground and between

nprimaryandsecondary.

Testtheoperationofthermistertypesensorrelayinaccordancewiththemanufacturer'sinstructions.
Checkthe polarity of terminalsandthe phase sequence.Proformafortransformertests:

3. Proformafortransformertests:

- Transformernameplate.
- Insulationresistancetestwith1000Vmeagre.
- a) betweenprimarytoearth
- b) betweensecondarytoearth
- c) betweenprimaryandsecondary
- Operationofthetapchanger.Operation

ofthetapattapNo.1Operation

ofthetapattapNo.2Operation

ofthetapattapNo.3Operation

ofthetapattapNo.4Operation ofthetapattapNo.5

- Polaritymarkingandphasesequences.
- Earthresistance:Body&Neutraltank.

[This proformashallbejointly signedbytheCLIENT/CONSULTANTandthecontractorinduplicate].

3.3 POWERCONTROLCENTER/MOTORCONTROLCENTER,DISTRIBUTIONBOARDS

1. ErectionElectrical panelsandbusductshallbedeliveredin convenientshippingsectionbythemanufacturer.Thecontractorshallmakehisownarrangementforsafetransportationofalltheitemstotheerectionsiteandalsocarryoutcompleteloading/unloadingduringtransportation.Thecontractorshallberesponsibleforfinalassemblyand interconnectionofbusbars/ wiring. Foundationchannel shallbegROUTEDinthe flooringbythecontractor.Switchgearshallbealignedandlevelledontheirbasechannels andboltedtothemaspertheinstructionsoftheclient / consultant. The earthbusshallbemadecontinuous throughoutthelength.Looselysuppliedrelaysandinstrumentsshall bemountedandconnectedontheswitchgear.The contactsof thedrawoutcircuit breaker shall becheckedfor properalignmentandinterchangeability.

After erection,the switchboardshall be inspected for dust and vermin proof. Anyholewhich mightallow dustor verminetc.to enterthepanel shall be pluggedsuitably at no extra cost. If the instrument transformers are supplied separately, theyshall be erected as per the direction of the client / consultant. The contractor shallfix the cableglandsafter drilling the bottom/ top plates of all switchboards withsuitableholesatnoextracost.

Range of overloadrelays / timers etc. shall be checkedwith requirement of motoractually to be connected at site and if the sameis undersized / oversized, it shall bebroughtto the notice of the client / consultant, who shall arrangeprocurement ofcorrectedcomponents.However,thecontractorshallnotchargeanythingextraforlabourforsuchreplacements.

The busductshallbesuitably supportedbetweenswitchgearandtransformer. Theopening in thewall wheretheductenters,theswitchgearroomshallbesealedtoavoidrain waterentry. The foundation of the switchgearshall beraisedsuitably forminoradjustment to ensureproper alignment andconnection of thebusductat noextra cost.Expansionjoints,flexible connection, etc.suppliedby themanufacturer /contractorofthebusductshallbeproperlyconnected.

1. TestingBefore electrical panelis energised, the insulation resistanceof each bus shall bemeasuredfromphaseto ground.Measurement shallberepeated with circuitbreakersinoperatingpositionsandcontactsopen.

Beforeswitchgearis energised,theinsulationresistance ofallcontrolcircuits shallbemeasuredfromlinetoground.

The following tests shall be performed on all circuit breakers during erection.

- Contact alignment and wipe shall be checked and adjustment where necessary in accordance with the breaker manufacturer's instructions.
- Each circuit breaker shall be drawn out of its cubicles, closed manually and its insulation resistance measured from phase to phase and phase to ground.
- All adjustable direct acting trip devices shall be set using values given by the consultant/manufacturer.
- The dielectric strength of insulating oil where ever applicable, shall be checked.
- Before switch gear is energised, the following tests shall be performed on each circuit breaker in its test position.
- Close and trip the circuit breaker from its local control switch push button or operating handle. Switch gear control bus may be energised to permit test operation of circuit breaker with A.C. closing with prior permission of the client / consultant.

- Test tripping of the electrically operated circuit breaker by operating mechanical trip device.
- Test proper operation of circuit breaker latch, check carrier limit switch if provided. Test proper operation of lockout device in the closing circuit. Where ever provided by simulating conditions which would cause a lockout to occur.
- Trip breaker either manually or by applying current or voltage to each of its associated protective release.
- Before switch gear is energised, the tests covered above shall be repeated with each breaker in its normal operating position.
- Capacitor banks shall be tested as per manufacturer's instructions. In addition, test for output and/or capacitance, insulation resistance test and test for efficiency of discharged devices shall be carried out.
- All electrical equipment alarm shall be tested for proper operation by causing alarm to sound under simulated abnormal conditions.

2. Perform a For PCC, MCC, DB, Control Panel Test

- Circuit breaker or contactor module designation / bus no.
- Insulation resistance test (contacts open, breaker racked in position)

a) between each phase of bus :	Megaohm
b) between each phase and earth :	Megaohm
c) DC and AC control and auxiliary circuits :	Megaohm
d) between each phase of CT/PT and between CT & PT circuit if any :	Megaohm

- CT checks
 - a) CT ratio
 - b) CT secondary resistance
 - c) CT polarity check
- Check for contact alignment and wipe.
- Check / test all releases / relays.
- Check mechanical interlocks.
- Check electrical interlocks.
- Check switch gear / control panel wiring.
- Check breaker / contactor or circuit for:
 - a) Closing - local & remote (where ever applicable)
 - b) Tripping - local & remote (where ever applicable)
- Opening time of breaker / contactor.
- Closing time of breaker / contactor.

[This proforma shall be jointly signed by the CLIENT / CONSULTANT and the contractor in duplicate].

3.1 INSTALLATION OF CABLE NETWORK

Cable network shall include power, control and lighting cables which shall be laid in underground trenches, human pipe open trenches, cable trays, G.I. pipes, or on building structures as detailed in the relevant drawings, cable schedules or as per the client / consultant's instructions. Supply & installation of cable trays, G.I. pipes/conduits, cable glands and socket of both end isolators, junction boxes, remote push button stations, etc. shall be under the scope of the contractor.

1. General requirements for handling cables:

- Before laying cables, this shall be tested for physical damage, continuity, absence of cross phasing, insulation resistance to earth and between conductors. Insulation resistance tests shall be carried out with 500/1000

Vmegger.

- The cables shall be supplied at site, wound on wooden drums as far as possible. For smaller length and sizes, cables in properly coiled form can be accepted. The cable shall be laid by mounting the drum of the cable on drum carriage. Where the carriage is not available, the drum shall be mounted on a properly supported axle, and the cable laid out from the top of the drum. In no case the cable will be rolled on as it produces kinks which may damage the conductor.
- Sharp bending of cables shall be avoided. The bending radius for PVC insulated and sheathed, armoured cable shall not be less than 10 D, where "D" is overall diameter of the cable.
- While drawing cables through G.I. pipes, conduits, RCC pipes, ensure that size of pipe is such that, after drawing cables, 40% area is free. After drawing cables, the end of pipes shall be sealed with cotton/ bituminous compound.
- High voltage (11KV and above), medium voltage (240V and above) and other control cables shall be separated from each other by adequate spacing or running through independent pipes/trays.
- Armoured cable shall never be concealed in walls/floors/roads without G.I. pipes, conduits or RCC pipes.
- Joints in the cable throughout its length of laying shall be avoided as far as possible and if unavoidable, prior approval of site engineers shall be taken. If allowed, proper straight through epoxy resin joint shall be made, without any additional cost.
- A minimum loop of 3mtr. shall be provided on both ends of the cable, and on both ends of straight through cable joint. This additional length shall be used for fresh termination in future. Cable for this loop shall be paid for supply and laying.
- Cables shall be neatly arranged in the trenches / trays in such manner so that criss-crossing is avoided and final take off to the motor / switch gear is facilitated. Arrangement of cable within the trenches / trays shall be the responsibility of the contractor.
- All cable routes shall be carefully measured and cable cut to the required lengths and undue wastage of cables to be avoided. The routes indicated in the drawings is indicative only and the same may be rechecked with the client/consultant before cutting of cables. While selecting cable routes interference with structures, foundations, pipelines, future expansion of building etc. should be avoided.
- All temporary ends of cables must be protected against dirt and moisture to prevent damage to the insulation. For this purpose, ends of all PVC insulated cables shall be taped with an approved PVC or rubber insulating tapes. Use of friction type or other fabric type tape is not permitted. Lead sheathed cables shall be plumbed with lead alloy.
- Wherever cable rises from underground / concrete / masonry trench to motors / switch gears / push buttons, these shall be taken in G.I. pipes of suitable size, for mechanical protection up to 300mm. distance of concerned cable gland or as instructed by the client / consultant.

- The cable pass through foundation / walls of other underground structures, the necessary ducts for opening will be provided in advance for the same. However, should it become necessary to cut holes in existing foundation of structures, the electrical contractor shall determine the location and obtain approval of the client/ consultant before cutting is done.

2. LAYING OF CABLES (UNDERGROUND SYSTEM)

Cables shall be so laid in trench that this will not interfere with other underground structure. All water pipes, sewer lines or other structures which become exposed by excavations shall be properly supported and protected from injury until the filling has been rammed solidly in place under and around them. Any telephone or other cables coming in the way are to be properly shielded/diverted as directed by the owner/consultant.

- Cables shall be laid at minimum depth of 750mm. in case of L.T. and 1200mm. in case of H.T. from ground level. Excavation will be generally in ordinary alluvial soil. The width of trench shall be sufficient for laying of required no. of cables.
- Sand bedding 75mm. thick shall be made below and above the cables. Layer of bricks (full size) shall be laid above sand bedding on the sides and above the cables to cover cable completely. More than one cable can be laid in the same trench by providing a brick on edge between two cables. However, the relative location of cables in trench shall be maintained till termination. The surface of the ground after backfilling the earth shall be made good so as to conform in all respects to the surrounding ground and to the entire satisfaction of the client/consultant.
- For all underground cables, route markers should be used:
 - a) Separate route markers should be used for LT, HT and telephone cables.
 - b) Route markers should be grounded in ground with 1:2:4 cement concrete pedestal size 230x230x300mm..
 - c) Cable markers should be installed at an interval not exceeding 30mtr. along the straight routes of cables at a distance of 0.5mtr. away from centre of cable with the arrow marked on the cable markers plate indicating the location of cable. Cable markers should also be used to identify change in direction of cable route and for location of every joint in underground cable.
- RCC humepipe for crossing road in cable laying shall be provided by employer. No deduction shall be made for cable laying in humepipe for not providing bricks, sand and excavation. RCC hump pipe at the ends shall be sealed by bituminous compound after laying and testing of cables by electrical contractor without any extra charge.

3. LAYING OF CABLE IN MASONRY TRENCHES

- Masonry/ concrete trenches for laying of cables shall be provided by employer. However, steel members such as M.S. angles / flats etc. shall be provided and grouted by electrical contractor to support the cables without any extra charge. Cables shall be clamped to these supports with minimum saddles / clamps. More than one tier of cables can be provided in the same trench if the no. of cables are more.
- Entry of cables in trenches shall be sealed with bituminous MASTIC compound to stop entry of water in trenches.

4. LAYING OF CABLES IN CABLE TRAYS

- Cable trays and steel members such as M.S. angle/channel/flat etc. shall be provided and fixed by the erector.
- Cables shall be fixed in cable trays in single tier formation and cables shall be clamped with aluminium flat clamps and galvanised bolts/nuts.
- Earthing flat/wire can also be laid in cable tray along with cables.
- After laying of cables, minimum 20% area shall be spare.

5. TERMINATION AND JOINTING OF CABLES

a) For HT cables suitable size of Reychem termination kit shall be used.

b) Use of glands:

All PVC cables upto 1.1 KV grade, armoured or unarmoured shall be terminated at the equipment/ junction box/ isolators/ push buttons/ control accessories, etc. by means of suitable sized double compression type cable glands. Armour of cables shall be connected to earth point. The contractor shall drill holes for fixing glands

wherever necessary. Wherever threaded cable gland is to be screwed into threaded opening of different size, suitable galvanized threaded reducing bushings shall be used of approved type.

In case of termination of cables at the bottom of the panel over a cable trench having no access from the bottom, a close fit hole should be drilled in the bottom plate for all the cables in one line, then bottom plate should be split into two parts along the centre line of holes. After installation of bottom plate and cables with glands, it shall be sealed with cold sealing compound.

● USE OF LUGS/SOCKETS

All cable leads shall be terminated at the equipment terminals, by means of crimped type solderless connectors unless the terminals at the equipment ends are suitable for direct joining without lugs/sockets.

The following is the recommended procedure for crimped joints and the same shall be followed:

a) Strip off the insulation of the cable and with every precaution, not in severe or damage any strand. All insulation to be removed from the stripped portion of the conductor and ends of the insulation should be clean and square.

b) The cable should be kept clean as far as possible before assembling it with the terminal/ socket. For preventing the ingress of moisture and possibility of re-oxidation after crimping of the aluminium conductors, the socket should be filled with corrosion inhibiting compound. This compound should also be applied over the stripped portion of the conductor and the palm surface of socket.

c) Correct size and type of socket/ ferrule/ lug should be selected depending on size of conductor, and type of connection to be made.

d) Make the crimped joint by suitable crimping tool.

e) If after crimping the conductor in socket/ lug, some portion of the conductor remains without insulation the same should be covered sufficiently with PVC tape.

f) For HT cable upto 11 KV the manufacturer's recommendations should be followed.

● DRESSING OF CABLE INSIDE THE EQUIPMENT

After fixing of cable glands, the individual cores of cables shall be dressed and taken along the cableways (if provided) or shall be fixed to the panels with polyethylene straps. Cables shall be dressed in such a manner that small loop of each core is available inside the panel.

For motors of 20 HP and above, terminal box if found not suitable for proper dressing of aluminium cables, the erector shall modify the same without any additional cost.

Cables inside the equipment shall be measured and paid for.

● IDENTIFICATION OF CABLES/WIRES/CORES

Power cables shall be identified with red, yellow and blue PVC tapes. For trip circuits identification, additional red ferrules shall be used only in the particular cores of control cable at the termination points in the switchgear/control panels and control switches.

In case of control cables all cores shall be identified at both ends by their wire numbers by means of PVC ferrules or self sticking cable markers, wire numbers shall be as per schematic/ connection drawing. For power circuits also, wire numbers shall be provided if required as per the drawings of switchgear manufacturer/supplier.

6. TESTING OF CABLES

● Before energising, the insulation resistance of every circuit shall be measured from phase to ground. This requires 3 measurements if one

side is grounded and 6 measurements for 3 phase circuits.

- Where splices or terminations are required in circuits rated above 650 volts, measure insulation resistance of each length of cable before splicing and/or terminating. Repeat measurements after splices and/or terminations are complete.
- DC high voltage test shall be made after installation on the following:
 - a) All 1100 volts grade cables in which straight through joints have been made.
 - b) All cables above 1100V grade.

For record purpose test data shall include the measured values of leakage current versus time.

The DC high voltage test shall be performed as detailed below:

Cables shall be installed in final position with all the straight through joints complete. Termination shall be kept unfinished so that motors, switch gear, transformer etc. are not subjected to test voltage.

The test voltage and duration shall be as per relevant codes and practices of Indian Standards Institution.

- PROFORMA FOR TESTING CABLES

DATE OF TEST

- a) Drum No. from which cable taken.
- b) Cable from _____ to _____
- c) Length of run of this cable _____ meter
- d) Insulation resistance test
 - i) between core-1 to earth _____ mega-ohm
 - ii) between core-2 to earth _____ mega-ohm
 - iii) between core-3 to earth _____ mega-ohm
 - iv) between core-1 to core-2 _____ mega-ohm
 - v) between core-2 to core-3 _____ mega-ohm
 - vi) between core-3 to core-1 _____ mega-ohm
 - vii) duration used: 1KV _____
- e) High voltage test _____ Voltage Duration
 - i) between core and earth.
 - ii) between individual cores

[This proforma shall be jointly signed by the CLIENT / CONSULTANT and the contractor in duplicate].

4.0 EARTHING NETWORK

4.1 INSTALLATION AND CONNECTION

1. The plate/pipe electrode, as far as practicable, shall be buried below permanent moisture level but in no case not less than 3M below finished ground level.
2. The plate/pipe electrode shall be kept clear of the building foundation and in no case, it shall be nearer by less than 2 M from outer face of the respective building wall/column.
3. The plate electrode shall be installed vertically and shall be surrounded _____ with 150mm. thick layers of Charcoal dust and Salt mixture.
4. 20mm. dia. Cu. pipe for _____ watering, shall run from top edge of _____ the plate/pipe electrode to the mid level of block masonry chamber.
5. Top of the pipe shall be provided with G.I. funnel and screen for watering the earth/ground through the pipe.
6. The masonry chambers shall be provided with a Cast Iron hinged cover resting over the Cast Iron frame which shall be embedded in the block masonry.
7. Construction of the earthing stations shall in general be as shown in the drawing

and shall conform to the requirement of one of the electrodes mentioned in the latest edition of Indian Standard IS:3043, Code of Practice for Earthing Installation.

8. The earth conductors (Strips / Wires copper/ Hot dip G.I.) Inside the building shall properly be clamped / supported on the wall with Galvanised Iron clamps and Mild Steel Zinc Passivated screws / bolts. The conductors outside the building shall be laid at least 600mm. below the finished ground level.
9. The earth conductor shall either terminate on an earthing socket provided on the equipment or shall be fastened to the foundation bolt and/ or on frames of the equipment. The earthing connection to equipment body shall be done after removing paint and other oily substances from the body and then properly be finished.
10. Overlapping of earth conductors during straight through joints, where required, shall be of minimum 75mm. long.
11. The earth conductor shall be in one length between the earthing grid and the equipment to be earthed.

4.2 EARTH LEADS AND CONNECTIONS

1. Earth lead shall be bare copper or Galvanised steel as specified with sizes shown on drawings. Copper lead shall have a phosphorus content of not over 0.15%. G.I. strip buried in the ground shall be protected with bitumen and hessian wrap or polythene faced hessian and bitumen coating. At road crossing necessary hume pipe shall be laid. Earth lead runs on surface of wall or ceiling shall be fixed on saddles so that strip is at least 8mm away from the wall surface.
2. The complete earthing system shall be mechanically and electrically bonded to provide an independent return path to the earth source.

4.3 TEST

1. The entire earthing installation shall be tested as per requirements of Indian Standard Specification IS:3043.
2. The following earth resistance values shall be measured with an approved earth megger and recorded.
 - 1) Each earthing station
 - 2) earthing system as a whole
 - 3) Earth continuity conductors
3. Earth conductor resistance for each earthen equipment shall be measured which shall not exceed 5 ohm in each case.
4. Measurements of earth resistance shall be carried out before earth connections are made between the earth and the object to be earthed.

5. All tests shall be carried out in presence of the Pmc

5.0 CONCEALED/SURFACE CONDUIT WORKS

5.1 LAYING OF CONDUITS

1. Conduit shall be laid before casting in the upper portion of a slab/ in PCC if below flooring or otherwise, as may be instructed in accordance with approved drawings, so as to conceal the entire run of conduits and ceiling outlet boxes. Conduit shall be so laid that they are interconnected. This is required to facilitate pulling of wires from different openings in case of any of the outlet is blocked during slab casting. Vertical drop shall be cut by the contractor to sufficient depth to allow full thickness of plaster over conduits. The width of the chases will be made to accommodate the required number of conduits. The chases will be filled with cement, coarse
2. When the conduit is to be embedded in a concrete member it shall be adequately tied to the reinforcement to prevent displacement during casting. Tie wire to be supplied by the contractor.
3. Cutting of chases in any RCC member / finished floor/ already finished surface is not allowed unless prior approval of Site Engineer is taken in site instruction book. If a

chases is cut in an already finished surface, the contractor shall fill the chases and finish it to match the existing finish including painting at his cost to Site Engineer's satisfaction.

4. Contractor shall not cut any iron bar to fix the conduits. Puncher of wooden/ steel shuttering for RCC slab / beams / column etc. for conduit work is also not allowed, unless Site Engineer permits in site instruction book under special conditions.
5. Run of conduit pipe through expansion joints in RCC members should be avoided as far as possible and if unavoidable, flexible conduit pipes should be used with ceiling outlet box on both sides of expansion joints.
6. Conduit on surface of RCC walls/ RCC members shall be avoided as far as possible and if unavoidable prior approval of Site Engineer on sample saddles, clamp screws and a minimum 5 mtr. conduit laid on surface shall be taken, to achieve best possible workmanship. Distance between 2 consecutive clamps for fixing conduits on surfaces shall not exceed 900 mm. wooden patties for fixing saddles / clamps shall be used. Use of roll plug / steel fastener with hard setting / sealing compound is disrecommended.
7. In case of stone masonry, necessary conduits with M.S. boxes should be placed as the masonry is in progress, since after completing masonry, it is very difficult to cut chases in wells. Special location of cement concrete shaft is also recommended to conceal conduit in stone masonry and the same shall be provided by client / consultant.
8. In ground floor conduiting below the flooring should be avoided. Wherever it is unavoidable G.I. pipes should be used with prior approval of Site Engineer.

5.2 CEILING/WALL OUTLET BOXES FOR LIGHTS/FANS

1. Outlet boxes shall be of steel with aluminium cover and so installed as to maintain continuity throughout. These shall be protected at the time of laying by filling with jute/ earth/cotton etc. so that no cement mortar finds its way inside during concreting or plastering etc. Typical sketches for such outlet boxes shall be supplied along with other working drawings. In beams conduit socket shall be provided in place of outlet boxes. The same shall be used for installation of luminaire.
2. For fixing light fixtures / brackets, outlet boxes complete with check nut for holding conduits shall be used. For lighting fixture suitable for 20 watts fluorescent tubes / incandescent lamps / mercury vapour lamps, only one outlet box is required. For fixing lighting suitable for 40 watts fluorescent lamps, two numbers outlet boxes should be provided at a distance of 300mm. away from the centre in the longitudinal direction of the fixture, so that the use of patties / roll plug etc. may be avoided, as well as wiring from outlet box to the light fitting is to be installed in RCC beam and due to heavy reinforcement at the bottom of beam it is not possible to provide outlet boxes simple conduit should be provided. However alternative fixing arrangements shall be made in consultation with client/consultant.
3. For fixing ceiling fans, circular outlet boxes, 100mm. diameter, complete with 12mm. dia. Mild Steel rod 300mm. long, for holding 12mm. dia. Mild Steel cover 125mm. dia. at bottom shall be used.

5.3 DRAW OUT JUNCTION BOXES

- Steel draw out boxes at angled dimensions shall be provided at a convenient point on walls / ceilings to facilitate pulling of long runs of cables/ wires. These shall be completely concealed with Anodised Aluminium, flush with plaster works. These draw boxes should be fixed on one side. The location of these boxes is to be decided prior to fixing, as per site requirement and following should be treated as general guidance for deciding the location of these:
1. These should be provided at a place where these are not in direct view. Recommended place is 400/ 450mm. below ceiling, if conduits are running vertically.
 2. Junction box in the offset of bottom of RCC beam and vertical wall should not be provided.
 3. If junction boxes are coming side by side for two or more conduits, one common

M.S. box of proper size can be used to act as junction box.

4. If junction box is to be provided in ceiling, its position should be so located that it is in line with other light/fan points.
5. Junction boxes should never be used for splitting one conduit into two or more. Junction box for such functions is avoidable and for this, number of conduits to be connected to one switch board should be calculated correctly as per drawing before laying conduit in ceiling.
6. Locating junction boxes on outer surface of exterior walls of buildings should be avoided as these are indirect view and are also exposed to weather.
7. Junction boxes should never be closed permanently by plaster. Removable covering of aluminium should be provided for conduit junction boxes for M.S. junction boxes removable hylem plate should be provided. This cover may be painted with wall colour.
8. Junction boxes in important areas should be avoided and can be located in toilets /corridors/ service shafts and stores etc.

5.4 SWITCHBOXES

Steel boxes of required sizes, shall be provided to houses speed regulators of fans, switches for lights, fans, plug sockets etc. as per requirement of drawings. These should be so designed that accessories on Anodised aluminium sheet could be mounted with tapped holes and brass machine screws, leaving ample space at the back and on the sides for accommodating wires and check nuts at conduit entries. These shall be attached to conduits by means of check nuts on all walls of the boxes through which the conduits are entering. These shall be completely connected leaving edges flush with finished wall surfaces. Anodised aluminium cover should be fixed to these switch boxes by means of brass chrome plated machine screws and cup washers. Utmost care shall be taken by contractor to ensure that all switch boxes are in line and level.

Inside each switch box, one bolt shall be welded to receive earthing wire.

5.5 SWITCH AND SOCKET

Switches shall be installed at 900 mm above finished floor level unless otherwise indicated on the drawings. The switch controlling the light point or fan shall be connected to the phase wire of the circuit and neutral shall be continuous, having no fuse or switch installed in the line except at the D.B. All fan regulators shall be fixed inside the switch boxes on adjustable flat M.S. strips/ plates with tapped holes and brass machine screws, leaving ample space at the back and side for accommodating wires.

The cover plate to the switch box shall be fixed by means of sunk head brass cadmium screws.

Where two or more switches and fan regulators are installed together, they shall be provided with one gang cover plate with knockout to accommodate required number of switches, sockets and regulators.

The switch controlling the socket outlet shall be on the phase wire of the circuit. The third pin of the socket shall be connected to the earth continuity conductor of the circuit.

The switch boxes, installed back-to-back in the same wall shall be offset from each other, 150 mm horizontally, to preclude noise transmission.

5.6 CLEANING AND PROTECTION OF CONDUIT SYSTEM

The entire conduit system including outlet boxes, junction boxes and switch boxes shall be thoroughly cleaned after completion of erection and tested for not blockage by air / sound or steel wire prior to finishing of building by air / sound or steel wire prior to finishing of building and before drawing in of cables/ wires to safeguard conduit system against filling up with the plaster / cement slurry / water etc. all the outlet and switch boxes will have to be provided with temporary jute / cotton filling, covers and plug etc.. Within tendered cost which shall be replaced later on by hylem/ sheet cover after wiring as required.

5.7 TESTING OF INSTALLATION

Before a completed installation is put into service, the following tests shall be complied with:

1. INSULATION RESISTANCE

The insulation resistance shall be measured by applying 500 volt megger with all fuses in places, circuit breaker and all switches closed.

The insulation resistance in gohms of an installation, measured shall not be less than 50 megohms divided by the number of points on the circuit.

The insulation resistance shall be measured between EARTH TO PHASE

EARTH

TO

NEUTRAL PHASE TO NEUTRAL PHASE TO

PHASE

2. EARTH CONTINUITY PATH

The earth continuity conductor shall be tested for electrical continuity and the electrical resistance of the same along with the earthing lead but excluding any added resistance or earth leakage circuit-breaker, measured from the connection, with the earth electrode to any point in the earth continuity conductor in the completed installation and shall not exceed one ohm.

3. POLARITY OF SINGLE POLE SWITCHES

A test shall be made to verify that every no-linked, single pole switch is connected to one of the phases of the supply system.

4. COMPLETION CERTIFICATES

All the above tests shall be carried out in presence of client and the results shall be recorded in prescribed forms. Any

default during the testing shall be immediately rectified and that section of

the installation shall be retested. The completed test result from shall be submitted to the client for approval.

On completion of an electric installation a certificate shall be furnished by the contractor, countersigned by the certified supervisor under whose direct supervision the installation was carried out. This certificate shall be in a prescribed form as required by the local electric supply authority.

6.0 INSTALLATION OF LIGHTING FIXTURES/FANS

6.1 INSTALLATION OF LIGHTING FIXTURES

Scope of work under this item shall start from light point, with a 5A bakelite connector, 2 core 1.5mm.² PVC insulated wires from this connector to the connector inside the lighting fixture, connections, fixing of lighting fixture complete with all accessories, lamps on wall / roof / steel truss etc. testing the lighting fixture and commissioning. If wire length of light point is enough to reach connector of light fitting, connector in light point can be deleted.

6.2 INSTALLATION OF EXHAUST FANS

Scope of work under this system shall start from exhaust fan point, with a ceiling rose, 2 core 2.5mm.² PVC insulated wire from ceiling rose to connector of exhaust fan, connections, making fan opening in walls including repair / finishing fixing of exhaust fan complete with accessories and louvers on walls with hold-fasts, testing the exhaust fans and commissioning.

7.0 INSTALLATION OF EXTERNAL LIGHT FIXTURES

7.1 BRACKET FOR STREET LIGHT FITTINGS

The bracket shall be made of 38mm NB MS class "B" pipe approx. 1.8mtr. long bent at the centre at an angle 120°C. with necessary holding brackets, hold fast etc. with special reducer at the end to accommodate type of street light fitting to be fixed. Bracket shall have 1 coat of anti-corrosion paint before despatch to site and 2 coats of approved make and shade of aluminium paint. This bracket shall also be provided with one M.S. water tight box complete with the connector, neutral link, rewirable fuse etc.. See enclosed drawings of street light poles.

7.2 INSTALLATION OF POLES

Installation of poles shall be done as per enclosed drawings of streetlight poles. The depth of pole to be buried in ground shall be 1/5th of the total pole length or as specified in drawing, whichever is more. Special care shall be taken in erecting poles so that these are not strained or damaged during erection and are firmly stayed till the foundation are secured. The poles shall be grouted in side ground pit (cross-section 600x 600mm.) with cement concrete 1:2:4. Before the placement of concrete around pole in the pit, necessary conduit pipes (not less than 25mm. dia.) shall be placed for facilitating drawing of cables. Separate conduit shall be provided for incoming and outgoing cables. The cement concrete shall be protected from premature drying by curing for at least 7 days after pouring. All concrete surface from 150mm. below ground level to top shall be finished smooth with cement mortar 1:4.

7.3 INSTALLATION OF STREETLIGHT FIXTURES

This includes fixing of streetlight fittings complete with accessories and lamps at the end of the pole/ bracket, connecting it with 3x 2.5mm.² aluminium conductor, PVC insulated cable from watertight M.S. box, testing, commissioning. Third core shall be connected with earthing point of light fitting at one end and earthing point of marshalling box at the other end.

7.4 GENERAL NOTES FOR STREET LIGHTING

1. For supplying and laying of cables, technical specification (wiring) shall be applicable reference shall be made under heading Cable Work elsewhere in the tender.
2. For streetlight poles along roads, nearest finished road level shall be taken as ground level and for poles along compound wall / away from roads, existing ground / finished ground shall be taken as ground level.
3. Distance of 1 mtr. shall be maintained between centre of pole and centre of curb of road. For compound wall poles, distance between compound wall and pole shall be 3mtrs.
4. A loop of 1.5mtr. of cable shall be provided near each streetlight pole for all incoming and outgoing cable.

8.0 COMPLETION TESTS

- 8.1 After supply and installation of complete project or a particular building/ area, following tests shall be carried out by the contractor before switching on the power to installation and the results shall be recorded and submitted to the Site-Engineer. If results are not satisfactory/ as per standards set herewith, the contractor shall identify the defects/ shortcoming and shall rectify the same. Nothing extra shall be paid for carrying out these tests and contractor has to arrange all necessary instruments.

8.2 INSULATION RESISTANCE TO EARTH

This is to be measured with all fuse links in place, all switches ON, all lamps and appliances in position by applying a voltage not less than twice the working voltage (subject to a limit of 500V). Insulation resistance of the whole or any part of the installation to earth must not be less than 50 mega-ohms divided by the number of outlets (points and switch positions) except that it need not exceed one mega-ohm for the whole installation.

8.3 INSULATION RESISTANCE BETWEEN CONDUCTORS

Tests to be made between all the conductors connected to one pole or phase conductor of the supply and all the conductors connected to the middle wire or neutral or the other pole or phase conductors of the supply. For this test, all lamps shall be removed and all switches put ON. The result of the test must be 50 mega-ohms divided by the number of outlets (points and switch positions) but need not exceed 1 mega-ohm for the whole installation.

8.4 POLARITY OF SINGLE POLES SWITCHES

Tests shall be made to verify that all non-linked single pole switches are on phase conductor (live) and not on neutral or earth conductor. This can be done by connecting test lamps between two terminals of switch and earth. If the lamp lights up when switch is ON and either terminal is touched, the switch is correctly installed.

8.5 RESISTANCE OF METAL CONDUITS/SHEETS (EARTH CONTINUITY TEST)

In case of cables encased in metal whether conduit or metallic sheathing, the total resistance of the conduit or sheathing from the earthing point any other position in the completed installations shall not exceed 2 ohms. This can be carried out by following circuit: One end of the lead is connected to the ECC and its connection with the electrode and the other to the farthest point of the ECC. First, current through the circuit is measured with the resistance of 2 ohms short circuited by the link. Next, current is measured through the two ohms resistance by disconnecting the two leads from the ECC and joining them together. If current is more in the first case, the resistance of ECC is less than 2 ohms.

9.0 HANDING OVER/TAKING OVER

9.1 After completion of works and tests specified above, the various buildings of the project can be taken over by the employer as and when these are ready in all respects. However, the defect liability period of 12 months would start from the date, when all the buildings of the project have been completed and handed over, unless employer agrees for defect liability period in phased due to non-completion of civil work of few buildings for which electrical contractor is not responsible.

10.0 HANDING OVER/TAKING OVER

10.1 The Tenderer shall indicate the makes of tools, test equipment and other items listed below:

1. TOOLS

- A. Set of spanners of sizes 6mm to 32mm width across flat
 - Adjustable wrench of 36mm jaw width
 - Adjustable wrench of 23mm jaw width
- B. Heavy duty screwdriver with full size insulated handle and blade length of
 - 100mm
 - 50mm
 - 200mm

2. TEST EQUIPMENT

- A. 2500V megger motor operated
- B. 500V megger hand operated
- C. Multimeter (Battery operated) satisfying the following
 - With 0-1mA, 0-100mA, 0-1A and 0-5A, AC & DC current ranges
 - With 0-100mV, 0-3V, 0-30V, 0-300V and 0-1000V AC & DC voltage ranges
 - The resistance ranges shall be at least five (0-100)mohm, (0-1)Ohm, (0-10)Ohm, (0-100)Ohm, (0-100)megaohm
 - The input impedances shall not be less than one mega Ohms for voltage ranges

3. LADDERS

Ladders shall be made out of light aluminium alloy of good strength. They shall be of step ladder, foldable, self supporting type with spreader of metallic angles or high strength nylon straps. The ladders shall be provided with shoes on bottom of legs. Rugs shall be flat type having thickness of 30mm in case of 3 metres long ladders and 60mm for 6 metres long ladder.

- 3 metres long
 - 6 metres long
4. Tong tester- ammeter range 0 to 30, 150 & 300 Amps AC and voltmeter (0-600)V, class 1.0 with leads and leather case.

DTS No - 93

Supplying & erecting fan hook box of 10 mm M.S. round bar bounded to the RCC bars up to 50mm length each side and pierced through a 16 Gauge M.S. box / Heavy Duty PVC box complete erected concealed in Ceiling with necessary finishing.

The rate shall be for a unit of one Ea.

Details specification same as per Item no 92

DTS No - 94

Supplying and erecting 19 / 20 mm. nominal bore Medium Class M.S. Pipe down rod erected duly painted for fan complete with proper insulation without leakage and earthing.

The rate shall be for a unit of one Mtr.

Details specification same as per Item no 92

DTS No - 95

Supplying Table fan approved make A.C. 230V, 50 c/s. 40 cm. sweep oscillating complete with 3 mtrs. of 3core round flexible wire and 3 pin plug top. [Make shall be approved by Engineer in Charge]

The rate shall be for a unit of one Ea

Details specification same as per Item no 92

DTS No - 96

Supplying and erecting approved make Bracket fan of 230 volt, A.C. 50 Cy/s., 400/450 mm sweep complete erected on wall or with lead Cores and connections complete. Cat.II

The rate shall be for a unit of one Ea

Details specification same as per Item no 92

DTS No - 97

Providing and erecting Miniature circuit breaker single pole 6A to 25A suitable to operate on 240 V A.C. system and having breaking capacity 10 KA to be erected in existing box. confirming to IS 8828/1996 with ISI Mark Cat.III

The rate shall be for a unit of one Each

TECHNICAL SPECIFICATIONS FOR INSTALLATION OF LIGHTING DBs

- 1.0 SCOPE
- 1.1 This section relates to specifications for installation, connection, testing and commissioning of lighting distribution board (LDB) using TPN/FP/DP/SP MCB Isolator & ELMCB, Earthing terminal, connector strip for phase neutral and earth for each circuit, CRCA sheet steel housing and complete the item installation. Common banking of neutral and earth conductor is not allowed.
- 2.0 CODES & STANDARDS
- 2.1 Refer Supply specs
- 3.0 MATERIALS REQUIRED
- 3.1 Refer Supply specs
- 4.0 INSTALLATION OF SYSTEM
- 4.1 The DB's shall be assembled and aligned together and be installed at site as per installation manual/instruction of the DB manufacturer.
- 4.2 The DB shall be installed in surface manner at the various location.
- 4.3 All minor electrical and mechanical work required to be attended to on the DB shall be completed in an approved manner after installation but before energizing the DB's.
- 4.4 The M.S. angle/channel iron frame used for installation of D.B. shall be hot dip galvanized (816g/m²).
- 4.5 The DB shall be mounted on angle/channel frame with Anchor fastening only. Civil grouting is not acceptable.
- 5.0 EARTHING INSTALLATION
- 5.1 Refer Earthing Specs
- 6.0 INSPECTION & TESTING
- 6.1 Prior to commissioning of the DB's following tests shall be carried out.
 - 6.1.1 Mechanical endurance test shall be carried out by closing and opening of all the MCB's, switches etc.
 - 6.1.2 Insulation resistance test shall be carried out between phases and between phase to earth bus, keeping the isolating switch in open position. Similar test shall be carried out keeping the isolating switch in closed position.
- All the interlocks, controls and tripping mechanism of the switch gear shall be tested for their proper functioning.

DTS No - 98

Providing and erecting Sheet Steel powder coated MCB distribution board - flush / surface mounted fitted with busbar, neutral link, earth bar and DIN rail, Conforms to IS 8623-1 & 3, IEC 61439-1 & 3 without MCB to house appropriate nos. of MCBs. (The DBs should be used of same company of MCB to be used) suitable for (A) single phase incoming and horizontal single phase outgoing (b) sheet steel double door (IP-43) (iii) 8 way

The rate shall be for a unit of one Each

Details specification same as per Item no 97

DTS No - 99

Supply, Erecting, testing and commissioning of only TPN D.B. PPI type with space for FPMCB as incoming and space for DP ELMCB and 16 SPMCB as outgoing per phase (i.e. 3 tier x 13 way flexy D.B.) of Legrand Make 607756

The rate shall be for a unit of one Each

Details specification same as per Item no 97

DTS No - 100

Supply, Erecting, testing and commissioning of only TPN D.B. PPI type with space for FP ELMCB as incoming and space for 12 SPMCB as outgoing per phase (i.e. 2 tier x 13 way flexy D.B.) of Legrand Make 607746

The rate shall be for a unit of one Each

Details specification same as per Item no 97

DTS No - 101

Providing and erecting Sheet Steel powder coated MCB distribution board - flush / surface mounted fitted with busbar, neutral link, earth bar and DIN rail, Conforms to IS 8623-1 & 3, IEC 61439-1 & 3 without MCB to house appropriate nos. of MCBs.(The DBs should be used of same company of MCB to be used) suitable for (A) single phase incoming and horizontal single phase outgoing (b) sheet steel double door (IP-43) (iv)12 way

The rate shall be for a unit of one Each

Details specification same as per Item no 97

DTS No - 102

providing and erecting Approved make RCCBs conforming to IS: 12640 and having sensitivity of 30 mA and Short Circuit withstand capacity of 10 KA and suitable for operation on single phase 240 V,50Hz. having characteristic of quick action & tripping with all advance feature & do not incorporate any electronic component. for following Max. rating erected as directed (i) 25 Amps.DP Cat. III

The rate shall be for a unit of one Each

Details specification same as per Item no 97

DTS No - 103

Providing & erecting 240 V MCB double pole switch for motor & inductive load (C Curve) having 10 KA breaking capacity & confirms to IS : 8828 in existing box having following capacity (A) 6 to 32 Amp. Cat.III

The rate shall be for a unit of one Each

Details specification same as per Item no 97

DTS No - 104

"providing and erecting Miniature circuit breaker single pole 6A to 25A suitable to operate on 240 V A.C. system and having breaking capacity 10 KA to be erected in existing box. confirming to IS 8828/1996 with ISI Mark

Cat.III "

The rate shall be for a unit of one Each

Details specification same as per Item no 97

DTS No - 105

"Providing & erecting 240 V MCB double pole switch for motor & inductive load (C Curve) having 10 KA breaking capacity & confirms to IS : 8828 in existing box having following capacity (B) 40 Amp.

Cat.III "

The rate shall be for a unit of one Each

Details specification same as per Item no 97

DTS No - 106

25 A / 100 mA DP ELMCB

The rate shall be for a unit of one Each

Details specification same as per Item no 97

DTS No - 107

32 A / 100 mA DP ELMCB

The rate shall be for a unit of one Each

Details specification same as per Item no 97

DTS No - 108

40 A / 100 mA DP ELMCB

The rate shall be for a unit of one Each

Details specification same as per Item no 97

DTS No - 109

"Providing & erecting 415 V MCB Four Pole for Motor & Inductive Load (C Curve) having 10KA breaking capacity & confirms to IS :8828 in existing box having following capacity

(a) 6 to 32 Amp.

Cat.III

(25 Amp)"

The rate shall be for a unit of one Each

Details specification same as per Item no 97

DTS No - 110

"Providing & erecting 415 V MCB Four Pole for Motor & Inductive Load (C Curve) having 10KA breaking capacity & confirms to IS :8828 in existing box having following capacity

(a) 6 to 32 Amp.

Cat.III

(32 Amp)"

The rate shall be for a unit of one Each

Details specification same as per Item no 97

DTS No - 111

"Providing & erecting 415 V MCB Four Pole for Motor & Inductive Load (C Curve) having 10KA breaking capacity & confirms to IS :8828 in existing box having following capacity

(b) 40 Amp.

Cat.III "

The rate shall be for a unit of one Each

Details specification same as per Item no 97

DTS No - 112

astronomical Dual Channel Timer equivalent to Legrand Make D22 Cat. No. 004767

The rate shall be for a unit of one Each

Details specification same as per Item no 97

DTS No - 113

40 Amp DP Dinrail Moured Contactor Equivalent to Legrand make Cat. No. 004068

The rate shall be for a unit of one Each

Details specification same as per Item no 97

DTS No - 114

63 Amp FP Dinrail Moured Contactor Equivalent to Legrand make Cat. No. 004078

The rate shall be for a unit of one Each

Details specification same as per Item no 97

DTS No - 115

Sheets steel powder coated enclosure suitable for incorporating One/Two nos. MCB.

The rate shall be for a unit of one Each

Details specification same as per Item no 97

DTS No - 116

"Providing and erecting Sheet Steel powder coated MCB distribution board - flush / surface mounted fitted with busbar, neutral link, earth bar and DIN rail, Conforms to IS 8623-1 & 3, IEC 61439-1 & 3 without MCB to house appropriate nos. of MCBs.(The DBs should be used of same company of MCB to be used) suitable for

(A) single phase incoming and horizontal single phase outgoing

(a) single door (IP-30)

(i) 4 way "

The rate shall be for a unit of one Each

Details specification same as per Item no 97

DTS No - 117

Providing and erecting Mains with 1.1 KV grade FRLS PVC insulated ISI marked stranded Copper conductor wire in following type of pipe to be erected concealed in /flushed on wall/ceiling, with 1.5 sq. mm copper conductor FRLS PVC insulated stranded wire of green colour for earth continuity of following size.(A) with medium class Rigid PVC pipe and accessories.(b) 2 wire 2.5 sq. mm)

The rate shall be for a unit of one Mtr

Details specification same as per Item no 68

DTS No - 118

Providing and erecting Mains with 1.1 KV grade FRLS PVC insulated ISI marked stranded Copper conductor wire in following type of pipe to be erected in / on wall / ceiling with 2.5 sq. mm copper conductor FRLS PVC insulated stranded wire of green colour for earth continuity of following size(A) with medium class Rigid PVC pipe and accessories.(a) 2 wire 4 sq. mm

The rate shall be for a unit of one Mtr

Details specification same as per Item no 68

DTS No - 119

Providing and erecting Mains with 1.1 KV grade FRLS PVC insulated ISI marked stranded Copper conductor wire in following type of pipe to be erected in / on wall / ceiling with 2.5 sq. mm copper conductor FRLS PVC insulated stranded wire of green colour for earth continuity of following size(A) with medium class Rigid PVC pipe and accessories.(h) 4 wire 6 sq. mm

The rate shall be for a unit of one Mtr

Details specification same as per Item no 68

DTS No - 120

Providing and erecting XLPE(IS:7098)(I)-88 ISI armoured cable multistrand Copper conductor for 1.1 KV. to be laid on wall with necessary clamps or in existing trench / pipe at road crossing or floor of following size of cables. (A) 4 core 10 Sq. mm

The rate shall be for a unit of one Mtr

TECHNICAL SPECIFICATIONS FOR LTLXLPE CABLE
TECHNICAL SPECIFICATIONS FOR LTLXLPE CABLE

1.0 SCOPE OF WORK

This section shall cover supply, laying, testing and commissioning of medium voltage XLPE cables.

1.2

This specification gives the general requirement of cables. However, it is the responsibility of the vendor to take the joint measurement and obtain client's approval before the placement of order to the main supplier/manufacturer.

2.0 CODES & STANDARDS

2.1 The following standards and rules shall be applicable:

Sr.No	Item	Relevant IS	Relevant IEC
1	XLPE insulated electric cables (heavy duty).	IS:7098 Part I	
2	Recommended current ratings for cables.	IS:3961	
3	Aluminium conductors for insulated cables	IS:8130	Indian Electricity Act and Rules.

3.0 DESIGN BASIS & SITE CONDITIONS

3.1 All equipment and materials will be selected and rated for use at the following site conditions.

Site conditions			
Location: Gujarat		Site altitude 81 M above mean sea level	
Ambient temperature		Relative humidity	
Maximum 45 ⁰ C		Maximum 85%	
Minimum 13 ⁰ C		Minimum 25%	
Design 50 ⁰ C		Design 90% at 50 ⁰ C	
Seismic factor Zone III as per S: 18 93		Rainfall 618 mm/year	
Environmental Tropical conditions		Location of Equipment Indoor	
Electrical system data:			
Power supply for Equipment			
Voltage 415V ± 5%		Frequency 50 Hz ± 3%	
Permissible combined voltage & frequency variation	± 6	System design fault level (Symmetrical)	15 kA for 1 sec. max.
System earthing LV side neutrals solidly earthed		Wiring 3 phase, 4 wire on 415 V system	

ply	
Powersupply	240VAC, 1-Ph, 50Hz
Control Supply	-----
Space heater powersupply	240VAC, 1-Ph, 50Hz
Illumination powersupply	240VAC, 1-Ph, 50Hz
Plug-socket powersupply	240VAC, 1-Ph, 50Hz

4.0 TECHNICAL REQUIREMENTS

4.1 GENERAL CONSTRUCTIONAL FEATURES

4.1.1 The medium voltage cables shall be supplied, laid, connected, tested and commissioned in accordance with the drawings, specifications, relevant Indian Standard specifications, manufacturer's instructions. The cables shall be delivered at site in original drums with manufacturer's name, size, and type, clearly written on the drums.

4.2 MATERIAL:

Medium voltage cables shall be XLPE insulated. PVC sheathed, aluminium or copper conductor, armoured conforming to IS: 7098 Part I.

4.2.1 Type:

The cables shall be circular, multicore, annealed copper or aluminium conductor, XLPE insulated and PVC sheathed, armoured or unarmoured.

4.2.2 Conductor:

Uncoated, annealed copper / aluminium, of high conductivity upto 4mm.² size, the conductor shall be solid and above 4mm.² conductors shall be concentrically stranded as per IEC: 228.

4.2.3 Insulation:

XLPE rated 70°C. extruded insulation

4.2.4 Core Identification:

Two core	:	Red and Black
Three core	:	Red, Yellow and Blue
Four core	:	Red, Yellow, Blue and Black
Single core	:	Green, Yellow for earthing

Black shall always be used for neutral.

4.2.5 Assembly:

Two, three or four insulated conductors shall be laid up, filled with non-hygroscopic material and covered with an additional layer of thermoplastic material.

4.2.6 Armour:

Galvanised steel flat strip / round wires applied helically in single layers completely covering the assembly of cores.

For cables size upto 25 Sq. mm. : Armour of 1.4 mm dia G.I. round wire

For cables size above 25 Sq. mm. : Armour of 4 mm wide 0.8 mm thick G.I. strip

4.2.7 Sheath:

XLPE 70 deg. C. rated extruded.

Innersheath shall be extruded type and shall be compatible with the insulation provided for the cables.

Outersheath shall be of an extruded type layer of suitable PVC material compatible with the specified ambient temp. 50 deg. C and operating temperature of cables. The sheath shall be resistant to water, ultraviolet radiation, fungus, termite and rodent attacks. The colour of outersheath shall be black.

Sequential length marking required at every 1.0mtr. interval on outer sheath Vendor has to furnish resistance

and reactance/capacitance of the cable

4.2.8 Rating:

Upto and including 1100 Volts.

5.0 DRAWINGS & INFORMATION

5.1 Contractor shall submit the as-built drawing of the cable laying drawing.

5.2 HANDING OVER DOCUMENTS

The suppliers shall submit following:

1. Data sheet indicating results of tests
2. Test reports

6.0 INSPECTION AND TESTING

6.1 All cables shall be adequately protected against any risk of mechanical damage to which they may be liable in normal conditions of handling during transportation, loading, unloading etc.

The cables shall be supplied in single length i.e. Without any intermediate joint or cut unless specifically approved by the client.

The cable ends shall be suitably sealed against entry of moisture, dust, water etc. with cable compound as per standard practice.

6.2 Finished Cable Tests at Manufacturer's Works:

The finished cables shall be tested at manufacturer's works. Following routine tests for each and every length of cable and copy of test results shall be furnished for each length of cable along with supply. If specified, the cables shall be tested in presence of client's representative.

6.2.1 Voltage Test:

Each core of cable shall be tested at room temperature at 3 KVA C.R.M.S. for duration of 5 minutes.

6.2.2 Conductor Resistance Test:

The D.C. Resistance of each conductor shall be measured at room temperature and the results shall be corrected to 20°C. to check the compliance with the values specified in IS 8130-1976.

6.3 Cable Test Before and After Laying of Cables at Site

6.3.1 Insulation Resistance test between phases and phase to Neutral and phase to earth.

6.3.2 Continuity test of all the phases, neutral and earth continuity conductor.

6.3.3 Sheathing continuity test.

6.3.4 Earth resistance test of all the phases and neutral.

7.0 METHOD OF MEASUREMENT

7.1 The cables will be measured in meters. The unit rate shall include cutting the cable into required lengths, packing, loading, unloading, insurance, transportation, delivery to stores/site as per work order, stocking in stores, testing of cables at stores etc. of medium voltage cable. Total quantity in meters shall be measured on a lump sum basis.

8.0 TRANSPORT, DELIVERY AND STORAGE

8.1 The cables shall be supplied in the actual length as per detailed purchase order

8.2 The cable shall be dispatched at client's stores or at site as per detailed instructions given by client at a later stage.

8.3 The cables shall be loaded from the main vendor's store and properly stacked as per instruction of client's local representative. All such labour and transportation charges shall be clearly mentioned in the offer.

9.0 GUARANTEE OF PERFORMANCE

9.1 The quoted values of parameters shall be within given tolerance for given period of service life.

DTS No - 121

"providing and erecting Mains with 1.1 KV grade FRLS PVC insulated ISI marked stranded Copper conductor wire in following type of pipe to be erected in / on wall / ceiling with 2.5 sq. mm copper conductor FRLS PVC insulated stranded wire of green colour for earth continuity of following size

(A) with medium class Rigid PVC pipe and accessories

(a) 2 wire 4 sq. mm"

The rate shall be for a unit of one Mtr

Details specification same as per Item no 68

DTS No - 122

"Providing and erecting Mains with 1.1 KV grade FRLS PVC insulated ISI marked stranded Copper conductor wire in following type of pipe to be erected concealed in /flushed on wall/ceiling, with 1.5 sq. mm copper conductor FRLS PVC insulated stranded wire of green colour for earth continuity of following size

(A) With medium class Rigid PVC pipe and accessories

(b) 2 wire 2.5 sq. mm"

The rate shall be for a unit of one Mtr

Details specification same as per Item no 68

DTS No - 123

"Providing and erecting Mains with 1.1 KV grade FRLS PVC insulated ISI marked stranded Copper conductor wire in following type of pipe to be erected concealed in /flushed on wall/ceiling, with 1.5 sq. mm copper conductor FRLS PVC insulated stranded wire of green colour for earth continuity of following size

(E) in existing pipe

(a) 2 wire 1.5 sq. mm"

The rate shall be for a unit of one Mtr

Details specification same as per Item no 68

DTS No - 124

"Providing and erecting Mains with 1.1 KV grade FRLS PVC insulated ISI marked stranded Copper conductor wire in following type of pipe to be erected concealed in /flushed on wall/ceiling, with 1.5 sq. mm copper conductor FRLS PVC insulated stranded wire of green colour for earth continuity of following size

(E) in existing pipe

(b) 2 wire 2.5 sq. mm"

The rate shall be for a unit of one Mtr

Details specification same as per Item no 68

DTS No - 125

"Supplying & erecting approved make LAN cable of following size in existing pipe as per direction [C] CAT - 6"

The rate shall be for a unit of one Mtr

Details specification same as per Item no 120

DTS No - 126

Providing and erecting XLPE (IS:7098)(I)-88 ISI armoured cable multistrand Aluminium conductor for 1.1 KV. to be laid on wall with necessary clamps or in existing trench / pipe of following size of cables (A) 4 core 16 Sq. mm

The rate shall be for a unit of one Mtr

Details specification same as per Item no 120

DTS No - 127

Providing and, fixing heavy duty flange type brass cable gland with rubber ring for PVC insulated armoured cable complete with out going tails, insulating tape etc for following size of cables. (D) 2 to 4 core 16 Sq. mm

The rate shall be for a unit of one Ea

Details specification same as per Item no 120

DTS No - 128

Solder less crimping type Aluminium lugs conforming to IS suitable for cable of following size evenly crimped with high pressure tool & connected to switchgear terminals with brass/cadmium plated nut bolts in an approved manner. (C) 16/25 Sq.mm.

The rate shall be for a unit of one Ea

Details specification same as per Item no 120

DTS No - 129

Making trench in soft soil of suitable width of 90 cm deep for laying cable or locating the fault all over the run and back filling the same and making the surface as normal ground.

The rate shall be for a unit of one Mtr

Details specification same as per Item no 120

DTS No - 130

Providing & laying approved make Double walled corrugated pipes (DWC) of polyethylene(conforming to IS 14930 II)with necessary connecting accessories of same material at required depth in existing trench for laying of cable. below ground / road surface for enclosing cable (A)50 mm outer dia

The rate shall be for a unit of one Mtr

Details specification same as per Item no 120

DTS No - 131

Providing & laying approved make Double walled corrugated pipes (DWC) of polyethylene(conforming to IS 14930 II)with necessary connecting accessories of same material at required depth in existing trench for laying of cable. below ground / road surface for enclosing cable (C))90 mm outer dia

The rate shall be for a unit of one Mtr

Details specification same as per Item no 120

DTS No - 132

Providing & laying. R.C.C. Hume pipe for cable to be laid 90 cm. below ground across the road crossing or on floor with necessary material in an approved manner and making the ground as per original. (F) 100 mm dia.

The rate shall be for a unit of one Mtr

Details specification same as per Item no 120

DTS No - 133

Providing and, fixing heavy duty flange type brass cable gland with rubber ring for PVC insulated armoured cable complete with out going tails, insulating tape etc for following size of cables. (C) 2 to 4 core 10 Sq. mm

The rate shall be for a unit of one Each

Details specification same as per Item no 120

DTS No - 134

Solder less crimping type Aluminium lugs conforming to IS suitable for cable of following size evenly crimped with high pressure tool & connected to switchgear terminals with brass/cadmium plated nut bolts in an approved manner. (B) 10 Sq.mm

The rate shall be for a unit of one Each

Details specification same as per Item no 120

DTS No - 135

Providing and erecting HOT deep Galvanized iron strip wire 8 to 16 SWG.

The rate shall be for a unit of one Kgs

TECHNICAL SPECIFICATIONS FOR SUPPLY OF EARTHING SYSTEM

1.0 SCOPE OF WORK

1.1 Design, assembling, testing, painting, supply, delivery at site with all related accessories as per the specifications as specified below. Compliance with the provisions of this specification shall not relieve the Bidder of the responsibility of furnishing apparatus and accessories of proper design, electrically and mechanically suited to meet the operating requirements under the specified service conditions and be suitable for the purpose of which they are intended.

2.0 CODES & STANDARDS

2.1 The design, material, assembling, inspection and testing shall comply with all currently applicable statutes, regulations and safety codes in the locality where the system will be installed. The equipment shall also conform to the latest applicable standards and codes of practice as mentioned below.

Sr.	Item	Relevant IS/IEC
1	Code of Practice for Earthing	IS 3043
2	Insulation Co-ordination Application Guide	IS 3716
3	Code of Practice for Protection of Buildings and Allied Structures against Lightning	IS 2309
4	Indian Electricity Rules, 1956	
5	Indian Electricity Act, 1910	
6	National Electrical Code	
7	Low Voltage Electrical Installations-Part 5-54: Selection & Erection of Electrical equipment- Earthing arrangement & protective conductors.	IEC 60364
8	Protection Against Lightning-Part 3: Protection of structures & life Hazards	IEC 62305

TECHNICAL REQUIREMENTS

- 4.1 The earth grid shall consist of main grounding grid conductors forming a closed ring network with required number of Rod type earthing stations connected to it to provide a common earth for electrical equipments and metallic structures. Two distinct connections shall be made from each earthing station to the main grounding/earthing mat through GI/Cu. flat.
- 4.2 Earthing system should offer a resistance of less than 2ohms throughout the year. In places where Soil resistivity is more, total length of the earthing rod has to be increased by adding 1m length rods (one over the other) to achieve low and stable resistance value. In rocky places, multiple earth rods have to be installed and inter- connected to get the required value.

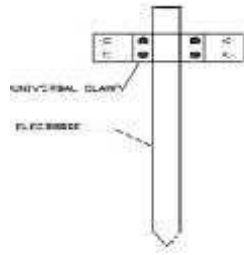
Minimum length for each earthing station to be 3 meters.

- 4.3 The earth bus in required numbers shall be installed in various plant open areas and rooms. Each earth bus shall be provided two distinct connections by GI/Cu flats / Cu. Flexible cable from the main grounding grid conductors available nearby. The plant/building equipment, metallic structures, tanks, etc. shall be brought to earth by providing two distinct connections between earth bus installed nearby and that equipments, tank, apparatus, etc.
- 4.4 Solid Copper coated rods are recommended as earth electrode than a pipe due to the fact that solid rods have much longer life and can be easily driven by electric/hydraulic hammers. Copper has much longer life than all other materials as explained in IS 3043.

4.5 GENERAL CONSTRUCTIONAL DETAILS

4.5.1 Pipe Electrode Earth Station

1. Copper coated Solid steel Rod shall be made of high tensile low carbon steel rod, molecularly bonded with 99.9% electrolytic copper with minimum coating thickness of 250 microns as per IEC 62561 part -2: Requirement for Conductor & Earth Electrodes.
2. The length of the earth rod shall be 1 meter at least or as per manufacturer's recommendation, so that driving into the ground is easier. For dry areas, length of the rods can go up to several meters by driving the rods one over the other.
3. For all the installation minimum length of the earthing rods shall be 3 mts minimum by adding similar rods.
4. Earth rods should be of diameter 20 mm minimum. Additional rods should be added without external couplers. The earth rods should have peg & bore arrangement or similar such arrangement so that additional rods are added without external couplers.
5. Interconnecting Strips / Earthing Conductor: Copper coated steel strips /tapes should be used to interconnect different earthing rods as well as horizontal earthing (Ring earthing). These strips should have a coating thickness of minimum 70 microns.
6. The earth resistance shall be maintained with a suitable soil treatment.
7. The earth lead shall be fixed to the pipe with a nut and safety set screws. The clamp shall be permanently accessible
8. Connectors/fasteners for connecting Electrode with Earthing conductor/strip should be of Stainless Steel as it is compatible with all other materials viz Copper, GI etc. Fasteners should be made of Stainless steel



9. The depth of an earth electrode pipe shall be in approximately in accordance with the drawing as well as on nature of soil. However as per general guidelines, the pipe electrode shall have to be placed at depth where soft earth is available. This is to reduce the effect of earth resistance.

10. **Inspection Chamber:**

Should have an inner dimension of 250 mm X 250 mm X 250 mm made of FRP material. Flush Mounted, removable cover of the earth pit should be able to withstand moderate loads.

The area inside the inspection chamber should be such that, the UNIVERSAL CLAMP/EBB/Bus bars not too deep inside the inspection chamber or projecting out of inspection chamber.

The chamber should have facility for marking earth resistance and latest testing date by paint at the cover and previous recorded values inside the cover.

If the earthing is shown in road ways subject to vehicular movement, the Inspection Chamber to be of Cast Iron Type to absorb the vehicular loads without any deformation / damage.

11. **Earth Enhancement material:**

This is a conductive mineral compound to provide low resistance to the earth termination system. Earth enhancing compound should contain minerals which in normal use is reliable and without creating any hazards to persons and the surroundings.

The material shall be chemically inert to sub soil and shall not pollute the environment. It shall provide a stable environment in terms of physical and chemical properties and exhibit low resistivity. It shall not be corrosive to the earth electrode itself. The material should have low resistivity less than 50 Ohm meter

4.4 **EQUIPMENT EARTHING**

All apparatus and equipment transmitting or utilizing power shall be earthed in the following manner. Copper/G.I. Earth strips/wires shall be used unless other-wise indicated.

4.5 **ELECTRICAL AND PERFORMANCE REQUIREMENTS**

4.5.1 **Power Transmission Apparatus**

1. Metallic conduit shall not be accepted as an earth continuity conductor. A separate insulated continuity conductor of size 100% of the phase conductor subject to the minimum shall be provided.

2. Non metallic conduit shall have an insulated earth continuity conductor of the same size for metallic conduit. All metal junction and switch boxes shall have an inside earth stud to which the earth conductor shall be connected. The earth conductor shall be distinctly coloured (Green or Green/Yellow) for easy identification

3. Armoured cables shall be earthed by two distinct earth connections to the armouring at both the ends and the size of connection being as for the metallic conduit.

4. In the case of unarmoured cable, an earth continuity conductor shall either be run outside along with the cable or should form a separate insulated core of the cable

5. Three phase power panel and distribution board shall have two distinct earth connection of the size correlated to the incoming cable size. In case of single phase DB's a single earth connection is adequate

5.0 DRAWINGS & INFORMATION

5.1 Drawing for Plate Type Earthing Station – Annexure-1

6.0 INSPECTION AND TESTING

6.1 The entire earthing installations shall be tested as per requirements of Indian Standard Specification IS: 3043

6.2 The following earth resistance values shall be measured with an approved earth megger and recorded.

1. Each earthing station
2. Earthing system as a whole
3. Earth continuity conductors

6.3 Earth conductor resistance for each earthing equipment shall be measured which shall not exceed 1 ohm in each case.

6.4 Measurements of earth resistance shall be carried out before earth connections are made between the earth and the object to be earthed

6.5 All tests shall be carried out in presence of the consultant/client

7.0 METHOD OF MEASUREMENT

7.1 Provision of earthing station complete with excavation, electrode, watering pipe, soil treatment, chamber with cover etc. shall be treated as one unit of measurement

7.2 The following items of work shall be measured and paid per unit length covering the cost of the earth wires/strips, clamps, labour etc.

1. Main equipment earthing grid and connection to the earthing station.
2. Connection to the switchboard, power panels, DB etc

7.3 The cost of earthing the following items shall become part of the cost of the item itself and no separate payment for earthing shall be made.

1. Motors-earthing forming part of the cabling/wiring for the motors.
2. Isolating switches and starters should form part of mounting frame, switch starter etc.
3. Light fittings-form part of installation of the light fittings.
4. Conduit wiring, cabling-should form part of the wiring or cabling.
5. Street lighting-should form part of the street light poles

8.0 TRANSPORT, DELIVERY AND STORAGE

8.1 The prices shall be F.O.R. site basis including packing & forwarding charges. The quoted price must include all the costs for necessary mode of transportation up to the final location of earthing system or site store. All incidental expenses during transportation shall be part of quoted prices including transit insurance. The charges for loading and unloading of equipments at site should form part of offer.

9.0 GUARANTEE & WARRANTY

9.1 The Bidder shall stand guarantee for the performance of entire equipment and components for twelve (12) months from the date of commissioning or eighteen

(18) months from the date of dispatch, whichever is earlier, as agreed up on and as reproduced in the purchase order within the tolerance specified or as permitted by the relevant standards for the equipment in his scope of supply.

10.0 **SPARES**

10.1 Not applicable

11.0 MATERIALS REQUIRED

11.1 All required hardware such as bolts, nuts, washers (round and spring type), anchor fasteners, screws, etc. of sizes and type as required shall be conforming to relevant IS. All hardware shall be hot-dip galvanized or zinc passivated / cadmium plated as per requirement of work either mechanical fabrication or electrical jointing.

11.2 All other items required for installations shall be as approved by site in-charge.

12.0 **INSTALLATION OF SYSTEM**

12.1 The plate/pipe electrode, as far as practicable, shall be buried below permanent moisture level but in no case less than 3 M below finished ground level

12.2 The plate/pipe electrode shall be kept clear of the building foundation and in no case, it shall be nearer by less than 2 M from outer face of the respective building wall / column

12.8 Construction of the earthing station shall in general be as shown in the drawing and shall conform to the requirement on earth electrodes mentioned in the latest edition of Indian Standard IS: 3043, Code of Practice for Earthing Installation.

12.9 The earth conductors (Strips / Wires, Hot dip G.I. / copper) inside the building shall properly be clamped / supported on the wall with Galvanized Iron clamps and Hot Dip GI screws / bolts. The conductors outside the building shall be laid at least 600 mm. below the finished ground level/

12.10

12.11 The earth conductors shall either terminate on earthing socket provided on the equipment or shall be fastened to the foundation bolt and / or on frames of the equipment. The earthing connection to equipment body shall be done after removing paint and other oily substances from the body and then properly be finished

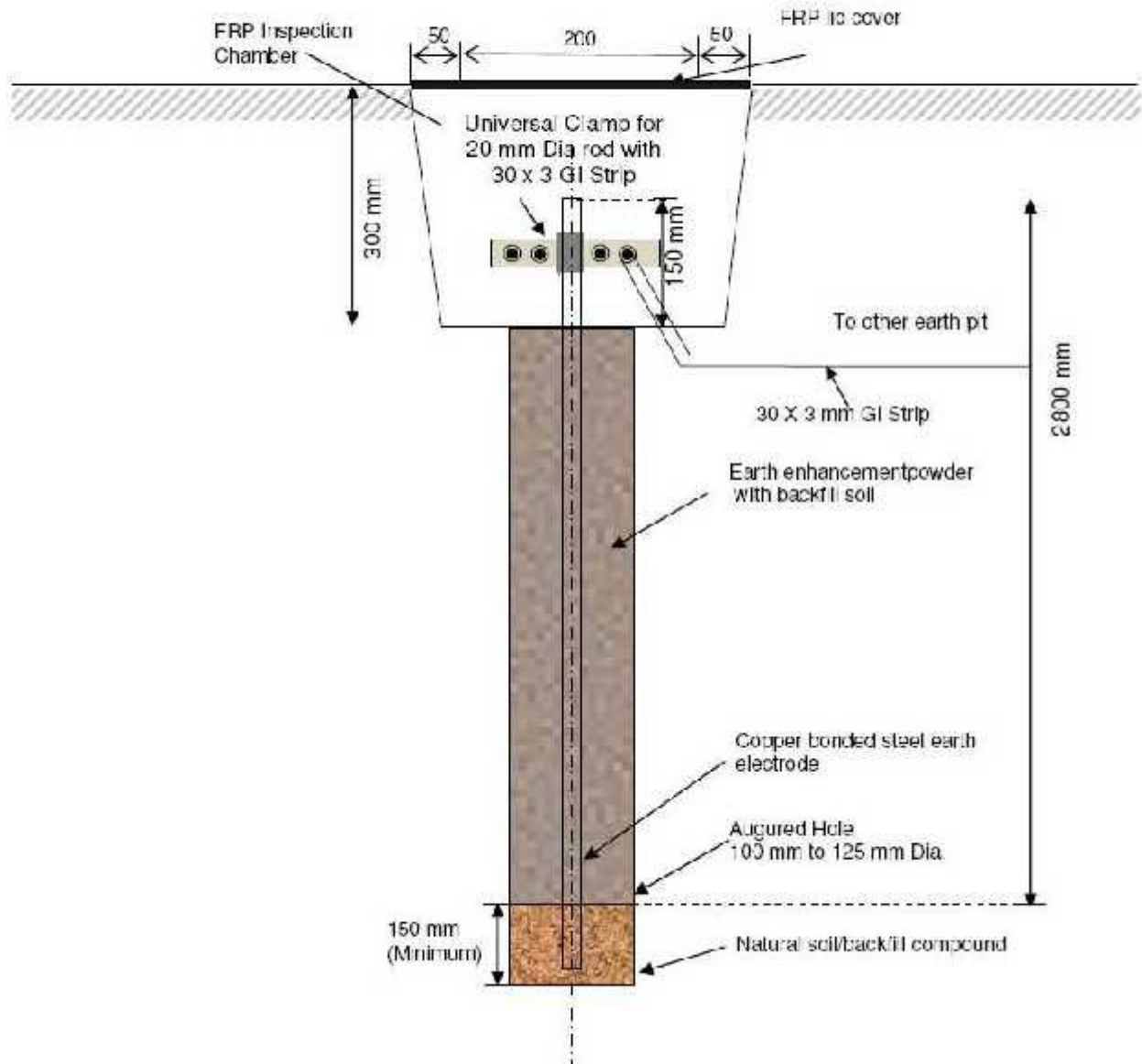
12.12 Over lapping of earth conductors during straight through in joints, where required, shall be of minimum 75mm. long and bitumen coated.

12.13 The earth conductors shall be in one length between the earthing grid and the equipment to be earthed

12.14 Minimum distance of 2 mtr shall be maintained between other electric conductor, earthing conductor and the conductor laid for the lightning protection system. Earthing and lightning protection system conductors shall be bonded to each other to prevent side flash over in case of non-availability of adequate clearance.

12.15 The earthing metal conductors, risers, earthing cables, etc. passing through walls shall be covered with galvanized iron sleeves for the passage through wall. Water stop sleeves shall also be provided wherever the earthing conductor enters the building from outside.

Earthing Auguring Method



DTS No - 135

**Providing and erecting HOT deep Galvanized iron strip wire 8 to 16 SWG.
The rate shall be for a unit of one Kgs**

DTS No - 136

Supplying & erecting earth pit of minimum bore dia.150mm size approved make Earthing Electrode consisting Pipe-in-Pipe Technology as per IS 3043-1987 made of corrosion free hot dipped G.I.Pipes having Outer pipe dia of 50mm having 80-200 Micron galvanising, Inner pipe dia of 25 mm having 200-250 Micron galvanising, connection terminal dia of 12mm with constant ohmic value surrounded by highly conductive compound with high charge dissipation suitable for following type of applications with chamber and heavy duty cover. (A)(approved make OEM has to submit test certificate including value of earth resistance of installation duly stamped and signed by agency and officer Incharge has to ensure the value of earthing resistance mentioned in test Certificate) & having back filling compound of (B) Inner chemical (CCM Compound)- Resistivity:- 0.2 ohm / meter testing as per IEC 62561-2017, Voltage drop:- < 1 volt at no load &

dry form, Sulphur content:- <2%(C) Back fill Compound :- Earthing compound should be capable to retain moisture for long time Necessary test report must be submitted by Agency.
(b)For Electrical installation up to 11 KV in normal soil.Length of Pipe : 2.00 mtrs Back filling Compound :1 no. Bag of 25 Kg.

The rate shall be for a unit of one Each

Details specification same as per Item no 135

DTS No - 137

Providing and erecting required size HOT deep Galvanised iron strip for earthing of H.T. , OCB/ ACB/ Transformer LT panel board, Motors etc. using proper clamp.

The rate shall be for a unit of one Kgs

Details specification same as per Item no 135

DTS No - 138

Providing and erecting Annealed bare Copper wire 8 to 16 SWG.

The rate shall be for a unit of one Kgs

Details specification same as per Item no 135

DTS No - 139

For using salt and charcoal / coke as required for pipe type earthing.

The rate shall be for a unit of one Each

Details specification same as per Item no 135

DTS No - 140

Approval & Liaisoning work for Obtaining the necessary legal permissions from the concern government authorities, including to prepare drawings before/after execution for the work etc complete as directed by E.I.C (Certificate For LIFT, Highrise Permission DG set. Also for Power supply meter connection) It includes charges of Name Transfer of Electric Meter of each flat as well as service Meter.

The rate shall be for a unit of one Job

DTS No - 141

"providing and erecting Approved make single phase electronic energy meter rating 5A/20A/40A based on ASIC (Application Specific integral circuit) digital technology with accuracy Class-I, temper proof, free from effect of external magnetic field with phase, earth, reverse and impulse indications, 6 digit electro-mechanical counter suitable to work on 120 V to 300V, 45 - 55 Hz., housed in robust enclosure complete to be erected as directed with 3 year replacement guarantee.

Cat. III"

The rate shall be for a unit of one Ea.

Details specification same as per Item no 97

DTS No - 142

"Providing and fixing 02 units Automatic sliding Doors (2 leafs) of size as per drawing for items to be fitted onto the Bus Station excluding any other RF component.) with Four Door RF Controller with 2 RFID Reader with weatherproof Stainless-Steel enclosure to be fitted near the bus door with Emergency Door operations Switches in Ticket office (inclusive of two-year warranty period) + Four Door RF Controller (inclusive of two-year warranty period) + RFID Reader with weatherproof Stainless-Steel enclosure to be fitted near the bus door (inclusive of two-year warranty period) + Emergency Door operations Switches in Ticket office (inclusive of two-year warranty period) (SD unit Per Station .Each Unit comprise two leafs)

"

The rate shall be for a unit of one Lot

Specifications for Automatic Sliding Door

1. Automated Sliding Door Functional Requirements

The Sliding door should provide access facility to the passengers to board the bus and exit out of the bus at BRTS bus stations. The doors are intended to be in closed position in normal condition when there is no bus at the bus station; however in event of abnormal conditions or emergency situations the station manager should have electronic/manual overriding control to manage the doors. The door should open only in an event that the bus arrives at the station bay and intends to allow passengers to enter or exit out of the bus.

2. Automatic Sliding Door Specifications

All the Aluminum sections of the System should be confirming to IS 733, IS 1285.

The thickness of the same to be minimum 3.18 mm, alloy 63400 WP with chemical composition, physical and mechanical properties shall be confirming to IS: 733 or IS: 1285 – 2002 (or) its latest amendment. They have to be finished with Anodizing of approved shade with minimum thickness of 20 micron as per approved colour (as per IS:1868) (Minimum anodic coating shall be of grade AC15

The System should be controlled by a microprocessor based electronic control and monitoring equipment. Gear motor with encoder acting as an automatic limit switch and anti-crushing device which, by means of the learning operation recognizes the mechanical stops and during the following operations it controls speed and deceleration. The running units with reinforced self-lubricated , noise limiting nylon wheels, electricity-conducting synthetic material drive belt, safety photocell and System for connection to framed wing or to tempered glass wing consisting of galvanized steel adjustable brackets and aluminum supporting profiles and anodized or painted finish and the same colour front guard should be provided.

Wing locking device complete with lever operated release System for manual opening and buffer battery pack for emergency power supply.

Vendor shall provide opening / closing alarm on the door by way of blinking light and clear audio interface suitable for crowded location.

3. Door Material Specifications

The Bidder is required to provide his prices for the following type of door:

4mm thick toughened glass + 1.5 mm PVB film (Poly Vinyl Butyl film) + 4mm thick toughened glass confirming to IS: 14900: 2000 and IS: 2553 of exterior glass work. Thickness Test, Resistance to Shock Test, Wrap test, Fragmentation Test and other required tests have to be carried out confirming to relevant IS Codes as instructed by Employer /Engineer In Charge.

4. Compatibility for RFID Subsystem

The vendor shall provide Sliding Doors in such as way that the system is compatible with (i) the RFID subsystem to be provided in this tender and (ii) the subsystem already installed on existing bus stations and buses. The successful bidder shall have to share the protocol for the system IPR.

The System thus provided shall seamlessly integrate with the current System installed.

Supplier is required to share the protocol and logic of RFID subsystems with the Employer in order to make the system compatible, in case of not doing so will result in termination of the Supplier and he shall forfeit his Performance Security.

The RFID sub system under bidding shall be capable enough to identify the Articulated as well as standard BRT buses in future as and when Employer introduce Articulated Buses for BRTS. This could be enable through prefix attached to serial id of RF tags and enable the sliding operation accordingly to accommodate boarding and alighting of commuters to regular BRT buses as well as Articulated Buses at all BRT Bus stations.

A. Specifications for wireless controller for door operator

(To be installed at the BRTS bus stations, One per bus station)

Specifications for RF Transceiver (Wireless central 8 door controller unit)

No.	Item	Specifications
1	Operating voltage	12V dc
2	Current	0.4A dc
3	Enclosure	MS powder coated wall mountable box.
4	Dimensions	192mm * 96mm * 100mm Kindly take a note that the dimensions specified above is indicative. Minor modifications, preferably close to the given dimensions as much as possible, can be acceptable. Any modification in size upto $\pm 10\%$ is acceptable.
5	RF transceiver	2.4 GHz, IS2400-2483.5 MHz ISM/SRD band
6	Microcontroller	8 bit, 50ns Cycle time
7	Outputs	8 RLY and 8 Solid state @ 12Vdc
8	Inputs	8 RS232 for RFID reading

Features:

- Eight door controller over wireless.
- Supports bus orientation indication and control for individual doors.
- Supports audio announcement system.
- On Site calibration of RFID over RF.
- Built in Watchdog and Reset circuit.
- Rugged and reliable.
- LED indications for easy diagnostics.
- Open and close commands supported.
- Secured serial protocol over RF.
- There are four regular bi-parting sliding doors in Bus Stations. Additionally there is provision to add four more sliding doors in future for facilitating operation of Articulated Buses. To allow this, a 8 door controlling unit per Bus Station and related accessories and fittings shall have to be included in quoted prices

B. Specifications of Currently Installed Extra Long Range Proximity Reader

(To be installed at the BRTS bus stations, Four per bus station)

Introduction:

extended range proximity reader featuring compact dimensions and read range of up to 90 cm. The unit will run from an excellent power supply and making it particularly suited to access control, car parking and through-wall reading applications.

Features:

- ☆ High-precision **auto tuning** circuitry compensates
- ☆ Extra long reading range of up to **90 cm** with ISO passive cards; up to **130 cm** with special clamshell card
- ☆ Internal **relay** control
 - Bright LED indicators, tuning LED bar
 - Firmware upgradeable in the field
 - Attractive and **waterproof** housing design
 - High-quality power supply with noise filter included

Applications:

- Access Control System
- Car Parking System
- Through-wall Reading Application
- Personal Identification
- Hands Free Application

Specifications :

Interfaces	Wiegand 26 bits MSR ABA Track2 RS232 RS485 or Special Customized Specification
Reading Range	Up to 90 cm with ISO card in ideal conditions or up to 130 cm with special clamshell card
RFID cards accepted	125KHz, 64 bits, Manchester encoding
Maximum power switched by internal relay	Up to 24V / 2A
Operating temperature range	-10 ~ +60° C
Audio / Visual indication	Bright blue LED and Buzzer
Dimensions	420 (W) x 320 (L) x 45(D) mm

**Operation Specifications:**

- Buffer batteries for emergency power supply with UPS facility or anti-panic door opening facility through the dip- switches
- Electronic force adjustment control
- Obstruction detection system which causes the door to stop or reverse operation when an obstruction is detected
- Automatically controlled braking and slowdown operations
- Independently controlled open, partly open and close controls
- Manually adjustable thrust force on obstacles, opening speed, closing speed, automatically controlled closing time and partly open operations
- Stop and reverse operation safety devices
- Operating parameters can be changed directly from the control panel, from an infrared control or by connecting PC equipment with a interface to control software.

The makes of Readers specifications provided in tender are indicative. The bidders' submission for Reader will be evaluated as per specifications provided in the tender and need to adhere to the same. It should be compatible with other equipment during operations. The apparatus should also be 'inter-operable' across operational infrastructure in earlier phases and upcoming phases in future

C. Specifications for Emergency Door operations Switches in Ticket office

(To be installed at the BRTS bus stations, Eight switches per bus station)

Specifications for Emergency Switch

Eight emergency switches shall be required to be installed at the ticket office in each bus station, for control of each of the four sliding doors at the bus station for manual operations of the door in case of emergencies.

There are four regular bi-parting sliding doors in Bus Stations. Additionally there is provision to add four more sliding doors in future for facilitating operation of Articulated Buses. To allow this, a total of 8 Emergency Switches per Bus Station and related accessories and fittings shall have to be included in quoted prices.

D. Automatic Sliding Door operations:

The automatic sliding door should operate only when bus door aligns completely with the bus station door in which case either the driver has a remote switch (RF Switch) which can be operated from inside the bus after the driver ensures it is safe to allow passengers to exit and enter the bus or the supplier should provide a mechanism such that the door is operated only when the mechanism senses that the bus has come to a halt and the door of bus and the station have aligned to each other.

The RFID Tag installation would involve installing the tag at suitable height in the Bus Station along with protective box in manner that makes it tamper proof. The complete responsibility of the location selection, provision of metallic protective box, installation, commissioning and maintenance for the RFID tag shall be with the Supplier.

The mounting structure made of SS needed to mount RFID reader on the station shall be in the scope of delivery. However the supplier shall be provided with proper drawings as and when needed.

The RFID reader supplied by the supplier shall also have a weather proof acrylic cover on top of the reader to ensure safety and weather protection.

The supplier shall provide visual alarm with buzzer on the station door to allow passengers to know that the door is opening or closing.

The RFID switch system on driver dashboard shall be driven by 12/24 VDC. The supplier shall have provision for a converter for the above mentioned supply requirements. The door operations switch to be installed on the bus dashboard is within the scope of supply.

1. System Availability

The System could be required to be functional round the clock, and the availability of the System should be in excess of 99% of the operations time of both the Warranty Period and AMC period. Any other service level metrics, as might be appropriately required, would be finalized during the contract signing stage.

1. Service monitoring

- (a) Supplier will put in place a monitoring mechanism to monitor all Components of automated sliding doors. Supplier through its monitoring system should provide data which is sufficient to allow analysis and reporting of Component performance and availability to the detail and frequency described in this Agreement.
- (b) Supplier will additionally use data gathered from its monitoring of the Components to inform & take approval from competent authority for its decisions in respect of any changes to its infrastructure which in its sole discretion, deems necessary to maintain or improve the availability and performance of the services delivered to Employer.

2. Performance reporting

Supplier shall record performance and availability of each of the Customer Components and report this information to the Customer. Where periodic account reviews are agreed by both parties to be held between the Customer and Supplier, these reports will form an agenda for such reviews. If the Customer Components include access to Supplier's service system, Supplier will enable the Customer to view the reports via Supplier's service system.

3. Complaints procedure

If the Customer has any complaints about the way in which Supplier support facilities are being managed, the Customer Representative should contact the Supplier.

4. General Maintenance Conditions:

- a) The maintenance shall include both Preventive Maintenance and Corrective Maintenance.
- b) This SLA shall cover each and every part/component of the Sliding Door System. The supplier shall examine, clean, lubricate and adjust various components/parts of the entire Automated Sliding Door System including all parts and components every month and shall take necessary measures to maintain the Sliding Door in proper working conditions in accordance with the Specifications in the Agreement.
- c) The supplier shall supply and replace any part/components which are discovered to be potentially detrimental to the safety of the user and/or to the efficient and cost effective operation of the Sliding Door and which require immediate replacement.
- d) In case of need to replace any part/component, the supplier shall provide original make genuine parts/components of similar/higher quality.
- e) In case of emergencies, the supplier shall respond immediately to take the necessary actions irrespective of the provisions regarding time limit in the Agreement.
- f) The supplier shall be liable for any kind of damage to the user of the Sliding Door caused by poor maintenance, delay in any repair/maintenance works and shall pay for the damage.
- g) Repairs may be carried out generally during non operational hours.

5. Insurance:

- a) The Supplier shall, at its cost and expense, purchase and maintain insurance during the Implementation Period & Warranty Period.

E. Protection against Ingress of Rain Water

The Porta cabins shall be constructed in such a way that, all joints shall be effectively sealed against water ingress in closed condition by Welding / rubber gasket profiles for windows and doors / weather proof sealants wherever necessary.

F. Roof (Self Draining Type)

The roof of the shell be manufactured from 2 mm thick. plane MS Sheet confirming to IS 1079 or IS 513 or equivalent with self-draining type (proper slope shall be maintained). The entire panel is continuously seam welded and is welded to the peripheral members.

- G. All materials used shall be brand new and free from pitting / rust. If the materials used or finished works are not found acceptable, the Supplier shall arrange for the replacement of materials required for re-execution of the work as per the contract.

DTS No - 142

"Providing and fixing 02 units Automatic sliding Doors (2 leaves) of size as per drawing for items to be fitted onto the Bus Station excluding any other RF component.) with Four Door RF Controller with 2 RFID Reader with

DTS No - 143

S & L only PVC Heavy gauge in concealed manner with GI pulling wire of 25 mm dia with all accessories.

The rate shall be for a unit of one Mtr

DTS No - 144

S & L only PVC heavy gauge in concealed manner with GI pulling wire of 32 mm dia with all accessories.

The rate shall be for a unit of one Mtr

MAKELISTFORELECTRICALWORKS		
SR.NO.	ITEM	STANDARDMAKE
1	LT / AMF PANELS	CPRI / ERDA APPROVED PANEL BUILDER. 70 KA SHORT CIRCUIT WITHSTAND STRENGTH. ACCESSORIES AS PER MENTIONED IN MAKELIST. Lauritz Knudsen (L&T) / C&S / SIEMENS / PVJ POWER
2	DISTRIBUTIONBOARDS	LEGRAND/SCHNIEDER/HAVELLS/SIEMENS/Lauritz Knudsen (L&T) / C&S
3	CABLE & WIRE	FINOLEX/POLYCAB/KEI/RRKABEL/ALLCAB
4	CABLETRAY(ALLTYPE)	PROFAB/PRECISION/THINKTRECK /UNIVERSAL/INDIANA/KEW/RUSHAB
5	LTSWITCHGEAR(ALLRANGE)	AS PER SPECIFIED PANEL DISCRIPTION IN BOQ. MODELAS PER SPECIFIED IN BOQ LEGRAND/SCHNIEDER/ HAVELLS/SIEMENS/Lauritz Knudsen (L&T) / C&S
6	LTMCCB	LEGRAND/SCHNIEDER/ HAVELLS/SIEMENS/Lauritz Knudsen (L&T) / C&S
7	LTMCB,ELCB	LEGRAND/SCHNIEDER/ HAVELLS/SIEMENS/Lauritz Knudsen (L&T) / C&S
8	LTSFU	LEGRAND/SCHNIEDER/ HAVELLS/SIEMENS/Lauritz Knudsen (L&T) / C&S
9	LTCONTACTORS	LEGRAND/SCHNIEDER/HAVELLS/SIEMENS/Lauritz Knudsen (L&T) / C&S
10	CHANGEOVERSWITCH	LEGRAND/SCHNIEDER/HAVELLS/SIEMENS/Lauritz Knudsen (L&T) / C&S
11	STARTER (STAR-DELTA /DOL)	LEGRAND/SCHNIEDER/HAVELLS/SIEMENS/Lauritz Knudsen (L&T) / C&S
12	SUBMERCIBLEMOTOR/MONOB LOCKPUMPSET	CROMPTON/KIRLOSKAR/KBL/LUBI
13	METERS(DIGITAL)	ENERCON/CONZERVE/SCHNEIDER/AE/SECURE/ ABB/ Lauritz Knudsen (L&T)
14	LOADMANAGER	ENERCON/SEM /KRYKARD/CONZERVE/NIPPEN/ Lauritz Knudsen (L&T)
15	RELAYS-EARTHFAULT	LEGRAND/SCHNIEDER/HAVELLS/SIEMENS/GE / Lauritz Knudsen (L&T) / C&S
16	LUGS	DOWELL'S/3M/JAINSON/COMET/HMI /(ISI MARKED)
17	BIMETALLICLUGS	DOWELL'S/3M/ISMAL/HMI /(ISI MARKED)
18	CABLEGLAND	DOWELL'S/JAINSON/3D/COMET/HMI(ISI MARKED)
19	PVCCONDUITSANDACCESSORIES,UPVC TRUNKING	PRECISION/ANCHOR/POLYCAB /NIHIR
20	CASINGCAPING	PRECISION/NIHIR/POLYCAB
21	MODULARSWITCHES,SOCKETS &OTHER ACCESSORIES	LEGRAND/HAVELLS/GM/ANCHOR / Lauritz Knudsen (L&T) / C&S
22	PVCJUNCTIONBOX	SINTEX/CLIPSAL/MK /PRECISION/ANCHOR/ POLYCAB/NIHIR

MAKELISTFORELECTRICALWORKS		
SR.NO.	ITEM	STANDARDMAKE
23	COAXIALTV CABLE	DELTON/NATIONAL/HAVELLS /FINOLEX
24	LEDLIGHTFIXTURES	LIGHTINGTECHNOLOGIES/ PHILIPS /HAVELLS/JAQUAR/WIPROPERMODELSPECIFIEDINB OQ
25	CEILINGFAN/EXHAUSTFAN	CROMPTON/USHA/HAVELLS/ ORIENTASPERMODEL SPECIFIEDIN BOQ
26	GIJUNCTIONBOX/UNDERFLOOR TRUNKING&ITSACCESSORIES	MK/LEGRAND
27	CMS	MK/LEGRAND
28	EARTHING&LIGHTNINGARRESTOR	GREENWIRE/ASHLOK/E-LINK
29	SMCPRESSBOX	SINTEX/EPP
30	MODULARLIGHTPOINTWITHACCES SORIES	ANCHOR/HAVELLS/MK/ LEGRAND
31	SOLARWATERHEATER	HONEYWELL/RACOLD/INTERSOLAR
32	SOLARPOWER SYSTEM	TATA/HAVELLS/SOLARSOKO/WARRI
33	DWCPIPE	RexPolyExtrusionLtd/VECEngineering/GEMINI
34	WATERCOOLER &RO	VOLTAS/USHA/BLUESTAR/ EUREKAFORBS
35	GIPOLE	MARUTI/AMBICA/RRISPAT
36	CCTVSYSTEM	HICKVISION/INFINOVA/HONEYWELL/ TYCO/ CISCO
37	LEDDISPLAY TV	SAMSUNG/PANASONIC/SONY / LG
38	PoESWITCH	CISCO/ AVAYA
39	CAT-6CABLE	DIGILINK/FINOLAX/ANCHOR/DLINK
40	COMPUTERORSERVER	HP/DELL
41	NETWORK RACK	VALRACK/APW
42	FIREEXTINGUISHER	SAFEX/MINIMEX/AAAG/NEWAGE
43	HAND DRYER	JAQUAR / DOLPHY / EURONICS
44	INTERACTIVE SMART BOARD	VESTEL OR EQUIVALENT
45	KEYBOARD AND MOUSE	HP / DELL / LOGITECH
46	All in one desktop Computer	HP / DELL / LENOVO
47	Bluetooth Earphones with Mic	Oneplus / Oppo / Realme / Boat
48	Laser Printer	HP / BROTHER / CANON / EPSON
49	BARCODE SCANNER	Honeywell / Zebra / Casio
50	Android Tablet	Oneplus / Samsung / Realme
51	Hard disk	WD / Samsung / Toshiba
52	Bus Duct	Lauritz Knudsen (L&T) / schneider electric / C&S
53	HT VCB Panel	Lauritz Knudsen (L&T) / C&S / schneider electric / Siemens energy
54	Diesel Generator Set	Kirloskar Oil Engines Limited / Kirloskar Generators / Ashok Leyland Ltd
55	Elevator	KONE / OTIS / TRIO / OMEGA / ORBIS
SpecialNote:-		
1	Client has right to check the challans of supplier.	
2	The MCB and MCB DB must be of same make.	
3	Approve all the make of material from Client/Consultant/PMC before execution.	
4	The Client/Consultant/PMC reserve the right to select the manufacture or approved make from the above list.	
5	Any make not mentioned in the above lists must be approved from Client/Consultant before execution.	
6	All the materials should be as per standards mentioned in specifications and BOQ.	
7	Equipment's/ items for which no make is specified, approval shall be obtained from both Consultant and Client prior to supply. Contractor will have to propose Minimum three vendors for such item, right to selection/rejection of particular make offer by	

	contractor is with consultant and client.
8	Various options are given in the above vendor's list. However, choice as to the selection of particular make will rest to both Consultant and Client.
9	If any make not mentioned in above make list, but if it is approved in SMC's approved vendor list in Light & EEC department, it will be allowed to use subject to prior approval of competent authority.

GENERAL SPECIFICATIONS

1. WIRING RULES :

The installation generally shall be carried in conformity with the Indian Electricity Act/Rules and the latest edition of the wiring rules of the Institution of Electrical Engineers (London) but where this specification differs from those rules the specifications shall be followed.

2. DEFINITION :

The definition of terms the I.E.C. wiring rules shall apply.

3. PRESSURE AND FREQUENCY :

The supply will be three phase 50 cycles A.C. 4 wire system 415 volts between phase, and 230 volts between phase and neutral and apparatus required shall be suitable for this supply.

4. SYSTEM OF WIRING :

Wiring for lights, fans wall sockets, refrigerators and bells shall be carried out as described in the items and details shall be confirmed with the specification herein.

5. All wiring must be done on the distribution system with main and branch distribution board at convenient centres and without isolated fuse. All conductors shall be run as far as possible so as to be easily accessible and capable of being inspected. Facility for maintenance shall be particularly provided for and blanking of circuits carefully arranged.

6. CONDUCTORS :

All conductors shall be of copper as set for in the I.E.C. wiring rules 11th edition and no insulated conductor shall have cross section less than of 1/0.044 and every such conductor of greater gross section shall be standard.

7. FALL OF POTENTIAL :

The cross sectional area of all conductor inside the building shall be so proportioned to their loads that the drop in pressure between the main fuses and the nearest consuming appliance shall not exceed 2% with all devices in use.

8. CIRCUITS :

No final lighting or fan circuits from a distribution board shall carry more than 3 amperes of 6 points and as far as possible the loading shall be arranged so as to obviate the necessity of using various sizes of fuse wires on sub-circuits.

9. TESTS :

The installation with fittings complete shall before current is switched on satisfactorily pass the following test.

- (a) All the lamps and appliance having been connected to the conductors and all switches and fuses be (ON a pressure not less than twice the working pressure) (subject to a limit of 500 volts) shall be applied and the installation resistance of the whole or any part of the installation to earth must be less in megohms than 25 divided by the number of points.

10. JOINTS :

All joints in conductors shall be made by means of approved mechanical connector in suitable approved joints boxes but as far as possible looping back shall be adopted.

11. SWITCHES :

- (a) All main switches shall be of quick make and break combined switch and fuse, ironclad type of reliable make and subject to approval.
- (b) All branch switches controlling not more than 5 amperes shall be of quick and break, push button or tumbler pattern and shall be 'NO' when the knob is down, the attachment of covers to the base of the switch must be by means of machine screws. All fan and wall socket shall be provided with controlling switches.

12. DISTRIBUTION BOARDS :

All distribution boards shall be fitted with hard grain pattern Home Office Type porcelain fuses (one on positive side of circuit, the neutral being connected to a common bus bar of copper in such a way that the circuit can be easily isolated from the distribution boards) of substantial make and at least of 5/10 Amp. capacity porcelain 5 amp. round cut-outs will not be allowed to be used as fuse holder. All distribution boards shall be fitted with the wall enclosed in box of approved pattern (to be supplied by the contractor) when concealed system is adopted and on polished folding Type Teakwood blocks with cover in the case of open wiring in each case the pattern shall be submitted to the Engineer-in-charge for approval. Load on each floor shall be distributed on required distribution boards.

13. CEILING ROSES AND SOCKETS :

Ceiling roses and wall sockets shall be of reliable make and subject to the approval. The subsuspension of the flexible wire for light pendants shall be so executed that the weight of the pendant will not be carried by the terminals of the ceiling rose.

14. LAMP HOLDERS :

Lamp holders for use on brackets shall have not less than a half inch female nipple. All cases must be solid and substantial and of bayonet pattern. Pendant lamp holder shall have a good grip fitted on them so as to carry the weight of the pendant.

15. INTERCHANGEABILITY :

Similar parts of all the switches, lamp holders, ceiling rose, brackets, pendants and all other fittings of the same type shall be interchangeable.

16. CONDUIT TO BE CONTINUOUS :

Conduit shall be of rigid P.V.C.

17. BUNCHING OF WIRES :

The wires of a circuit must be each together in a conduit.

18. JOINTS IN CONDUIT :

The lengths of conduit shall be jointed by means of adhesive solution.

19. PRECAUTION AGAINST INSECTS AND DAMP :

All outlets of conduit system shall be properly drained and ventilated but in such a manner as to prevent the entry of insects.

20. PROTECTION OF CONDUIT :

The conduits and fittings shall be joined by means of adhesive solution.

21. CONDUCTOR :

All conductors used in in conduit wiring shall be standard confirming to I.S. 694 1988 Part -II

22. ERECTION AND EARTHING OF CONDUIT :

Conduit shall be electrically continuous through out and shall be permanently and efficiently connected to earth by means of solid or standard copper wire having a cross sectional area not less than that of No. 8 S.W.G. in conduit system the pipe must be continuous when passing through wall of 1 floor and earthing shall extend to the metal frame of all main and branch switches and distribution boards. Gas pipes must not be used for obtaining and earth connection.

23. EARTH WIRE AND PLATES :

The earthing wire and the connection with earth shall be of 8 SWG G.I. as per specified instructed by Engineer-in-charge and shall be so constructed and laid as to avoid the formation of any electronic couple. all earthing wires shall be efficiently protected against mechanical damages.

24. PASSING THROUGH WALLS :

The conductor shall be carried in an approved heavy gauge solid drawn or lapwelded conduit tube or porcelain ducts. Where a wall tube passes outside a building so as to be exposed to the weather, the other end shall be bellmouthed and turned down wards.

25. PLUGGING WALLS :

Plugs for ordinary walls or ceiling shall be of well seasoned teak wood not less than two inches long by one inch square on the inner and three fourth inch square on the outer or they shall be cemented into the walls to within one fourth inch of surface used with plaster or line putting to give the cement hold the plugs, two counterboards not less than half inch diameter, one inch deep must be provided on each of the two opposite sides. Iron screw may be used for attaching battens to the plugs. Where owing to **IRREGULAR COURING OR OTHER REASONS THE PLUGGING OF THE WALLS IRREGULAR PRESENTS DIFFICULTIES BATTENS OR CONDUIT SHALL BE ATTACHED TO THE WALLS OR CEILING IN A MANNER APPROVED BY THE ENGINEER-IN-CHARGE.**

25. ATTACHMENT TO WALLS AND CEILINGS :

In the case of lead covered or Cab-Tyre Shethed system the conductors shall be fixed on varnished teak wood battens not less than half inch in thickness by means of metal clips (of approved make) spaced at intervals of not more than 4.1/2 inches. The clips shall be fixed to T.W. battens by means of brass screws or pins set level with the surface of the clips. Pawl plug may be used for fixing battens to walls and ceiling, but only taper T.W. plugs (see clause 24) shall be used for fixing T.W. base blocks for switches regulator and ceiling rose.

26. ATTACHMENT OF FITTINGS AND ACCESSORIES :

All ceiling roses, wall socket switches, regulators, brackets, pendants and accessories attached to wall or ceiling shall be mounted on substantial teak wood varnished blocks having solid backs not less than quarter inch thick. All accessories shall be fixed to such base blocks by means of brass screw.

27. PASSING THROUGH FLOORS :

All wires passing through floors shall be efficiently protected by means of metal or T.W. covering box extending not less than 8 fts. above floor level conduit or procelain tubes shall be used for lading the wires though the floor.

28. FITTINGS :

No wire shall be buried directly in plaster.

29. FITTINGS :

Fans, regulators, lighting, fixtures etc. whether splied by the employer or conductor shall be erected in position by the contractor in such manner as not expose any unsightly fittings necessary for suspension from the ceiling or walls, and in cofirmity with the surrounding architectural design.

30. RATING :

The raing of consuming devises unless indicated on the drawings will be as follows :-

Ceiling Fans	150 Watts.
Desk fans	80 „
Lights	60 „
Wall sockets	80 „

31. LOCATION OF CONTROL BOARDS :

The controll boards shall be fixed in consulation with the Engineer-in-charge.

32. All makings on the switches and distribution boards shall comply with Rule 510 of Indian Electricity Act.
33. All control switches shall be located as far as possible on walls.
34. In wiring work should be used approved by I.S.I.

SIGNATURE OF THE CONTRACTOR WITH SEAL

EXECUTIVE ENGINEER
BRTS PROJECT
SURAT MUNICIPAL CORPORATION

GENERAL

1. Meters for power points, light and fan points shall be separate mains shall be brought to the position indicated on the planned the line shall be taken there from to the distribution boards on various floors.
 2. Electric company's charges for bringing the main cables to position indicated together with the connection for meters are payable by the S.M.C.
 3. It will be the responsibility of the contractor to get power connection form supplying company. The application and all respective forms shall be signed by the contractor & service connection, applicable charges shall be paid by the corporation. The Corporation will not take over the possession of dwelling units unless permanent electric connection is received and the entire installation is energized.
-
1. The contractor having electric contract license of Gujarat State shall only be eligible to tender.
 2. All electrical system/equipment maintain & keep in healthy condition up to the liability period and handover to the citylink in good & healthy condition.
 3. Test report should be submitted by electrical contractor of all electrical items and factory testing should be conducted as suggested by engineer-in-charge Electrical.

SIGNATURE OF THE CONTRACTOR WITH SEAL

EXECUTIVE ENGINEER
BRTS PROJECT
SURAT MUNICIPAL CORPORATION

I have tendered after studying the above specification.

Signature of the Contractor:-

Address:-

Date:-

SPECIFICATION OF MATERIAL

WIRES & CABLES	:	FINOLEX/L & T /HAVELLS/R.R.CABLES
ARMoured CABLES	:	TROPODURE/INCAB/TORRENT/FINOLEX/UNISTER/GLOSTER/CCI/BHARAT CAN/ABOCAB/HAVELLS.
UNARMoured CABLES	:	TROPODURE/INCAB/TORRENT/FINOLEX/UNISTER/GLOSTER/CCI/BHARAT CAN/ABOCAB/HAVELLS/R.R.CABLES
WIRING ACCESSARIES		CRABTREE, M K INDIA(LOGIC),ANCHOR(ROMA),JAINEX,STRACCO
MCB /DISTRIBUTION BOARDS	:	SEIMENS/INDO KUPP/MDS/HAVELES/HAGER/STANDARD/SCHINEIDLER/ABB

I here by agree to supply as above make materials of your choice.

Date :-

Signature of the contractor with seal

SPECIAL CONDITION

- (1) Point wiring shall be from the distribution fuse board, No sub main shall be measured.
- (2) Samples of materials shall be given to Engineer-in-charge and approval should be taken in writing before its use.
- (3) Fabrication drawing should be get approved from the Engineer-in-charge prior to Manufacturer.
- (4) Pipe laying lay out shall be as per instruction given by Engineer-in-charge.
- (5) There shall be no junction in wiring out let box shall be used after bond.
- (6) Electrical contractor shall make good the civil work if chased or damaged.
- (7) Electrical Engineer-in-charge opinion shall be final and binding on contractor.
- (8) Qualified labour and supervisors shall work at site.
- (9) Electrical Contractor shall not permit unqualified labour contractor to work at site. He shall observe Govt. rules regarding control of labour. He shall submit test report and carry out tests as required and furnish detailed drawings on completion of work. The responsible authorised person by the contractor should be available of site daily when work is in progress.
- (10) The Electrical appliance-materials shall be bear the ISI mark or declaration indicating manufacture's names and appliances material used having been manufactured in accordance with the manufactures's certificate issued by the Government of Gujarat and confirming to the standar specified by the I.S.I. shall be given by the contractor.
- (11) Entire work shall be conforming to IS where ever not specified.

The conditions laid down under House Hold Electrical appliances (Quality control Act 1981) shall be followed.

The Contractor shall provide test report and get the installation approved from Govt. Elect. Authority is required.

CONTRACTORS STAMP AND SIGNATURE.

19.0 DECLARATION FORM

- (1) I/We hereby declare that I/We have visited the site and fully acquainted myself/ourselves with the local situation regarding materials, labour and other factors pertaining to the work before submitting this tender.
- (2) I/We hereby declare that I/We have carefully studied the conditions of contract, specifications and other tender documents of this work and agree to execute the same accordingly.

SIGNATURE OF THE CONTRACTOR WITH SEAL

EXECUTIVE ENGINEER
BRTS PROJECT
SURAT MUNICIPAL CORPORATION

Address:-

Date:-

Place:-

20.0 FORMAT FOR BANK GAURANTEE

~~To,~~
~~The Commissioner,~~
~~Surat Municipal Corporation,~~
~~SURAT.~~

~~[1] In consideration of the Terms and Conditions of an Agreement made between Commissioner, Surat Municipal Corporation, Surat (herein after called "Surat Municipal Corporation") and (Contractor) (hereinafter called "Contractor") for the work of **CONSTRUCTION OF CONVENTIONAL TYPE BRTS BUS SHELTER AT RATNAMALA JUNCTION, UNDER FLYOVER BRIDGE IN NORTH (KATARGAM) ZONE, SURAT (WORK NO.1)** for the Earnest Money deposit for the due fulfillment by the contractor of the terms and conditions contained in the said agreement, We Bank (hereinafter referred to as the Bank) at the request of (Name of Contractor) do hereby undertake to pay the Surat Municipal Corporation an Amount not exceeding **Rs. 29,000.00** (i.e. 50% of Total E.M.D. Amount) against any loss or damage caused to or suffered by Surat Municipal Corporation by reason of any breach of any term or condition contained in the said agreement by the said Contractor.~~

~~[2] We Bank of, do hereby undertake to pay the amount due and payable under this Guarantee without any demur merely on a demand from the Surat Municipal Corporation stating that the amount claimed in due by way of loss of damage caused to or would be caused to or suffered by the Surat Municipal Corporation by the reason of breach by the said contractor of any of the terms and conditions in the said agreement or by reason of the contractor failure to perform the said agreement. Any such demand made on the Bank shall be conclusive as regards the amount due and payable by the Bank under this guarantee shall be restricted to an amount not exceeding **Rs. 29,000.00** (50% of Total of Amt. of EMD)~~

~~[3] We undertake to pay the Surat Municipal Corporation any money so demanded notwithstanding dispute or disputes raised by the contractor. In any suit or proceeding pending before any Court or Tribunal relating thereto our liability under this present being absolute and unequivocal.~~

~~The payment so made by under this bond shall be a valid discharge of our liability for payment thereunder and the contractor shall have no claim against us for making such payment.~~

~~[4] We Bank of, further agree that the guarantee herein contained shall remain in full force and effecting during the period that would be taken for the performance of the said agreement and that under or by virtue of said agreement have been fully paid and its claim satisfied or discharged or till Commissioner, Surat Municipal Corporation, Surat clarified that the terms and conditions of the said agreement have been fully and properly carried out by the said contractor and accordingly discharge this guarantee. Unless a demand or claim under this agreement is made on us in writing on or before **Dtd** we shall be discharged from all liability under this Guarantee thereafter.~~

~~[5] We Bank of, further agree with the Surat Municipal Corporation that the Surat Municipal Corporation shall have the fullest liberty without our consent and without in any manner our obligations hereunder to vary and of the terms and conditions of the said agreement or to extend the time of performance by the said contractor from time to time or to postpone for~~

~~any time or time to time any of the power exercisable by the Surat Municipal Corporation against the said contractor and to Forces or enforce any of the terms and conditions relating to the said agreement and we shall not be relieved from our liability by reason of any variation or extension being granted to the said contractor or for any biarnaise, act or omission of the part of the Surat Surat Municipal Corporation or any indulgence by the Surat Municipal Corporation to the said contractor or by any such matter or thing whatsoever which under the law relating to sureties would but for his provision have of a relieving us.~~

~~{6} This guarantee will not be discharged due to the change in the constitution of the Bank or the Contractor.~~

~~{7} We Bank of, lastly undertake not to revoke during its currency except with the previous consent of the Surat Municipal Corporation in writing.~~

~~{8} Not withstanding anything contained here in above our liability under this guarantee is restricted to **Rs.29,000.00**(50% Amt. of EMD) shall remain in force until **Dtd. _____** unless a claim or demand under the guarantee is made against us in writing and received on or before **Dtd. _____** all your rights under the said guarantee shall be forfeited and we shall be relieved discharged from all liabilities there under.~~

Seal, stamp and signature
of Bank's authorized signatory

~~_____Date:-~~

21.0 COVERING LETTER

To,
Municipal Commissioner,
Surat Municipal Corporation,
SURAT.

Sir,

I / We have tendered for the work..... of
.....
.....and have paid Earnest
Money Deposit Amounting to Rs..... drawn by
.....

(Name of the Bank)

The receipt No. dated by the Corporation is attached herewith.

In case, my / our tender is not accepted, therefore kindly arrange to refund the amount of Earnest Money Deposit paid by me / us as per the details referred to above.

Advance, stamped Receipt duly signed on Revenue Stamp of Rs. 1.00 p. is also enclosed here with.
Signature of the Contractor.....

Address :-

.....

.....

Encl : As Stated.

22.0 ADVANCE STAMP RECEIPT

Received with thanks the sum of Rs. (In Words) only from the Surat Municipal Corporation being the refund of Earnest Money Deposit placed by me/us vide SMC's Receipt No. dated along with the tender paper for the.....

(Name of the work)

:- Revenue Stamp Date

Signature of the Tenderer.

F.W.C. to the Accountant,

2. For remarks whether thedeposit amounting to Rs. placed on by Shri/M/s. in connection with the work of stands in full in the name of the aforesaid party (R.No. dated)

SIGNATURE OF THE CONTRACTOR WITH SEAL

EXECUTIVE ENGINEER
BRTS PROJECT
SURAT MUNICIPAL CORPORATION

F.W.Cs. to EXECUTIVE ENGINEER, TRAFFIC BRTS PROJECT CELL,

To deposit of Rs. placed on by Shri/M/s. stands in full in the name of the aforesaid party.

Accountant.

Submitted,

For favour of sanction of refund Rs. being the amount of
deposit placed on.....vide Receipt No..... by
Shri/M/s..... in connection with the work of
..... as the tender of the
above party has been accepted / had not been accepted and the concerned contractor has paid security
deposit of Rs. for the above referred work on Dt. The party has
also executed an agreement for the above work. The above deposit stands in full in the name of the said
party as certified by the Accountant on..... The expenditure will be debited on B.H.G.
Tender Deposit Account.

Assistant Engineer / Jr. Engineer.

Dy. Engineer,

Sanctioned Accordingly.

23.0 ANTI-BLACKLISTING CERTIFICATE

(on Non Judicial Stamp Paper of Rs.300/-)

(To be provided by Bidder)

I M/s. _____ (Name of the Bidder along with name and address of registered office) hereby certify and confirm that we or any of our promoter/s/ director/s are not barred by Government of Gujarat (GoG)/ any other entity of GoG or blacklisted by any state government or central government/ department/ agency/local self Government/Surat Municipal Corporation in India from participating in Project/s, either individually or as member of a Consortium as on _____ (Bid Submission Date).

We further confirm that we are aware that our Bid for the captioned Project would be liable for rejection in case any material misrepresentation is made or discovered with regard to the requirements of this Tender at any stage of the Bidding Process or thereafter during the agreement period. Dated this ____ day of _____ 2026

To be signed by:

Authorised Signatory with name & designation

Name of the Bidder

SURAT MUNICIPAL CORPORATION

24.0 STATEMENT - A

Statement showing the similar works completed in the last seven years, i.e. for a period starting from Dt. 01.04.2019 to 31.03.2026

Sr.No.	Name of Department / Client with Address	Name of work	Estimated cost of work put to tender	Tendered Amount	Date of award of contract	Target date of completion of work as per contract and date of completion of work if completed		Actual Amount of work completed	Time limit in year and months		Percentage rate and amount of Penalty	Reasons for delay in completion of work	Remarks
						Target Date	Completion Date		Original Y M	Extended Y M			
1	2	3	4	5	6	7a	7b	8	9a	9b	10	11	12

**Date
Place**

Signature of contractor

25.0 STATEMENT – B

Statement showing the similar works on hand / in progress.

Sr.No.	Name of Department / Client with Address	Name of work	Estimated cost of work put to tender	Tendered Amount	Date of award of contract	Target date of completion of work as per contract and date of completion of work if completed		Actual Amount of work done	Time limit in year and months		Reasons for delay in completion of work	Remarks
						Target Date	% Progress till Date		Original Y M	Extended (if any) Y M		
1	2	3	4	5	6	7a	7b	8	9a	9b	10	11

Signature of the contractor with seal

Address

26.0 ANNEXURE A
AFFIDAVIT

NAME OF WORK:- CONSTRUCTION OF CONVENTIONAL TYPE BRTS BUS SHELTER AT RATNAMALA JUNCTION, UNDER FLYOVER BRIDGE IN NORTH (KATARGAM) ZONE, SURAT (WORK NO.1) (2nd Attempt).

- 1.0 I, the undersigned, do hereby certify that all the statements made in the required attachments are true and correct.
- 2.0 The undersigned also hereby certifies that neither our firm M/s _____ nor any of its constituent partners have abandoned any work in India nor any contract awarded to us for such works has been rescinded during last five years, prior to the date of this bid.
- 3.0 The undersigned hereby authorize(s) and request(s) any bank, person, authorities, government or public limited institutions, firm or corporation to furnish pertinent information deemed necessary and requested by the SMC to verify our statements or our competence and general reputation.
- 4.0 The undersigned understands and agrees that further qualifying information may be requested, and agrees to furnish any such information at the request of the SMC.
- 5.0 The SMC and its authorised representatives are hereby authorised to conduct any inquiries or investigations to verify the statements, documents, and information submitted in connection with this application and to seek clarification from our bankers and clients regarding any financial and technical aspects. This Affidavit will also serve as authorisation to any individual or authorised representative of any institution referred to in the supporting information, to provide such information deemed necessary and requested by yourselves to verify statements and information provided in the Tender or with regard to the resources, experience and competence of the Applicant.

Signed by the authorised signatory of the firm

Title of the office

Name of the firm

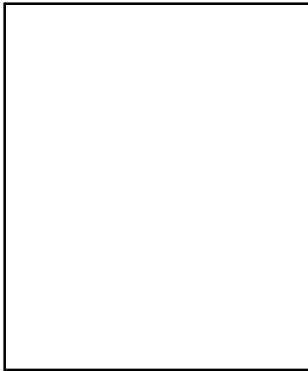
Date

Note: The affidavit format as indicated above to be furnished on non judicial stamp Paper of **Rs.300.**



27.0. M. UNDERTAKING :

Photographs of the Tenderer/ Partners/ Managing Director of the firm :



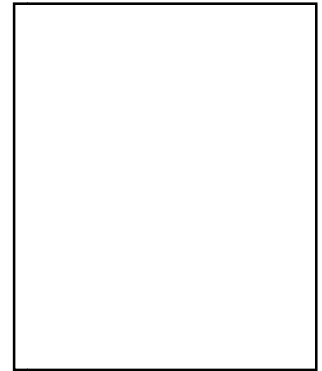
Name :

Signature :



Name :

Signature :



Name :

Signature :

(Separate Sheet Shall be attached for Photographs, if required).

1. I/We agree, hereby, that the decision of the Surat Municipal Corporation in qualifying &/or Selection of the applicant's / Contractor, phasing of the work and in any other project related matter, shall be final and binding to me/us.
2. All the information and data, furnished herewith, are correct to my/our best of Knowledge.
3. I/We agree that I/We have no Objection, if inquiries are made about my/our works, their related areas and any other inquiry regarding all the details, projects and works listed by me/us in the qualifying documents at any Stage.

Signature of the applicant with seal of the firm

28.0 Drawings:-

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