

SURAT MUNICIPAL CORPORATION

TRAFFIC - BRTS PROJECT CELL

NAME OF WORK	CONSTRUCTION OF BRTS BUS SHELTER ON UDHANA TEEN RASTA TO DINDOLI-KHARVASA (MADHURAM CIRCLE) IN SURAT CITY.(2ND ATTEMPT) (WORK-3)
E-Tender	
Tender Notice (On Line) No. ACE & I/c. CE / TRAFFIC- BRTS PROJECT CELL /02/2026-27	
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
LAST DATE OF ONLINE QUERY SUBMISSION	:	Bidders shall have to post their queries on E-Mail address brts@suratmunicipal.org on or before 01/07/2026 Upto 18.00 Hrs.
DATE OF ONLINE SUBMISSION OF TENDER	:	on or before 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)	:	From 10/07/2026 to 17/07/2026 up to 17:00 Hrs. at the office of "Chief Accountant, Surat Municipal Corporation, Tapiipura 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 11:00 hrs onwards.
ESTIMATED AMOUNT	:	Rs.1,64,15,052.79 Ps. + GST Separately
E.M.D.	:	Rs.1,65,000/-
TENDER DOCUMENT FEES	:	Rs.3,600.00 + Rs.648.00 (18%GST) = Rs.4,248/-
CLASS	:	"B"

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

**SURAT MUNICIPAL CORPORATION
TENDER DOCUMENT
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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 **From 19/06/2026 to 09/07/2026 up to 18.00 hrs.** on website smc.nprocure.com. The tender received after due time and date specified will not be accepted.

(B) NAME OF WORK : CONSTRUCTION OF BRTS BUS SHELTER ON UDHANA TEEN RASTA TO DINDOLI-KHARVASA (MADHURAM CIRCLE) IN SURAT CITY.(2ND ATTEMPT) (WORK-3)

1. Estimated Cost : Rs. **1,64,15,052.79** Ps. + GST separately
2. Earnest Money Deposit : Rs.1,65,000/-
3. Time Limit : **12 (Twelve) months [Including monsoon]**
4. Tender Document Fee : Rs. 3600.00 + Rs.648.00 (18% GST) = Rs. 4248/-
5. Registration required : "B"

(C) OPENING OF TENDERS:

The tenders will be opened online in presence of bidders who wants to remain present and opening authority subject to receipt of Tender Fees, EMD in **hard copy in Account Department (Head 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 **From 19/06/2026 to 09/07/2026**

Tender documents fees as mentioned which is required for submission of tender towards the cost of tender documents in pay order or by demand draft of any nationalized bank, in favor of "The Commissioner, Surat Municipal Corporation" payable at Surat and shall be submitted along with 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.

- **EMD & Tender Fee shall be submitted in electronic format only through online (by scanning) while uploading the bid. This submission shall mean that EMD and tender fee are received for purpose of opening the bid. Accordingly, offer/tenders of those Tenderer whose EMD & 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 (Head office) within stipulated date as mentioned in tender notice for the submission of tender FEE & EMD. Punitive action shall be initiated for non submission of EMD & Tender fees in original to Account Department (Head Office) by bidder including abeyance of registration and cancellation of E – tendering code for one year. 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 documents must be coloured scanned to be seen as original. Scanning in black and white or gray shall not be acceptable.**
- **If the documents uploaded electronically are photocopies, they must be notarized with clearly displaying stamp, number and name of the notary.**

(E) CONTRACT PERIOD :

The total contract period is hereby fixed as **12(Twelve) months including monsoon from the 11th Day of the work order.**

(F) Tenderer must comply with and agree to all instructions & requirements in the Notice and in the Instructions to Tenderer, including requirements in the Contract Documents.

- (a) All tenders must be submitted in the prescribed Tender form.
- (b) Each Tender must be accompanied by the completion Schedule.
- (c) Each tender must be accompanied by the Tender Document fee and the Tender Security (Earnest Money Deposit).
- (d) The successful Tenderer shall execute the Contract Agreement within fifteen days after the date of Notice of award.
- (e) The successful Tenderer will be required to furnish a performance bond (Security Deposit) of amount equal to **(2%)** two percent of the tendered amount.
- (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 proceeds 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 employer's code number under EPF Act, 1952 and are required to comply the applicable provisions of said statute regularly and totally.**
- (k) **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. Undertaking on Non-Judicial Stamp paper of Rs 300/-.

- k. Anti- blacklist Certificate on Non-Judicial Stamp paper of Rs 300/-.
- l. All documents in supporting of bid.

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. Other necessary documents mentioned in Technical Bid (if any)
- e. Declaration Form.
- f. Undertaking on Non-Judicial Stamp paper of Rs 300/-.
- g. Anti- blacklist Certificate 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 date of opening of the price bid for this 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 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 :

**Executive Engineer
Traffic-BRTS Project Cell
Surat Municipal Corporation**

**ANNEXURE-I TO II FOR PRE-QUALIFICATION
TO BE FILLED IN BY TENDERER
ANNEXURE-I**

Proforma for list of works of similar nature already completed by the Tenderer during last 7 years.

Sr. No.	Name of work and Place	Cost on Completion	Time taken in months to complete the work	Client name	Date of completion
1	2	3	4	5	6

Note: Bidder shall give completion certificate from client. In absence of such completion certificate, experience shall not be considered for evaluation. If completion certificate covers "Similar work with other work" then bidders shall have to submit copies of final bill indicating similar work or certificate of amount including "Similar work" from relevant authority (Govt. or Semi Govt. Dept., State Govt., Municipal Corporation, Municipality, CPWD etc.). Also an attested copy of registration with MES, Various department of State Govt., Surat Municipal Corporation, CPWD etc.)

Please Fill above details attached separate sheet.

Signature of the Contractor
With seal.

Place:
Date

ANNEXURE-II

Proforma for declaration regarding work on hand with the tender:

Sr. No.	Name of work with place	Estimated Cost	Date of Issue of work order	Stipulated period of completion	Amount of work done	Brief details of delay if any	Name of client
1	2	3	4	5	6	7	8

Present liability = Total of column 3 - Total of column-6

Signature of the Contractor

with seal :

Place

Date:

Note: Amount of work done in Column 6, should be given up to the month previous to the month in which tender are invited.

Please Fill above details attached separate sheet.

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 0occurring 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.

Signature of the contractor with seal:

Date :

**Executive Engineer
Traffic-BRTS Project Cell
Surat Municipal Corporation**

3.0 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:

Address:

Date :

**Executive Engineer
Traffic-BRTS Project Cell
Surat Municipal Corporation**

SURAT MUNICIPAL CORPORATION

TRAFFIC BRTS PROJECT CELL

E- Tender Notice (online) No. ACE & I/C C.E./Traffic BRTS Pro. Cell/02/2026-27, Work No.3

4.0 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 Registration certificates	Yes	No	
(5)	PAN card No.	Yes	No	
(6)	Professional Tax Registration (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 may be	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 - C)	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 for rejection.

SEAL & SIGNATURE OF TENDERER :-

5.0 INSTRUCTIONS 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 work of **CONSTRUCTION OF BRTS BUS SHELTER ON UDHANA TEEN RASTA TO DINDOLI-KHARVASA (MADHURAM CIRCLE) IN SURAT CITY.(2ND ATTEMPT) (WORK-3)** 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) Mainly tenderer shall fulfil following the pre-qualification.

(a) Experience of having successfully completed similar works during last 7 years ~~either of the~~ following:-

(1a) Three similar completed works, each costing not less than amount equal to 40% of the estimated cost.

OR

(2a) Two similar completed works, each costing not less the amount equal to 50% of the estimated cost.

OR

(3a) One similar completed works, each costing not less the amount equal to 80% of the estimated cost.

"Similar work" means Construction work of building works likes residential building, commercial buildings, educational building, hospital buildings of relevant authority (Govt. or Semi Govt. Dept., State Govt., Municipal Corporation, Municipality, CPWD etc.)

(b) Average Annual Turnover during last 3 years, ending 31st March of previous financial year should be atleast 30% of Estimated Tender Amount. An attested copy of annual turnover for last 3 years should be enclosed. The turnover certificate shall be prepared by Chartered Accountant

(c) Current Solvency certificate from bankers of schedule bank/Nationalized bank for the amount upto 20% of the tender cost plus works on the hand still to be executed.

(d) An attested copy of registration with MES, Various department of State Govt., Surat Municipal Corporation, CPWD etc.

(e) List of the works already completed in last seven years in prescribed proforma as per Annexure-I 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 an financial figures to amount 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 cost and the amount for the work executed in Annexure-I without accounting for the above mentioned factors.

(f) Declaration regarding the work on hand with the tender should also be given in prescribed proforma as per Annexure-II. Attested copies of work orders, interim certificates if any shall also be attach as supporting documents.

(g) Attested copy of partnership deed, power of attorney etc.

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 affect 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.

IT-07 EARNEST MONEY DEPOSIT:

- A. The Tender shall be accompanied by the Earnest Money Deposit. The tenderer shall pay Earnest Money Deposit to be deposited by pay order/demand draft issued in favour of Commissioner, Surat Municipal Corporation, Surat through Nationalized / Schedule Bank only. The Earnest Money Deposit in the form of FDR or cheque shall not be accepted. The tenderer shall have to mention details of Earnest Money Deposit on the seal cover of Earnest Money Deposit. The instruments for Earnest Money Deposit shall be issued by or payable / encashable at Surat Branch of the said nationalized bank.

- 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 Security Deposit / Performance Guarantee Bond to the owner as stipulated in this tender documents within **fifteen** 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 Security Deposit/ performance guarantee bond, as required, if furnished by the contractor.
- D. No interest shall be paid by the owner on any tender 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 attested photo 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 wherever 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 only. Tenderers are requested to quote for all parts of the tender.

IT 10 SUBMISSION OF TENDER DOCUMENT :-

- **EMD & Tender Fee shall be submitted in electronic format through online (by scanning) while uploading the bid. This submission shall mean that EMD and tender fee are received for purpose of opening the bid. Accordingly, offer/tenders of those tenderers whose EMD & 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 (Head office) within stipulated date as mentioned in tender notice for the submission of TENDER FEE & EMD. Punitive action shall be initiated for non submission of EMD & Tender fees in original to Account Department (Head Office) by bidder including abeyance of registration and cancellation of E- tendering code for one year. 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 documents must be coloured scanned to be seen as original. Scanning in block and white or gray shall not be acceptable.
- If the documents uploaded electronically are photocopies, they must be notarized with clearly displaying stamp, number and name of the notary.
- **"Only Following Documents shall 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/-.
 - Addenda, Corrigendum (if any) duly signed by Contractor.

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

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 and Price Bid in hard copy shall be submitted by Successful bidder upon intimation from Surat Municipal Corporation.

(i) COVER : Technical Bid

EMD and Tender Fees for the work of **CONSTRUCTION OF BRTS BUS SHELTER ON UDHANA TEEN RASTA TO DINDOLI-KHARVASA (MADHURAM CIRCLE) IN SURAT CITY.(2ND ATTEMPT) (WORK-3)** along with other Documents in Hard Copy within stipulated period mentioned in the tender. Also mention the name of Tenderer, address, tender notice number, work number etc. on the cover.

The name of work to be written on cover shall be work of **CONSTRUCTION OF BRTS BUS SHELTER ON UDHANA TEEN RASTA TO DINDOLI-KHARVASA (MADHURAM CIRCLE) IN SURAT CITY.(2ND ATTEMPT) (WORK-3).**

Also mention the name and the address of tenderer, tender notice number on the cover, work number and to be submitted to the Chief Accountant, Surat Municipal Corporation, Tapipura, Surat – 395 003.

(ii) PRICE BID

Price bid for the work of **CONSTRUCTION OF BRTS BUS SHELTER ON UDHANA TEEN RASTA TO DINDOLI-KHARVASA (MADHURAM CIRCLE) IN SURAT CITY** shall be submitted online only.

2. 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.
3. **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.
12. Does not submit all the addenda, corrigendum duly signed in hard copy.
4. All corrections, additions or posted slips to be initialled by the Tenderer.
5. All pages of tender documents including specifications should be initialled by the contractor.
6. The tenderer shall submit the tender that satisfies each and every condition laid down in this notice and tender documents failing which the tender is liable for rejection.
7. Notice of inviting tenders shall be a part of the contract documents.
8. Acceptance of tender/quotation will rest with the competent authority of Surat Municipal Corporation who does not bind himself to accept the lowest 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.
9. The contractor shall also attach list of machineries, tools, plants, equipments which he propose to deploy for this work.
10. All octroi duty and other taxes chargeable by the Municipal Corporation shall be payable by the Contractor.
11. Tender once accepted shall be binding on the contractor even if the formal agreement is not signed.
12. Tender once offered cannot be withdrawn except with the permission of head of the concerned department, Surat Municipal Corporation, Surat.
13. 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.

14. The successful tenderer may be required to furnish surety in accordance with IT-28 on stamp paper.
15. The tenderers are requested to give complete specification of work quoted.
16. 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 but excluding GST and no claim will be entertained for payment of extra taxes on the bills submitted by them.
17. The Price-bid will be opened only after technical clarifications are clarified.
18. 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 the 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 furnish satisfactory evidence of its existence before the contract is awarded.

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 Deposit) 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 affect 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 uploaded on line. 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 Addenda/Corrigendum may be issued after the time stated in Notice Inviting Tenders.

IT-18 TAXES AND DUTIES ON MATERIAL :

All charges taxes on account of Octroi, terminal tax or Sales tax or GST etc. and other duties on material obtain for the works from any source shall be borne by the Contractor. 'P' and 'C' form shall not be supplied by the Municipal Corporation.

IT-19 EVALUATION OF TENDERS : DELETED

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 more 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 initialled 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 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**.

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 Tendered Amount 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 of Total Amount of Work Done (Including GST).
- (iii) 5% Retention money deposit (RMD) to be retained from each running account bill of Total Amount of Work Done (Including GST).

(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 and completion of defect liability period is 01(One) Year From Date Of Completion.
- (ii) Whereas, the 2% security deposit recovered from the each running account bills Shall be released along with Final Bills according to Work Quality.
- (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) Whereas, the 2% security deposit recovered from the each running account bills Shall be released along with Final Bills according to Work Quality.~~
- ~~(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) Whereas, the 2% security deposit recovered from the each running account bills Shall be released after clearance of Final bill by Audit Dept & completion of defect liability period.~~
- ~~(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 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 of 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 extent 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 Deposite 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 opening of price bid 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 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 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 No mobilisation advance or advance on machinery will be given.

IT-38 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. Moreover, 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 Taxes

GST CLAUSE FOR CONSTRUCTION / ERECTION / COMMISSIONING / INSTALLATION / REPAIRS / MAINTENANCE / RENOVATION / FABRICATION OF STRUCTURE INCLUDING BUILDING (MEANS ALL WORKS CONTRACT / TURN KEY PROJECTS / SUPPLY OF MATERIAL / GOODS)

GST (Goods & 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 Terms 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.

The Contractor will submit the invoice to the SMC having GSTIN of SMC mentioned therein and the taxes shall be shown separately on the face of the Invoice so as to claim as ITC by SMC.

Signature of the contractor with seal:

Address:

Date :

**Executive Engineer
Traffic-BRTS Project Cell
Surat Municipal Corporation**

SURAT MUNICIPAL CORPORATION

PERCENTAGE RATE TENDER & CONTRACT FOR WORKS

6.0 GENERAL RULES AND DIRECTIONS FOR THE GUIDANCE OF CONTRACTORS :-

- (1) All work proposed to be executed by contract shall be notified in a form of invitation to tender Posted on a board hung up in the Municipal Office and signed by the authorised officer of SMC or shall be notified in news paper.

This form will state the work to be carried out, as well as the date for submitting and opening tenders, and the time allowed for carrying out the work; also the amount of earnest money to be deposited with the tender, and the amount of the security deposit to be deposited by the successful tenderer and the percentage, if any to be deducted from bills. Copies of the specifications, designs drawings and estimated rates; schedule rates and any other documents required in connection with the work which will be signed by the Engineer-in-charge for the purpose of identification shall also be opened for inspection by contractors at the office of the Engineer-in-charge during office hours.

Where the works are proposed to be executed according to the specifications recommended by a contractor and approved by a competent authority on behalf of the Surat Municipal Corporation such specification with designs and drawings shall form part of the accepted tender.

- (2) In the event of the tender being submitted by a firm, it must be signed by each partner thereof, and in the event of the absence of any partner, it shall be signed on his behalf by a person holding a power of attorney authorising him to do so.
- (3) Receipt for payments made on account of any work when executed by a firm, should also be signed by all the partners, except where the contractors are described in their tender as a firm, in which case the receipts shall be signed in the name of the firm by one of the partners, or by some other person having authority to give effectual receipt for the firm.
- (4) The Municipal Corporation shall have the right of rejecting all or of the tenders without assigning any reason.
- (5) No receipt for any payment alleged to have been made by a contractor regard to any matter relating to this tender or the contract shall be valid and binding on Municipal Corporation unless it signed by the Engineer-in-charge.
- (6) The memorandum of work to be tendered for and the schedule of materials to be supplied by the Municipal Corporation and their rates shall be filled in and completed by the office of the Engineer-in-charge before the tender form is issued. If a form issued to an intending tenderer has not been so filled in and completed, he shall request the said office to have this done before he completes and delivers his tender.
- (7) All work shall be measured net by standard measure and according to the rules and custom of the Municipal Department of Surat Municipal Corporation without reference to any local custom.
- (8) Under no circumstances shall any contractor be entitled to claim enhanced rates for any items in this contract.
- (9) Every contractor shall, if so desired by the Commissioner, produce alongwith his tender a banker's certificate of his financial stability. If he fails to produce such a certificate his tender will not be considered.
- (10) All corrections and additions or pasted slips shall be initialled by bidders.

- (11) The measurements of work will be taken according to the usual method in use in the Public Works Department of Govt. of Gujarat and no proposals to adopt alternative methods will be accepted. The Commissioner's decision as to what the usual method in use in the Public Works Department will be final.
- (12) The Insurance Company's bond will not be accepted against the Security Deposit.
- (13) 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.
- (14) 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.
- (15) 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 calendar 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).
- (16) 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 withdraw 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 then 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.
- (17) 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.
- (18) Tenderer should submit True Copy of the Certificate of Registration along with the tender without which the tender will not be considered.
- (19) Every partner of the firm shall have to sign the tender documents, otherwise the same will not be accepted.
- (20) Performance Guidelines :
- For the due performance of the work and safety of the people around and to ensure quality work the following performance guidelines is given to the contractors which shall be strictly followed :
- (I) Boards indicating "Caution-Work in Progress" shall be invariably displayed at site, the boards shall be of enough size so as to be visible and readable from a distance for night time, reflective

type boards are from a distance for night time, reflective type boards are advisable : or proper lighting of the site shall be done to avoid accidents.

- (21) 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.
- (22) "Whatever sales tax is levied by the Government on works contract and if paid by the contractor in the first instance, shall be refunded to the concerned contractor by Corporation.

Signature of the contractor with seal:

Address:

Date :

**Executive Engineer
Traffic-BRTS Project Cell
Surat Municipal Corporation**

TENDER FOR WORKS

<p>I/We hereby tender for the execution for the Surat Municipal Corporation (herein before and after referred to as "Municipal Corporation") of the work specified in the memorandum within the time specified in such memorandum at the tendered rates specified in schedule-B (memorandum showing items of work to be carried out) and in accordance in all respects with the specification, designs, drawings, and instructions in writing referred to the annexed general conditions of contract and agree that when materials for the work are provided by Municipal Corporation such material and the rates to be paid for them shall be as provided in schedule-A hereto.</p> <p>Should this tender be accepted I/We hereby agree to abide by and fulfill all the terms & provisions of the conditions of contract annexed hereto so far as applicable, & in default thereof to forfeit & pay to Municipal Corporation in office the sums of money mentioned in the said conditions.</p>	
<p>* Receipt No. _____ dated _____ from Municipal Corporation in respect of the sum of Rs. _____/A crossed _____ order _____ cheque _____ of Rs. _____ No. _____ Dated _____ on the in favour of the Commissioner, Surat Municipal Corporation is herewith forwarded representing the earnest money the full value of which is to be absolutely forfeited to Municipal Corporation should I/We not deposit the full amount of security deposit specified in the Memorandum, in accordance with GC-10 of the said conditions.</p>	<p>Amount to be specified in word & figures</p> <p>Strike out (a) if no cash security deposit is to be taken</p>
<p>Contractor :</p> <p>Address :</p> <p>Dated the _____ day of _____ 2026</p>	<p>Signature of the Contractor before submission of tender</p>
<p>(Witness)</p> <p>(Address)</p> <p>(Occupation)</p>	<p>Signature of witness to contractor's signature</p>
<p>The above tender is hereby accepted by me on behalf of the Surat Municipal Corporation.</p>	
<p>I/c. CITY ENGINEER (CIVIL) SURAT MUNICIPAL CORPORATION</p>	<p>Signature of the officer by whom Accepted.</p>
<p>Dated: _____ day of _____ 2026</p>	

7.0 GENERAL CONDITIONS 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 / City Engineer / Deputy Municipal Commissioner / Additional City Engineer or 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 assignees.
- 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 Assistant 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" OR "Corrigendum" 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 assignees 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 know private or 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 from actual date of completion of work or as decided by Engineer-In-Charge.
- 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 vice-versa and the singular shall include the plural and vice-versa.

GC-02 LOCATION OF SITE AND ACCESSIBILITY :

The site of works is within the limits of Surat Municipal Corporation and SUDA area. It is served by all weather roads and Western Railway Broad Gauge line, Government Irrigation Canal Crossing. The intending Tenderer should inspect the site and make himself familiar with site conditions and available communication facilities. Non availability of access/roads shall in no case be the cause to condone 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.

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. 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 commission 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 corporate 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 are 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 specifications 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 whatsoever 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 inquires, 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 circumstances 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 understood 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 misunderstanding 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 otherwise provided for, cover all the Contractor's liabilities and obligation set further 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 dispatched 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 (twelve) months** from actual date of completion of work or as decided by Engineer-In-Charge. 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 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 program 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 program of time schedule for execution of the works in accordance with the specifications & the completion date. The entire program to be finalised by the Contractor, has to confirm to the execution period mentioned along with the Bill of Quantities in the Tender Documents. The Engineer upon scrutiny of such submitted program 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 individuals contractor is submitted to the Engineer-in-charge before being entered into and in approved by him. List of Sub-Contractors is to be supplied. Not with standing any subletting with such approval as aforesaid and not with standing 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 expeditions 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 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 penalized for the delay.
2. The general time schedule for work is given in the tender document. Contractor shall prepare a detailed weekly or monthly program 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 contract 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 owner 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 owner 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 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 the 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 a 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 be 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 equipments, 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, it 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 qualified 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 behaviour 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 license 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 authorise 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 authorized 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 conform 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 authorised 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 owner 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.

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-78 (Procedure for 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-84 (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 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 other-wise 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 rise there from.

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 hereunder :

(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-49 (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 upto 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 breaches 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.

It 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 questions of fact arising under the contract shall be decided by the Commissioner, subject to a written appeal by the Contractor to the Commissioner, and these decisions shall be final and binding to the contractor.

Disputes if any, shall be discussed and mutually settled and in case of disagreement the same shall be referred 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-48 DISPUTES OF DIFFERENCE TO BE REFERRED TO :

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-49 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 cannot be expected to cease or become unavoidable or if operations cannot 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 reasonable defrayed by payment under (a) above;
 - c) The Municipal Commissioner also release all bonds and guarantees at its disposal except is cause 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-50 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-51 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-52 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-53 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-54 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-55 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-56 EXTRA SUPERVISION CHARGES TO BE BORNE BY CONTRACTOR :

Further to clause No. GC-55 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-57 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-58 DRAWINGS TO BE SUPPLIED BY THE CONTRACTOR :

Where drawings, data 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-59 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, flag, ranging, rods, strings and other materials and labour 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 relieve 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-60 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-61 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 un-used 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-62 CONDITIONS OF ISSUE OF MATERIALS BY THE S.M.C.:

- a) The materials specified to be issued by the S.M.C. to the contractor shall be issued by the S.M.C.'s store or at Railway Station and all expenses for its shifting to site shall be borne by the contractor. The materials will be issued during working hours and as per rules of S.M.C. from time to time.
- b) Contractor shall bear all expenses for storage and safe custody at site of materials issued to him before use in work.
- c) Material shall be issued by the S.M.C. in Standard/non-standard sizes as obtained from manufacturer.
- d) Contractor shall construct suitable godowns at site for storing the materials to protect the same from damage due to rain, dampness, fires, theft etc.
- e) The contractor should take the delivery of the materials issued by the S.M.C. after satisfying himself that they are in good conditions. Once the materials are issued, it will be the responsibility of the Contractor to keep them in good condition and in safe custody. If the materials get damaged or if they are stolen, it shall be the responsibility of the contractor to replace them at his according to the instructions of the Engineer-in-charge.
- f) For delay in supply or for non supply of materials to be supplied by the S.M.C., on account of natural calamities, act of enemies, other difficulties beyond the control of the S.M.C., the S.M.C. carries non-responsibilities. In no case the contractor shall be entitled to claim any compensation for loss suffered by him on this account.
- g) None of the materials issued to the contractor, shall be used by the Contractor for manufacturing items which can be obtained from manufacturer. The materials issued by the owner shall be used for the work only and no other purpose.
- h) Contractor shall be required to execute indemnity bond in the prescribed form for the same custody and account of materials issued by the owner.
- i) Contractor shall furnish sufficiently in advance a Statement of his requirements of quantities of materials to be supplied by the S.M.C. and the time when the same will be required for the work, so as to enable Engineer-in-charge to make arrangements to procure and supply the materials.

- j) A daily account of materials issued by the owner shall be maintained by the Contractor showing receipt, consumption and balance in head in the form laid down by Engineer-in-charge with all connected paper and shall be always available for inspection in the site office.
- k) Contractor shall see that only the required quantities of materials to be issued and no more. The contractor shall be responsible to return the surplus materials in good condition at S.M.C.'s store at his own cost.

GC-63 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 licenses 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 license 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 than any other rate to be determined by the Engineer-in-charge and his decision shall be final and conclusive.

GC-64 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-65 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 property preserve the same to the satisfaction of Engineer-in-charge and shall hand over the same to the owner.

GC-66 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-67 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 thirty percent for each of the items, should the quantities of work actually involved under any item vary by more than thirty percent (30%), 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 Surat Division) Year 2023-2024 (1% Construction Cess shall be added in 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-68 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-69 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 notice 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-70 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-71 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 directed at the place of manufacture of 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 borne all charges for testing and inspection purpose. The Contractor shall have to bear the to and fro travelling allowance of SMC officials.

GC-72 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 shall, no 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 continue 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-73 SUSPENSION OF WORK :

Contractor shall, if ordered in writing by Engineer-in-charge or his representative temporarily suspended 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-74 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-75 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-76 COMPLETION CERTIFICATE :

As soon as the work has been completed in accordance with contract (except in minor respect that do not affect 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.

GC-77 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 interference with contractor's conduct of work which may occur 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 omitted.

GC-78 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 notwithstanding 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 imperishable nature and an agreement be drawn 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 postponed 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-79 RUNNING ACCOUNT PAYMENT TO BE RECOVERED AS ADVANCES :

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-80 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-81 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 within 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-82 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-83 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-84 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 alongwith 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-85 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-85(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 be 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 bills & Final 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-86 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 of 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 from 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 workmen's 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-87 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 omission 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 negligence or wilful act of omission of contractor, his employees, agents, representatives or sub-contractors.

GC-88 LABOUR LAWS AND REGULATIONS :

1. The contractor shall be responsible 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 licenses, consents, Registration and / or other authorization as shall from time to time be or become necessary for relating 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 authorization and laws, rules and regulations applicable thereto.

GC-89 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-90 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-91 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-92 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 mazdoor 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 of 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-93 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 conform 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 or by the Municipal Corporation as principal employer, the Engineer-in-charge may 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 liability. On receipt of award from the labour commission in regard to quantum of compensation, the difference in amount will be adjusted.

GC-94

~~It is clarified that if the contractor makes his own arrangements for water required for construction and labour camp etc. by drilling bore, No water charges will be recovered from the contractor. On the otherhand, 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 even so water charges shall be recovered as per relevant condition of the tender.~~

GC-95. TESTING AND INSPECTION CHARGE :-

The contractor shall have to borne all charges for testing and inspection purpose. The contractor shall have to bear the to and from travelling allowance of SMC official.

GC-96. SPECIAL CLAUSES REGARDING REFUND/RECOVERY OF EXCESS/ADDITION SECURITY DEPOSIT :-

In case the total amount of work done is less by 5% of the contract value, prorate 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.

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 rounded of to the nearest multiple of Rs. 25000/- such additional S.D. (4% of the additional amount) shall be recovered for the works amounting to Rs. 5/- Lacs or more.

GC-97.

If the contractor fails to complete the work and the Commissioner on behalf of the Corporation takes actions in accordance to Clause 3(a) or (b) or (c) of the contract then in such cases the remaining work shall be carried out at the risk and cost of the original contractor by advertising the tender for the remaining work and the whole administrative process right from inviting the tenders to finalizing the tender etc. shall have to be repeated. For this, a fixed amount of Rs. 1000/- shall be recovered from the original contractor towards the cost of re-advertisement and other administrative charges incurred by the department in finalizing the contract for the remaining work. If however, separate advertisement is issued for the instant work, actual cost of advertisement shall be recovered. Such recovery shall be in addition to the recovery to be made under such other relevant clauses.

GC-98.

No Contractor shall employ any person who is under the age of 15 years. If any contractor found employing person or persons under the age of 15 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-99.

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.

GC-100.

The contractor shall not be entitled to claim any compensation from Municipal Corporation for the loss suffered by him on account of delay by Municipal Corporation in the supply of materials entered in Schedule 'A' where such delay is caused by:

- (1) Difficulties relating to the supply of Railway wagons & availability of Government controlled materials-
- (2) Force Majeure.
- (3) Act of God.
- (4) Act of the Nation's enemies or any other reasonable cause beyond the control of Municipal Corporation.

In the case of such delay in the supply of material the Municipal Corporation shall grant such extension of time for the completion of the work as shall appear to the Commissioner to be reasonable in accordance with the circumstances of the case.

The decision of the Municipal Commissioner as to the extension of time shall be accepted as final by the contractor.

GC-101. Force Majeure.

- 101.1.** 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").
- 101.2.** On occurrence of Force Majeure Event, Parties are excused from the Performance of their Obligations.
- 101.3.** 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.
- 101.4.** 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.
- 101.5.** 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-102. 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 time frame 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 deem 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 the 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. than 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.

Signature of Contractor with seal :

Name :-

Address :-

Date:-

**EXECUTIVE ENGINEER
TRAFFIC- BRTS PROJECT CELL
SURAT MUNICIPAL CORPORATION**

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, Gallantt Metal Ltd., JSW steel ltd. ,Ramsarup and Polaad Rajuri Steel & TMT Bars Pvt. Ltd., Metaroll Ispat Pvt. Ltd, Mono Steel India Ltd, Bhagyalaxmi Rolling Mill Pvt. Ltd.** as per confirming to IS 1786/85 latest amendment TMT Fe-500/500D. 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 **March-2026** for Cement is **Rs.5,200/-** per MT (Without GST)
 - (c) The Basic Rate of Month of **March-2026** for **(A) High Strength TMT Steel is Rs.53,000/- per MT (Without GST) AND (B) High Strength TMT CRS Steel is Rs.55,500/- 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.

Signature of the contractor with seal:

Date :

**Executive Engineer
Traffic-BRTS Project Cell
Surat Municipal Corporation**

9.0 MEMORANDUM

(1)	General Description of the Work	:-	CONSTRUCTION OF BRTS BUS SHELTER ON UDHANA TEEN RASTA TO DINDOLI-KHARVASA (MADHURAM CIRCLE) IN SURAT CITY.(2ND ATTEMPT) (WORK-3)
(2)	Estimated Cost	:-	Rs. 1,64,15,052.79 Ps. + GST Separately
(3)	Earnest Money Deposit	:-	Rs. 1,65,000/-
(4)	Security Deposit (refer IT -27)		
	(i) Initial Security Deposit	:-	Rs. 2% of the Tender Value.
	(ii) To be deducted from R.A.Bills	:	Rs. 2% of each R. A. Bill of total Amount of work done (Including GST).
	Total Security Deposit	:	Rs.4% of the Tender Value.
(5)	Time allowed for the completion of the Work from date fixed in Work Order Letter to commence	:-	12 (Twelve) Months (Including Monsoon).
(6)	Percentage to be retained from running Account Bills	:-	5% (Five Percent) of total Amount Of work done (Including GST) (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	:-	12 (twelve) months from actual date of completion of work
(10)	Water Charges	:-	Condition For The Water Supply & Electric Supply on next page No.65
(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:

Address:

Date :

**Executive Engineer
Traffic-BRTS Project Cell
Surat Municipal Corporation**

SURAT MUNICIPAL CORPORATION
TRAFFIC -BRTS PROJECT CELL
10.0 CONDITION FOR THE WATER SUPPLY & ELECTRIC SUPPLY

(1) FOR WATER CHARGE : In case of Municipal Network or distribution centre available or not at nearby 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 to follow 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 fails 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 cancelled 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 not acquiring water connection from Surat Municipal Corporation under option-2 but not found to be using any of the means of Surat Municipal Corporation water or not following either of the mentioned options, water charges shall be recovered at the rate of 3% (THREE Percent) of the civil items in which water consumed.

(2) FOR ELECTRICITY :

1. 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.
2. The energy bills shall also be paid by the contractor.

Signature of the contractor with seal:

Date :

Executive Engineer
Traffic-BRTS Project Cell
Surat Municipal Corporation

11.0 IMPORTANT INSTRUCTIONS-A TO THE CONTRACTOR

- (1) This tender document containing all pages 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 EMD 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 intending to do so.
- (3) Following Certificate shall be enclosed with tender documents online
 - (a) Solvency Certificate amounting of 20% of Estimated amount.
 - (b) **Registration Certificate of required class given by Government or Semi-Government firm.**
 - (c) Income-Tax clearance certificate.
 - (d) List of work done by Contractor with its volume.
- (4) ~~This is annual rate contract, If the work given to one or more Contractors,~~ the time limit shall be as per memorandum of the tender.

Signature of the contractor with seal:

Date :

**Executive Engineer
Traffic-BRTS Project Cell
Surat Municipal Corporation**

12.0 IMPORTANT INSTRUCTIONS-B TO TENDERER

1.

Affix latest passport size photo of tenderer

Specimen Signature of the Contractor

2. AFFIX LATEST PASSPORT SIZE PHOTOGRAPH OF ALL PARTNERS IN CASE OF PARTNERSHIP AGENCY

1	2	3	4

Specimen signature of all partners in case of partnership agency.

1. _____

2. _____

3. _____

4. _____

Submission of Registered
Agreement is compulsory
in case of partnership
agency.

3. Submission of income tax return 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 SMC.
7. The specimen signature of contractor will be cross checked by Account Department of SMC, in case of representative of Contractor along with letter of authority of a person who signed an agreement, receives payment.
8. In case of octroi applicable to the goods of supplier/tenderer, the tenderer/supplier has to submit an attested copies of photocopy of all octroi receipts.

Signature of the contractor with seal:

Address:

Date :

**Executive Engineer
Traffic-BRTS Project Cell
Surat Municipal Corporation**

13.0 SPECIFICATIONS OF MATERIALS

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. 456-2000.
- 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. 269-1989. 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. 712-1984. Necessary tests shall be carried out as per I.S. 6932 (Parts I to X) 1995.
- 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 unburnt 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. 712-1984. 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. 162-1989 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.

Cement shall be as Schedule-A confirming to IS-12269:2013 with latest amendment ISO-9000 of 53 grade OPC only and ordinary portland slag cement as per I.S. 269-1989 or Portland slag cement as per I.S. 455-1976 and revised latest I.S.

M-4 WHITE CEMENT :

- 4.1 The white cement shall conform to I.S. 8042-1989.

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 properly such that it is neither affected by the cement not 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, alkaly, 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 shall be as under ---

I.S. Sieve Designation	% by weight passing sieve	I.S. Sieve Designation	% by weight passing sieve
4.55 mm	100	600 Micron	30-100
2.36 mm	900-100	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 sieve	I.S. Sieve Designation	% by weight passing sieve
4.55 mm	100	600 Micron	40-85
2.36 mm	100	300 Micron	5-50
1.18 mm	75-100	150 Micron	0-10

M-7 STONE DUST :

- 7.1 This shall be obtained from crushing hard black tray 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 files 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. 383-1990. Unless a special stone of a particularly 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	% by weight passing sieve	I.S. Sieve Designation	% by weight passing sieve
12.50 mm	100%	4.75 mm	2.20%
10.00 mm	80-100%	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) 1988, 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 brunt 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 shall 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 trapaulin 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	80-100	100	-	4.75 mm	-	0.50	0.50
20 mm	0-20	85-100	100	2.75 mm	-	-	-
10 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. 383-1990 and I.S. 456-2000 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. 383-1990 and I.S. 456-2000 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)-1992.

M-15 (A) 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 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. 1134-1985. 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 be 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 than 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 free from waviness and unevenness and the edges true and square.

17.3 Those types 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/CRS BARS :

- 18.1 Mild steel bars reinforcement TMT/CRS Bars for R.C.C. work shall conform to I.S. 432 (Part-II)-1982 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 from 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)	6 mm	0.22 Kg/Rmt.
(ii)	8 mm	0.39 Kg/Rmt.
(iii)	10 mm	0.62 Kg/Rmt.
(iv)	12 mm	0.89 Kg/Rmt.
(v)	14 mm	1.21 Kg/Rmt.
(vi)	16 mm	1.58 Kg/Rmt.
(vii)	18 mm	2.00 Kg/Rmt.
(viii)	20 mm	2.47 Kg/Rmt.
(ix)	22 mm	2.98 Kg/Rmt.
(x)	25 mm	3.85 Kg/Rmt.
(xi)	28 mm	4.38 Kg/Rmt.
(xii)	32 mm	6.32 Kg/Rmt.
(xiii)	36 mm	8.00 Kg/Rmt.
(xiv)	40 mm	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. 1739-1978 and I.S. 1139-1966 respectively.
- 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 gauge) 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. 226-1975. 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. 1148-1992.
- 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 galvanized iron sheets shall be plain or corrugated sheets of gauge as specified in item. The G.I. Sheets shall conform to I.S. 277-1992. 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 galvanized 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 galvanized 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. 654-1992 for Class 'AA' or 'A' type as specified in item. Samples of the tiles to be provided shall got approved from the Engineer-in0charge. 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 braced 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 shuttering 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 provides 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 strip 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)-1991. 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. 303-1298.
- 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 lapping, rebating, opening of glazing, venation 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) 1991. There shall be no delamination at the end of the test.
 - ii] Knife Test : The face panel when tested in accordance with I.S. 1659-1990 shall pass the test.
 - iii] Glue Adhesion Test : The flush door shall be tested for glue adhesive test in accordance with I.S. 2202(Part-I)- 1991. 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- 1991 and also to I.S. Designation WVG - WP OF I.S.:1285-1991. 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 excluded aluminium hinges of same type as in window but or 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. 6248-1991. 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 galvanized 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 - 1992 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. 280-1992.

M-37 PLYWOOD :

- 37.1 The Plywood for general purpose shall conform I.S. 303-1998. 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 slitting with change in moisture content.
- 37.3 Usually synthetic resins are used for glue. 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. : 303-1998 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	Thick
3 ply	3 mm
	4 mm
	5 mm
	6 mm
6 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. 761-1963. 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 flate 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 **Wired Glass :**

Glass shall be with wire netting embedded in a sheet of plane glass. Electrically welded 13 mm. Georgain square mesh shall be used. Thickness of glass shall not be less than 6 mm. wired glass shall be of type and thickness as specified.

38.6.0 **Toughened Glass or Tempered Glass:**

Tempered glass is an extremely strong glass which is heat treated to a uniform temperature of approximately 650deg C and rapidly cooled to induce compressive stresses of 770kg/sq m to 1462kg/sq m on the surfaces and edge compression of the order of 680kg/sq m. Any attempt to cut, drill, grind or sand blast after toughening may result in breakage and hence all holes etc as required shall be drilled prior to toughening the glass. No other glass but tempered glass shall be used for sliding doors, ticket counters and cutout coverings. The thickness of the glass shall be as per the drawings of the design consultants or as per the calculations of the manufacturer.

38.6.1 Properties of Tempered Glass / Toughened Glass

1. Density (approximate)	: 2.42-2.52 g/cubic cm
2. Tensile Strength	: 120 to 200 N/sq .mm
3. Compressive Strength	: 1000 N/sq.mm
4. Modulus of Elasticity	: 70Gpa-
5. Coefficient of linear expansion	: 9×10^{-6} m/Mk
6. U Value	: 5.7 W/sq .m.K for 6mm thick clear
7. SF for 6 mm clear	: 81 %
8. Shading coefficient of 6 mm clear	: 0.93
9. Visible light transmission of 6 mm clear	: 87 %
10. Thickness	: 3mm to 19mm

38.7.0 **Laminated Glass :**

Laminated glass is a sandwich made of one piece of plastic Poly Vinyl Butyral (PVB) between two or more glasses. The PVB sticks with the glass, forms chemical as well as mechanical bonds. When laminated with annealed glass, the layer maintains the geometric integrity of the pane in case of breakage. Also it gives acoustic insulation as well as gives protection against damage caused due to UV radiation because it cuts almost 99% of UV radiation present in the sunlight. A Laminated glass is regarded as a safety glass by most of the standards. The glasses used for the purpose of making a laminated glass can be either float glass or toughened glass or as directed.

38.7.1 The Glass if otherwise specifically mentioned in the Bills of Quantities or design drawings shall be 4mm clear glass + 1.52PVB + 4mm clear glass of AIS, Saint Gobain, Asahi, ModiGuard or equivalent.

38.7.2 The framing around the glass shall be as per the designs and specifications.

38.7.3 Properties of Laminated Glass :

- PVB thickness --0.38mm, 0.76mm, 1.14mm, 1.52mm
- PVB colors --Clear, white, gray, purple, blue, green, yellow, orange, red

• Refractive Index	-- 1.48
• Visible Light Transmittance, Clear	-- 89%
• Shading Coefficient, Clear	-- 0.92
• UV Screening, up to 380 nm	-- 99%
• Tensile Strength	-- 3220 psi
• Tensile Elongation	-- 205% (JIS K6771)
• Specific Gravity	-- 1.07
• Specific Heat	-- 0.47 Btu/lb°F
• Thermal Conductivity (K value)	-- 0.12 Btu/(ft ² hr°F)
• Coefficient of Thermal Expansion	-- 2.6 x 10 ⁻⁴ in./in.°F
• Emissivity	-- 0.9

38.7.4 Sealants :

General: Provide products of type indicated, complying with the following requirements: Select glazing sealants that are compatible with one another and with other materials they will contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience. Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.

38.7.5 Gasket :

Neoprene extrusions in shape and sizes indicated, fabricated into frames with moulded corners.

These shall be of Neoprene, EPDM, Silicone, Thermoplastic polyolefin rubber or as approved.

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 PARTICLE BOARD :

40.1 The particle boards used for face panels shall of best quality free from any defects. The particle boards shall be made with phenolmaldehyde adhesive. The particle boards shall conform to I.S. 3087-1990. "Specification for wood particle board for general purpose." The size and the thickness of the particle board shall be as specified.

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 oxidized iron, copper oxidized brass or anodized 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 anodized 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 as approved. 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 redressed 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. 2933-1991.

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. 348-1991.

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. 2114-1990.

M-47 FLOORING TILES :

47.1 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- 1990 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 1 mm. The tolerance on thickness shall be plus 5 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. 1237-1990.
- 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. 1237-1990. 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 bad 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. 1237-1990.

47.5 E] Chequered Tiles for Staircases :

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 dedo, 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 bard, 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. 1130-1993 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 relecting 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. 3462-1991. 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 straight 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. 2691-1995.
- 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. 1077-1992.
- 54.3 The permissible tolerance in dimensions specified above shall be as follows.

Size	Torrence for	
	1st Class Brick	2nd Class Brice
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 accordance with the produre aid as per I.S. 1077-1992 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. 1077-1992 the rate of efflorescence 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. 777-1988.

M-56 GALVANISED IRON PIPES AHND FITTINGS :

Galvanized iron pipe shall be of the medium type and of required diameter and shall comply with I.S. 1239-1990. The specified diameter of the pipes shall refer to the inside diameter of the bore. Clamps, screw and all glavanised iron fittings shall be of the standard 'R' or equivalent make.

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 or brass chromium plated and of diameter as specified in the description of the item. They shall conform to I.S. 781-1990 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--

Dia.	Bib Cock	Stop Cock	Dia.	Bib Cock	Stop Cock
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. 778-1990.

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)-1994 and I.S. 771-1990. 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 underside 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 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. 2556-1994 and I.S. 771-1692.
- 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. 2548-1996. 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 CLOSED :

- 61.1 The specification of Orissa type white glazed water closet of first quality shall conform to I.S. 2556 (Part-III) 1994 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)-1994. 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-62A : 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-1992. The brackets for sinks shall conform to I.S. 775-1990.

The pipes shall conform to I.S. 1239-Part-I-1990 and I.S. 404-1993 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. 771-1992. 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. 774-1990. 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. 775-1990.

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. 774-1990. 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) 1993. 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 galvanized 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. 775-1990.

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. 1729-1991. 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 Thick	Wight of pipe excluding ears		
			1.5 m long	1.m long	2 m long
1.	75 mm	5.00 mm	12.83 Kg.	16.52 Kg.	18.36 Kg.
2.	100 mm	5.00 mm	18.14 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. 651-1992. 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 C.I. grating of square size corresponding to the dimensions, of inlet of gully trap. It will also have a water tight C.I. cover with frame inside dimensions 300mm. x 300mm. the cover weighing not less than 4.53 Kg. and the frame not less than 2.72 Kg. The grating cover and frame shall be of sound and good casting 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. lead 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. 651-1992.

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 G.I. WATER SPOUT :

- 73.1 The G.I. 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 CRYDON BALL VALVE :

Ball valve of screwed type including polythene float and necessary lever etc. shall be of the size as mentioned in the description of item and shall conform to I.S. 1703-1989.

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

- 76.1 Bitumen felt shall be on the fiber bases and shall be of type 2, self finished felt grade-2 and shall conform to I.S. 1322-1998.

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. confirming to I.S. 5455-1969 or its latest version.

The cast iron steps shall be coated with a material having tar base or a place bituminous composition of cashew-nut shall liquid. The coating shall be smooth and tenacious. It shall not flow when exposed to a temprature of 63 degree C and shall not be brittle as to chip of 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 $\pm 5.0\%$ 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 $\pm 0.50\%$ deviation. All the sides shall be straight & square and the deviation allowed shall be maximum $\pm 0.40\%$.
- 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 $\pm 0.5\%$ 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 $\pm 0.3\%$,
maximum deviation in thickness $\pm 2.0\%$,
maximum wedging allowed ± 0.270 ,
maximum surface flatness shall be $\pm 0.2\%$,
water absorption capacity $< 0.5\%$,
maximum Mohs hardness 8.0,
flexural strength shall be $> 45 \text{ N/mm}^2$,
maximum Abrasion resistance 144 mm³,
maximum thermal expansion $< (, \times 10^{-1}$

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, "Mozzaterra" 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 fixed 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.

M-84 BARBED WIRE

- 84.1. The barbed wire shall be of galvanised steel and it shall generally conform to I.S. 278-1978. The barbed wire shall be of types-I whose nominal diameter for line wire shall be 2.5 mm. and point wire 2.24 mm. The nominal distance between two barbs shall be 75 mm unless otherwise specified in the item. The barbed wire shall be formed by twisting together two fine wires. One containing the barbs. The size of the line and point wires and barb spacing shall be as specified above. The permissible deviation from the nominal diameter of the line wire and point wire shall not exceed + 0.08 mm.
- 84.2. The barbs shall carry four points and shall be formed by twisting two point wires, each two turns tightly round one line wire making altogether four complete turns. The barbs shall have a length of not less than 13 mm and not more than 18 mm. The point shall be sharp and cut at an angle not greater than 35 degree of the axis of the wire forming the barbs.
- 84.3. The line and point wires shall be circular in section, free from scale and other defects and shall be uniformly galvanized. The line wire shall be in continuous length and shall not contain any welds other than those in the rod before it is drawn. The distance between two successive splices shall not be less than 15 meters.
- 84.4. The lengths per 100 Kg. of barbed wire I.S. type I shall be as under: Nominal 1000 meter Minimum 934 meter Maximum 1066 Meter.

SIGNATURE OF THE CONTRACTOR WITH SEAL:

DATE:

**EXECUTIVE ENGINEER
TRAFFIC -BRTS PROJECT CELL
SURAT MUNICIPAL CORPORATION**

14.0 GENERAL TECHNICAL SPECIFICATIONS FOR 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 partical 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 perfix '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 overloading 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 satisfactory 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 relevant 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 does not in any way relieve the contractor of his responsibility for the correctness, soundness and strength of the structure as per the drawings and specifications.

SIGNATURE OF THE CONTRACTOR WITH SEAL :
DATE:

**EXECUTIVE ENGINEER
TRAFFIC -BRTS PROJECT CELL
SURAT MUNICIPAL CORPORATION**

15. ITEMWISE DETAILED TECHNICAL SPECIFICATIONS

Item 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.

1.1 Materials & Construction

- **CGI Sheets:** Use 24 SWG (Standard Wire Gauge) corrugated galvanized iron sheets. The sheets must be of the height specified by the site conditions or as directed by the engineer-in-charge.
- **Structural Framework:** Utilize M.S. (Mild Steel) angles of appropriate size (as specified by design or site requirement) to provide structural integrity.
- **Spacing:** Structural supports (M.S. angles) must be fixed at a center-to-center (c/c) distance of 2.5 meters.
- **Finishing:** All sheets and exposed steelwork must be painted with high-visibility fluorescent paint (for night safety) and white paint, applied to a professional standard to ensure reflectivity and durability.

1.2 Scope of Work

- **Supply & Installation:** Includes the procurement of all materials (CGI sheets, M.S. angles, fasteners, and paints), transportation to the site, and secure erection.
- **Operational Requirements:** The barricading must be installed to facilitate the orderly movement of traffic as per approved site drawings. Any modifications required to maintain traffic flow must be executed promptly upon the engineer-in-charge's instruction.
- **Dismantling & Restoration:** Upon the completion of the project, all barricading materials must be dismantled, removed from the site, and the area must be cleared of debris to restore the site to its original or specified condition.

1.3 The rate shall be for a unit of **per Square Metre (S.M)**.

Item No.2 :- Reuse of the above barricades in item 1 for traffic safety purpose without procuring new barricades.

- 2.1 This item covers the relocation and re-installation of the existing barricading materials provided in Item No. 1.
- 2.2 This pertains to the shifting of barricades from a completed section of the project to a new section requiring traffic safety measures.
- 2.3 If the paint has faded or been damaged during the previous phase, the barricades must be **repainted** to maintain visibility and safety standards.
- 2.4 The installation methodology remains identical to Item No. 1, adhering to the 2.5m c/c spacing and secure fixing requirements.
- 2.5 The contractor is responsible for ensuring that the reused barricades are positioned to allow for the smooth and safe movement of traffic as per the approved traffic management plan.
- 2.6 The rate shall be for a unit of **per Square Metre (S.M)**.

Item 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.

3.1. Technical Specifications

- **Power Source:** High-efficiency monocrystalline or polycrystalline solar panels integrated with a rechargeable, maintenance-free battery (Lithium-ion or Lead-acid).
- **Light Source:** High-intensity **LEDs** (typically Amber/Yellow) with a visibility range of at least **500 meters** under clear night conditions.
- **Blink Rate:** Standardized at **50 to 60 flashes per minute**, ensuring a distinct warning signal to approaching drivers.
- **Housing:** Weatherproof, IP65-rated (or higher) UV-stabilized plastic or metallic casing to withstand Surat's heat and monsoon conditions.
- **Automatic Operation:** Equipped with integrated light sensors (dusk-to-dawn) to automatically activate at sunset and deactivate at sunrise.

3.2 Functional Zones of Placement

The blinkers must be strategically placed to guide traffic through the following zones as per the approved Traffic Management Plan:

- **Warning Zone:** Placed well in advance of the work site to alert motorists of upcoming changes in road conditions.
- **Approach Transition Zone:** Positioned along the taper or shift to guide traffic into the diverted path.
- **Working Zone:** Fixed at regular intervals along the barricades (Item No. 1 & 2) to clearly delineate the construction area from the active traffic lane.
- **Terminal Transition Zone:** Placed at the end of the work zone to indicate where traffic can safely return to the original lanes.

3.3 Installation & Maintenance

- **Mounting:** Blinkers shall be securely fixed to the top of the M.S. angles or CGI sheets at a uniform height to ensure maximum visibility.
- **Spacing:** Typically placed every **10 to 15 meters** in the working zone, and more frequently (every **5 meters**) in transition and taper zones.
- **Maintenance:** The contractor is responsible for cleaning the solar panels regularly to ensure optimal charging. Any faulty or damaged blinkers must be replaced within **24 hours** to maintain safety standards.
- **Duration:** This provision is for a **limited period** as dictated by the construction schedule or until the engineer-in-charge deems the specific safety risk resolved.

3.4 The rate shall be for a unit of per Nos.

Item No.4 :- Demolition including stacking of serviceable materials with all lead and lift. (i) RCC Work

4.1 WORKMANSHIP

The term Demolition shall consist of one or more parts of the building as specified or shown in the drawing. 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. The demolition shall always be planned before hand and shall be done in reverse order of the one in which the structure was constructed. This scheme shall be got approved from the

Engineer-in-charge before stating the work. This however will not absolve the contractor from the responsibility of proper and safe demolition. Necessary propping, the shoring and or 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 the such away no damage is caused to the adjoining property. Temporary enclosers or partitions shall also be provided wherever required. Necessary precautions shall be taken to keep dust nuisance down as and where necessary. Dismantling shall be done in a systematic manner. All materials which are likely to be damaged by dropping from a height or demolishing roofs, masonry etc. shall be carefully removed first. The dismantled articles shall be passed by hand where necessary, lowered the ground (as not thrown) and then properly stacked as directed.

All materials obtained from demolition shall the property of Corporation unless otherwise specified and shall be kept in safe custody until handed over to any store to Surat Municipal Corporation as specified the Engineer-in-charge.

Any serviceable materials, obtained during dismantling demolition, shall be separated out and stacked properly on site or any store of S.M.C. as directed, with all lead and lift. All unserviceable materials, rubbish etc. shall be stacked as directed by Engineer-in-charge. On completion of work the site shall be cleared of all debris rubbish and cleaned as directed.

4.2 Rates :

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 the employed for construction of work.

All work shall be measured in decimal system as fixed in its place subject to the following limit, unless otherwise stated hereinafter : (a) Dimensions shall be measured to the nearest 0.01 mt. (b) Areas shall be worked out to the nearest 0.01 cum.

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 partitions where considered necessary.

The rate shall be for a unit of one **cubic metre(C.M)**.

Item No.5 :- Demolition and disposal of unserviceable materials with all lead and lift (ii) Unreinforced cement concrete

5.1 The relevant specifications of **Item-4** shall be followed but read Unreinforced cement concrete instead of R.C.C. work. The unserviceable materials shall be disposed of at all leads and lifts. The rate excludes scraping straightening of reinforcement but includes cutting of reinforcement.

5.2 The rate shall be for a unit of one **Cubic Metre(C.M)**.

Item No.6 :- Demolition and disposal of unserviceable materials with all lead and lift (i) Paver Block

6.1 Details specification same as per the **Item-4**

6.2 The work shall be carried out as per instructions of Engineer-in-charge.

6.3 The rate shall be per **Square Metre**.

Item No.7:- Excavation for foundation includ.sorting out & stacking of useful materials & disposing of the excavated stuff upto 50 mt. Lead & all lift, watering etc. Comp. (A) Loose or Soft soil Executed With Manual Labours

(1) 0 To 1.5 mt. Depth

(2) 1.5 To 3.0 mt. Depth

In general the work shall be carried out as per the standard specifications of P.W.D./C.P.W.D/GWSSB, relevant drawings and as per the instructions of Engineer-in-Charge. Work shall be carried out as per item description.

7.1.0 GENERAL

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

7.2 CLEARING THE SITE

7.2.1 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.

7.2.2 The rate of site clearance is deemed to be included in the rate of earth work for which no extra amount will be paid.

7.3 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.

7.4 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.

7.5 DISPOSAL OF EXCAVATED MATERIALS

7.5.1 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.

7.5.2 Disposal of excavated materials is subject to the following - Unsuitable materials obtained from clearing site and excavation shall be disposed off within a lead of 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.

7.6.0 MODE OF MEASUREMENT AND PAYMENT

7.6.1 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.

7.6.2 No extra payment shall be made for temporary pumping of water / sewage due to abnormal adverse conditions /climate.

7.6.3 The rate shall be for a unit of one **Cubic Meter**.

**Item No.8:- 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.
300 mm dia**

8.1 Mobilization including all necessary plants, equipment, properly calibrated instruments, piling rigs and hammers, trucks, cranes and other necessary modes of transport, material handling, materials to be furnished by contractor, posting qualified personnel, skilled and unskilled labour etc. to site of work, arranging kentledges and all other equipment, calibrated instruments and set ups required for conducting the various types of pile load tests, setting up properly equipped materials/concrete testing laboratory, insurance, erecting and commissioning all plants and equipment essential for operating the contract including augmenting plant, equipment, rigs personal etc. when called for by Engineer either during the tenure of the contract or on completion, including clean up. Rate shall also include various designs of concrete mixes that may be required from time to time. (Bidder shall submit details of driving equipment and list of all equipment including pile hammers and rigs, cranes etc.

8.2 Workmanship :

The ground shall be roughly leveled and after making the position of piles, the holes shall be bored with aspire angle to the 3.5 M. depth and specified diameter using boring guide.

The bore holes shall be truly vertical and uniform bore throughout 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.

8.3 Mode of measurement and payments :

The rate for boring holes shall include :-

- (a) Roughly leveling the ground in positions where piles are to be provided.
- (b) Making the positions 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 of surplus excavated soil within a lead of 50 M. and
- (e) All tools, plants, equipment's and labor required for satisfactory completion of work.
- The rate shall be for a unit of one Running metre.

Item No.9:- Providing & laying C.C 1:3:6 (1 cement : 3 coarse sand : 6 Crushed stone agg 20 m.m Nominal size) & curing comp. incl. cost of form work in : (a) foundation & Plinth

In general the work shall be carried out as per the standard specifications of P.W.D./C.P.W.D/GWSSB, relevant drawings and as per the instructions of Engineer-in-Charge. Work shall be carried out as per item description.

9.1.0 Materials

- 9.1.1 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.

9.2.0 Workmanship

9.2.1 General

- 9.2.1.1 Before stating concrete the bed of foundation trenches shall be cleared of all loose materials, leveled, watered and rammed as directed

9.2.2 Proportion of Mix:

- 9.2.2.1 The proportion of cement, sand and coarse aggregate shall be one part of cement. 4 parts of sand and 8 parts of stone aggregates and shall be measured by volume.

9.2.3 Mixing:

- 9.2.3.1 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 the Engineer-in-charge. When hand mixing is permitted by the Engineer-incharge 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 period 1 1/2 to 2 minutes. The quantity of water shall be just sufficient to produce a dense concrete of required workability for the purpose.

9.2.4 Transporting & Placing the Concrete:

- 9.2.4.1 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.
- 9.2.4.2 The concrete shall be laid in layers of 15 cms. to 20 cms.
- 9.2.5.1 The concrete shall be rammed with heavy iron rammers and rapidly to get the required compaction and to allow all the interstices to be filled with mortar.

9.2.6 Curing:

- 9.2.6.1 After the final set, the concrete-shall be kept continuously wet if required by pounding for a period of not less then 7 days form the date of placement.

9.3.0 Mode of measurement and payment

- 9.3.1 The concrete shall be measured for its length, breadth and depth, limiting dimensions to those specified on plans or as directed.
- 9.3.2 The rate shall be for a unit of one **Cubic Metre (C.M)**.

Item No.10 :- Providing and laying cement concrete work 1:1.5:3 [1 cement :1.5 coarse sand: 3 graded stone aggregates 20 mm nominal size] and curing complete including cost of form work and excluding cost of reinforcement for reinforced concrete work in [A] foundation footing, Base of columns and mass concrete.

10.1.0 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.

10.2.0 General :-

- 10.2.1 The concrete mix is not required to designed by preliminary tests. The proportion of the concrete mix shall be 1:1.5:3 [1 cement: 1.5 coarse sand: 3 graded stone aggregate 20 mm nominal size] by volume concrete work shall have exposed concrete surface or as specified the item.
- 10.2.2 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, 1/2: 3 and 1:1:2 nominal mix of ordinary concrete by volume respectively with conforming to IS:456.
- 10.2.3 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 Dry Aggregates by mass per 50 kg of Cement, to be Taken as the sum of the Individual masses of fine and coarse aggregates (Kg.) (Maximum)	Proportion of fine aggregate of coarse aggregate	quantity of water per 50 Kg. of cement maximum
M-5	800	Generally 1:2 but subject to an upper limit of 1:1.5 and a lower limit of 1:2.5.	60 Liters
M-7.5	625		45 Liters
M-10	480		34 Liters
M-15	330		32 Liters
M-20	250		27 Liters

- 10.2.4 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.
- 10.2.5 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.
- 10.2.6 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 throughly and to fill the corners of the form.

- 10.2.7 For reinforced concrete work, coarse aggregates having a nominal size of 20 mm generally considered satisfactory.
- 10.2.8 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.
- 10.2.9 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 sometimes be as great as or greater than the minimum cover.
- 10.2.10 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.
- 10.3.0 WORKMANSHIP :
- 10.3.1 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 centres.
 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.
- 10.3.2 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 bulking shall be made.
- 10.3.3 Mixing :-
- 10.3.3.1 For all work, concrete shall be mixed in a mechanical mixer which alongwith 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.

- 10.3.3.2 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.
- 10.3.3.3 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.
- 10.3.4 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.
- 10.3.5 Inspection :
- 10.3.5.1 Contractor shall give the Engineer-in-charge due notice before placing any concrete in the forms to permit to inspect and accept the false 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.
- 10.3.5.2 Centring design and its erection shall be got approved from the Engineer- in- charge. One carpenter with helper shall invariably 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.
- 10.3.6 Transporting and laying :-
- 10.3.6.1 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.
- 10.3.6.2 All form work shall be cleaned and made free from standing water dust snow or ice immediately before placing of concrete. No concret shall be placed in any part of structure until the approval of Engineer-in-charge.
- 10.3.6.3 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.

- 10.3.6.4 Unless otherwise agreed to by the Engineer-in-charge, concrete shall not be dropped into place from a height exceeding 2 meters.
- 10.3.6.5 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.
- 10.3.6.6 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.
- 10.3.6.7 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.
- 10.3.7 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. Masonary 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.
- 10.3.8 Sampling and Testing of concrete :-
- 10.3.8.1 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.
- 10.3.8.2
- | 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 cumt. |
| | or part thereof. |
- 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.

- 10.3.8.3 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 to 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.

10.3.9 Stripping :

- 10.3.9.1 The Engineer- in- charge shall be informed in advance by the contractor of his intention to strike 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.

- 10.3.9.2 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. Centreing 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.

- 10.3.9.3 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 hole 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.

- 10.3.9.4 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.

10.4.0 Mode of measurement and payment :

- 10.4.1 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.
- 10.4.2 The rate includes cost of all materials labour, tools and plant required for mixing, placing in position 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.
- 10.4.3 The rate shall be for a unit of **Cubic Metre (C.M)**.

Item No.11:- Providing & laying ordinary cement con. 1:1.5:3 (1cement:1.5sand: 3 graded stone agg. 20 mm nominal size) finishing smooth curing etc. comp. Includ. Cost of form work but excl. Cost of reinforcement for R.C.C. Work in : Up to G.L./P.L. (B) BEAMS :

- [i] Having cross sectional area 0.05 to 0.08 Square metre.**
- [ii] Having cross sectional area more than 0.08 Square metre upto 0.12 Square metre.**
- [iii] Having cross sectional area more than 0.12 Square metre.**

All specifications same as per **Item No.10**

Item No.12:-Providing IS Mark TMT Bar FE 500/500D reinforcement for R.C.C. work including bending, binding and placing in position complete as per Engineer-in-charge. Upto G.L./P.L.

In general the work shall be carried out as per the standard specifications of P.W.D./C.P.W.D/GWSSB, relevant drawings and as per the instructions of Engineer-in-Charge. Work shall be carried out as per item description.

12.1.0 Materials

12.1.1 Mild Steel bars shall conform to M-18. Mild steel binding wires shall conform to M-21.

12.2.0 Workmanship

12.2.1 The work shall consist of furnishing and-placing reinforcement to the shape and dimensions shown as on the drawings or as directed

12.2.2 Steel shall be clean and free from rust and loose mill scale at the lime of fixing in position and subsequent concreting.

12.2.3 Reinforcing steel shall conform accurate 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 transport-or handling shall be straightened before being used on the work. They shall not be heated to facilitate bending Unless otherwise specified 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 twice the diameter of the round bar and the length of the straight part of the bar beyond the end of the curve shall be at least four times the diameter of the round bar. In case of bars which are not round and in case of deformed bars, the diameter shall be taken as the diameter of circle having an equivalent effective area. The hooks shall be suitably encased to prevent any splitting of the concrete.

12.2.4 All the reinforcement bars shall lie accurately placed in exact position 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 hangers

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 concrete, except where shown on 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 and 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 protruding from concrete and to which other bars are to be lapped and which are likely to be exposed for a period exceeding 10 days shall be protected by a thick coat of neat cement grout.

- 12.2.5 Bars crossing each other where required shall be secured by binding wire (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.
- 12.2.6 As far possible, bars of full length shall be used. In case this is not possible. Over lapping of bars shall be done as directed. When practicable, overlapping bars shall not touch each other, but be kept apart by 25 mm. 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.
- 12.2.7 Whenever indicated on the drawings or desired by the Engineer-in-charge, bars shall be jointed 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.
- 12.2.8 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 subject to more than 75 percent of the maximum permissible stresses and welds so staggered that at any one section not more than 20 percent of the rods are welded. Only electric arc welding using a process which excludes air from the molten metal 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, slag, 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.

12.3.0 Mode of Measurements & Payment

- 12.3.1 For the purpose of calculating consumption, wastage shall not be permitted beyond 5 percent. Excess consumption over 5% will be charged at penal rate.
- 12.3.2 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 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 tones on the same basis of as per M-18 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.

12.3.3 The rate for reinforcement includes cost of steel binding wires. its carting from Department store to work site, cutting, bending, placing, binding 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.

12.3.4 The rate shall be for a unit of One **Kilo Gram(K.G)**.

Item No.13:- 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.

In general the work shall be carried out as per the standard specifications of P.W.D./C.P.W.D/GWSSB, relevant drawings and as per the instructions of Engineer-in-Charge. Work shall be carried out as per item description.

13.1.0 Workmanship

13.1.1 The earth to be used for filling shall be free from salts, organic or other foreign matter. All clods of earth shall be broken.

13.1.2 Filling with excavated earth shall be done in regular horizontal layers each not exceeding 20 cm in depth. All lumps and clods exceeding 8 cm in any direction shall be broken. Each layer shall be watered and consolidated with steel rammer or ½ tonne roller. Where specified, every third and top must layer shall also be consolidated with power roller of minimum 8 tonnes. Wherever depth of filling exceeds 1.5 metre vibratory power roller shall be used to consolidate the filing unless otherwise directed by Engineer-in-charge. The top and sides of filling shall be neatly dressed. The contractor shall make good all subsidence and shrinkage in earth fillings, embankments, traverses etc. during execution and till the completion of work unless otherwise specified.

13.1.3 The plinth shall be similarly filled with earth in layers not exceeding 20 cms. adequately watered and consolidated by ramming with iron or wooden rammers. 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.

13.1.4 The finished level of filling shall be kept to shape intended to be given to floor.

13.1.5 In case off large heavy duty flooring like factory flooring, the consolidation may be done by power rollers, where so specified. The extent of consolidation required, shall also be as specified.

13.1.6 The excavated stuff of the selected type shall be allowed to be used in filling the trenches and plinth. Under no circumstances black cotton soil be used for filling the plinth.

13.2.0 Mode of Measurements & Payment

13.2.1 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.

13.2.2 The rate shall be for a unit of one **Cubic Metre(C.M)**.

Item No.14:- 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 G.F (C) Fly Ash Bricks

14.1.0 MATERIALS

14.1.1 Flyash Building Brick shall confirm to M-15, Water shall confirm to M-1, Cement shall confirm to M-3, Sand shall confirm to M-6, Cement mortar shall confirm to M-11.

14.2.0 WORKMANSHIP

14.2.1 Proportion : The proportion of cement mortar shall be 1:4 (1 cement, 4 fine sand) by volume.

14.2.2 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.

14.2.3 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.

14.2.4 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 be done.

The face of brick shall be cleaned the very day on which the brick work is laid and all mortar dropping removed.

14.2.5 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.

14.2.6 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.

- 14.2.7 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.
- 14.2.8 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.
- 14.2.9 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 false of brick work shall be cleaned and mortar dropping removed on very same day that brick work is laid.
- 14.3.0 MODE OF MEASUREMENTS & PAYMENTS**
- 14.3.1 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.
- 14.3.2 The relevant specifications of Item No.18 shall be followed. The length shall be measured nearest to 1 Cm.
- 14.3.3 The rate shall be for a unit of **Square Metre**.

Item No.15:-Providing 20 mm thick double coat mala cement plaster on brick / concrete work for plastering comprising of base coat 12 mm thick cement plaster in cement mortar (1 Cement : 4 coarse sand) in rough finishing and 8 mm thick top coat of cement mortar 1:2 (1 Cement : 2 Coarse sand) finished with trowel including scaffolding curing etc. complete.

- 15.1.0 Materials :-
Water shall conform to M-1 cement mortar shall conform to M-11.
- 15.2.0 WORKMANSHIP
- 15.2.1 The work shall be carried out in two coats. The backing coat [basecoat] shall be 12 mm. 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 raisign 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.
- 15.2.2 Scaffolding - Wooden ballies, 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.
- 15.2.3 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.

15.2.4 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 recommencing 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 than 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 arrises. 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.

15.3.0 MODE OF MEASUREMENTS & PAYMENT

15.3.1 The rate shall include the cost of all materials, labour and scaffolding etc. involved in the operations described under workmanship.

15.3.2 All plastering shall be measured in square metres unless otherwise specified. Length, breadth or height shall be measured correct to a centimetre.

15.3.3 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.

15.3.5 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.

15.3.6 Soffits of stairs shall be measured as plastering on ceilings. Blowing soffits shall be measured separately.

15.3.7 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.

15.3.8 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.

15.3.9 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.

15.3.10 The rate shall be for a unit of one Sq.Mts.

Item No.16:- 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

16.1.0 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.

16.2.0 Workmanship :-

16.2.1 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.

16.2.2 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.

16.2.3 The floor shall be kept wet for a minimum period of 7 days so that bedding and joints set properly.

16.2.4 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.

16.2.5 The holes required for Nahni traps, pipes and any other fitting shall be made without extra cost.

16.3.0 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 **Square Metre**.

The rate shall be for a unit of **Square Metre**.

Item No.17:- Providing and laying chequered precast concrete tiles 22mm thick with aggregate of sizes upto 6mm in floors treads of steps and landing on 20mm thick bed of C.M. 1:6 (1 cement : 6 sand) or L.M. 1:1.5 (1 Lime putty : 1.5 sand) jointed with neat cement slurry with pigments to match the shade of the tiles.

17.1.0 Materials :

Water shall conform to M-1 cement shall conform to M-3. Lime Mortar shall conform to M-10. Cement mortar shall conform to M-11. The precast chequered tiles of 20 mm thick shall be of light shade using white cement and conform to M-47-D.

17.2.0 Workmanhship :

17.2.1 The work shall be carried out as per I.S.1443-1972.

17.2.1 Bedding : Before spreading the mortar, the sub-base of the floor shall ne cleaned of all dirt, scum and loose materials and then well wetted without fomring any pools of water on the surface. In case of R.C.C.floors, the top shall be left a little rough, all points of level for the finished surface shall be marked out. The lime water of proportion 1:6 (1 cement : 6coarse sand) jointed with neat cement slurry mixed with pigment to match the shade of the tiles as directed shall be then evenly and smoothly spread over the base. Bedding layer or mortar shall be not less than 10 mm and average thickness of bedding shall be 25 mm.

17.2.2 Laying : Before laying the terrazzo (Marble/Mosaic) tiles, the tiles shall be thoroughly wetted with water. Neat cement grout of required consistency at 4.4 kg.cement/sqmt shall be spread on the mortar bed. The tiles shall be laid on the neat cement float and shall be evenly and firmly bedded to the required level and slops. There shall be no hollows left. The joints shall be of uniform thickness and in straight line as per the pattern. The surface of flooring shall be checked frequently with a straight edge at-least two metres long so as to obtain a true surface with required slope. The tiles which are fixed in the adjoining the wall shall go about 10 mm under plaster. Skirting or dedo shall be left unfinished for about 50 mm above finished floor level and unfinished strip then left earlier shall be finished. In places where full tiles can not be fixed.The tiles shall be cut to the size and smoothened at edges to give straight and true joints.

After the tiles have been laid, the surplus cement slurry and the joints shall be cleaned and washed fairly deep before cement hardens.The day after tiles have been laid, the joints shall be cleaned of every cement grout with a wire brush to a depth of about 5 mm and then grouted with white cement with or without pigment to match the shade of the topping of tiler.

17.2.4 Curing :

The flooring shall be kept wet with damp sand or water for seven days.It shall be kept undisturbed atleast for 14 days. The grinding shall normally be commenced after 14 days.

17.2.5 Polishing :

After the tiles are properly cured, first grinding shall be done with carborundum stone of 48 to 60 grade grit fitted in machine. Water shall be properly used during grinding. When the chips show up and the floor has been uniformly rubbed, it shall be cleaned with water, baring all pin holes. It shall then be covered with a thin coat of white cement mixed with or without pigments to match the colour of the topping of the tiles. Pin holes if any shall thus be filled. This grout shall be kept moist for a week. Thereafter second grinding shall be started with carboundum of 120 grit. Grouting and curing shall follow again. Final grinding shall be done when other works are finished. The machine shall be fitted with carborundum of grit 220 to 350 using water in abundance. The floor shall then be washed clean with water. Oxalic acid

powder shall than be dusted at 33 grams per square metre on the surface and the surface rubbed with machine fitted with hessian bobs or rubbed hard with pad of wooden rags, The floor shall then be washed clean and dried with a soft cloth or Linen. The finished floor shall not sound hollow when tapped with a mallet. If any tiles is disturbed or damaged it shall be refitted or replaced properly jointed and polished. Testing of the tiles shall be carried out by the contractor at his own cost as per I.S. requirement for required tests.

17.3.0 Mode of Measurements and payment :

The terrazo tiles flooring shall be measured in Sq.metre for visible area of work done. No deductions shall be made nor extra paid for any opening in the floor area upto 0.1 Sq.mt. Nothing extra shall be paid for use of cut tiles or for laying the floors at different levels in the same room or court yard. Mosaic tiles laid in floor borders and bands etc. shall be measured in the same ITEM and nothing extra shall be payable on account of these or similar bonds formed of half or multiples of half size, standard tiles or other uncut tiles. The treads of stairs and steps paved with tiles without nosing shall also be measured under this ITEM. Extra rate shall however be paid for such area where width of treads does not exceed 30 cms. The rate shall include the cost of all materials, labour involved in all the operations as described above.

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

Item No.18 :- Providing and fixing 40 mm thick polished granite stone slab of approved colour and make for platform in ticket cabin area, machine cut to required size with edges machine polished and chamfered as directed. The granite slab shall be laid over cement mortar bed (1:4) of average 20 mm thickness over prepared base, properly aligned, levelled and jointed with matching shade epoxy/cement slurry. The joints shall be neatly finished and the top surface shall be properly cleaned and made ready for use. The item shall include cutting, handling, laying, curing, polishing, labour, materials and all incidental charges complete in all respects as per directions of the Engineer-in-charge.

18.1. Material Requirements

Primary Stone: 40 mm thick polished granite slab. The exact color and brand/make must be approved by the Engineer-in-charge before procurement.

Bedding Material: Cement mortar mixed at a 1:4 ratio (1 part cement to 4 parts sand).

Jointing Material: Epoxy or cement slurry specifically chosen to match the shade of the approved granite.

18.2. Fabrication and Processing

Sizing: The stone must be precisely machine-cut to the required dimensions. Hand-cutting is not permitted.

Edge Treatment: All exposed edges must be machine-polished and chamfered (angled/beveled) to remove sharp 90-degree corners, which prevents chipping and ensures safety for users and staff.

18.3. Installation Methodology

Base Preparation: The underlying base must be properly prepared before laying the stone.

Mortar Bed: The granite is to be laid on an average 20 mm thick bed of the 1:4 cement mortar.

Fixing & Leveling: The slabs must be perfectly aligned and leveled during installation.

Jointing: Slabs must be joined using the matching epoxy/slurry, ensuring the joints are neat, flush, and tightly sealed.

18.4. Finishing and Scope of Work

Final Delivery: The top surface must be completely cleaned of any construction residue and made fully ready for immediate use.

The rate shall be for a unit of **Square Metre**.

Item No.19 :- 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 rafter & 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 shoring to form shall be done by application of pressure and not by hammering. 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 advance 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 identification marks as given in the shop drawings.

The bars shall be thickened 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. So 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, buckles or open joints.

Before making holes in individual members, for fabrication the steel work intended to be riveted or bolted to gather shall be assembled or clamped properly and tightly so as to ensure close abutting or lapping of the surface of the different members. All stiffeners shall be tightly both at top and bottom without being drawn or caulked. The abutting joints shall be cut or 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 plates or girders which have no cover plates shall have their ends flush with the top of angles forming the flanges unless 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 greater 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 practical reasons, greater clearance 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.

Expansion bed plates shall be planed true and smooth. The planing of bed plates shall be done in the direction of the movement of the girder or truss resting on it.

Column splices and butt joints of struts and compression 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, channels etc. after riveting together shall be accurately machined so that the parts connected butt against each other over the entire surface of contact. 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 reamed 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 held together by clamps. Before riveting or bolting up or welding finally. The members shall be taken apart and all burrs 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 to 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 period 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 symbol 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. a part from the aspect of economy.

PREPARATION OF SURFACE :

Surfaces which are to be welded together, shall be free from loose mild-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 requirement 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. Whereever 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 after 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 them in position.

RATE :

The rate shall be for a unit of **one Quintal**.

Item No.20 :- Providing and Fixing Hollow steel Sections Framed Work including Cutting, Hoisting, Welding & Fixing in position Purlin, Main Chord etc. as per Engineer- in-charge.TATA / JINDAL / ASIAN Make

In general the work shall be carried out as per the standard specifications of P.W.D. / C.P.W.D./ GWSSB relevant drawings and as per the instructions of Engineer in Charge. Work shall be carried out as per item description.

- **Structural Hollow steel Sections**

1. Hot finished welded (HFW) type, or
2. Hot finished seamless (HFS) type, or
3. Electric resistance or induction butt welded (ERW), having carbon content less than 0.03 percent, yield stress of 21.5 kg/mm² (YST 210) type Conforming to the requirement of IS 1161. The **Hollow steel Sections** when analysed in accordance with the method specified in IS 228 shall show not more than 0.06 percent sulphur, and not more than 0.06 per cent phosphorous.

Hollow steel Sections shall be designated by their into in dimensions of hollow steel section. These shall be light, medium or heavy as specified depending upon the wall thickness. The

standard size and weights of Hollow steel section shall be as per relevant IS Ccode. Hollow sections shall be as per IS 4923.

Hollow steel Sections shall be clean finished and reasonably free from scale. They shall be free from cracks, surface flaws, laminations and other defects. The ends shall be cut clean and square with axis of tube, unless otherwise specified.

- **Minimum Thickness of Metals**

Thickness of **Hollow steel Sections** used for construction exposed to weather shall be not less than 4 mm and for construction not exposed to weather it shall be not less than 3.2 mm where structures are not readily accessible for maintenance, the minimum thickness shall be 5 mm.

- **Fabrication**

The component parts of the structure shall be assembled in such a manner that they are neither twisted nor otherwise damaged and be so prepared that the specified cambers, if any, are, maintained. The **Hollow steel Sections** work shall be painted with one coat of approved steel primer after fabrication. All fabrication and welding is to be done in an approved workshop. The joint details shall be generally as per S.P-38 of B.I.S publication.

Straightening: All material before being assembled shall be straightened, if necessary, unless required to be of curvilinear form and shall be free from twist. This work also include curvature structure. It should be precisely fabricated In terms of rendering, curvature & length as per instruction of Engineer-in-charge and as per Drawing. Curvature should be fabricated using bending Equipment.

Bolting : Washers shall be specially shaped where necessary, or other means, used to give the nuts and the heads of bolts a satisfactory bearing.

In all cases, where the full area of the bolts is to be developed, the threaded portion of the bolt shall not be within the thickness of the parts bolted together and washers of appropriate thickness shall be provided to allow the nuts to be completely tightened.

Welding : Where welding is adopted, it shall be as per IS 816.

Caps and Bases for Columns : The ends of all the tubes, for columns transmitting loads through the ends, should be true and square to the axis of the tubes and should be provided with a cap or base accurately fitted to the end of the tube and screwed, welded or shrunk on. The cap or base plate should be true and square to the axis of the column.

Sealing of Tubes : When the end of a **Hollow steel Sections** is not automatically sealed by virtue of its connection be welding to another member the end shall be properly and completely sealed. Before sealing, the inside of the **Hollow steel Sections** should be dry and free from loose scale.

Flatened Ends : In **Hollow steel Sections** construction the ends of **Hollow steel Sections** may be flattened or otherwise formed to provide for welded. Riveted or bolted connections provide that the methods adopted for such flattening do not injure the material. The change of sections shall be gradual.

- **Hoisting and Erection**

Hollow stell seccion trusses shall be hoisted and erected in position carefully, without damage to themselves, other structure, equipment and injury to workman.

The method of hoisting and erection proposed to be adopted shall be got approved from the Engineer-in-charge. The contractor shall however be fully responsible, for the work being carried out in a safe and proper manner without unduly stressing the various members. Proper equipment such as derricks, lifting tackles, winches, ropes etc. shall be used.

Relevant specification of DTS NO.42E shall be followed wherever found necessary. Work shall be strictly done as per drawing and as per instruction by Engineer-in-charge.

- **Measurements**

The work as fixed in place shall be measured in running metres correct to a centimeter on their weights

calculated on the basis of standard tables correct to the nearest kilogram unless otherwise specified.

Weight of cleats, brackets, packing pieces bolts nuts, washers distance pieces separators diaphragm gaskets (taking overall square dimensions) fish plates, etc. shall be added to the weight of respective items unless otherwise specified. No deduction shall be made for skew cuts.

- **Rate**

The rate shall include the cost of labour and materials involved in all the operations described above including application of one coat of approved steel primer, i.e. red oxide zinc chrome primer conforming to IS 2074.

Rate also include NDT Test for Welding.

The rate shall be for a unit of one Kilo Gram (Kg).

Item No.21 :-Fabricating, supplying, cutting, bending, fixing and assembling frames etc using aluminium sections of JINDAL/HINDALCO make or equivalent of thickness and fixed to MS framing, concrete members etc with S.S.screws in counter sunk/ S.S. rivets, S.S washers, SS anchor bolts, cleats, hangers etc and other necessary accessories and hardware complete as per detailed drawing and design. (Only finished measurements will be paid for, M.S. framing shall not be part of this item.) The rate shall include 20 micron anodising of approved shade. The sheet type will be finalised by the consultant. The rates shall be inclusive of rubber gaskets and all other hardware. Cutting and making of framing etc shall be done by experts. The rates shall be inclusive of all mechanized tools, cutters, bending machine work, grinders etc..

21.1. MATERIALS :

Aluminium shall conform to M-31. Rubber gasket shall be as per the details or as per instructions given by the Engineer-in-charge.

21.2. WORKMANSHIP :

Preparing the surface for the fixing of aluminium frame. Providing and fixing aluminium door frame as per the details of instruction given by the site in charge with proper alignment and precautions. Providing and fixing sheet glass with acid frosting as per instructions given by the Engineer in charge with necessary precautions. Aluminium doors, frame, glass etc. shall be cleaned after the completion of the work as per the instruction of Engineer in charge.

21.3. MODE OF MEASUREMENT AND PAYMENT :

21.3.1. Rates include all materials, labour, tools including providing and fixing aluminium sheet, nails etc. complete. The measurement shall be taken for the finished product.

21.3.2. The rate shall be paid **per Kilo grams (K.G).**

Item No.22 :-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-incharge, (for payment purpose only weight of stainless steel members shall be considered excluding fixing accessories such as nuts, bolts, fasteners etc.).

22.1. Materials & Workmanship

The relevant specifications be followed except that the work shall be for Stainless Steel of Hollow Tubes, Channel, plates, SS Nuts, Rivets, Bolts Etc.

22.2. Workmanship

The steel sections/hollow tubes as specified or required, shall be cut, square and 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 the required length of member. All straightening and shaping to form shall be done by application of pressure and not by hammering. Any bending or cutting shall be carried out in such a manner as not to impair the strength of the metal. Edges should not be sharp and not exposed in all the manners. All operations shall be done in cold state unless otherwise directed/permitted.

Details specification same as per item description and as directed by Engineer-in-charge.

The rate shall be for a unit of Kilogram(K.G).

Item No.23 :-Providing & fixing Aluminium Composite panel of alum decor, Indobond & Flexibond make to all Surfaces 4mm thick in required colours of exterior consisting of two layers of aluminium skins of 0.25mm thick sandwiching a thermo plastic core in continuous lamination process with PVDF coating of exterior grades ensuring long life colour and fungal resistance. Base frame work with aluminium sections shall be fixed over the all surfaces, ACP shall be fixed to the frame work as cladding it includes cost of labour, Materials , accessories, adhesive, scaffolding, wastages, transport, taxes, fixing into a neat finish in aesthetic point of view, without any undulations in facias all complete as per drawing and instruction of engineer in-charge.

23.1 The rate includes cost of labour, materials, accessories, adhesive, scaffolding, wastages, transport, taxes.

23.2 Rate shall be paid per **Square Metre**.

Item No.24 :- Providing and fixing in position as per designs 10mm thick toughened glass of required diameter with diamond polished edges of Asahi, Modiguard make. The glass shall be firmly fixed to the base surface using structural silicon of Dow Corning or Wacker make. The contractor shall ensure that the base surface is thoroughly cleaned prior to fixing of glass and the assembly shall be made completely water tight. The contractor shall check for water tightness and provide a certificate for the same. The work shall be executed to the complete satisfaction of the Engineer in charge and the work area shall be made totally clean on completion of the work.

24.1 Materials :

Materials shall conform to M-38 and relevant specifications.

24.2 SCOPE OF WORK :

Work under this section shall be inclusive of design, fabrication and installation of toughened glass for sliding doors, ticket counters, signage etc as specified and as per the designs of the consultant including supply and installation of patch fittings of approved make as mentioned in the design drawings of the Consultant.

24.3 WORKMANSHIP :

24.3.1 Examine conditions and proceed with work when framing systems are ready for glazing.

- a. Verify that openings for glazing, Sliding door/Window/ opening/ ticket counter work etc are correctly sized and within tolerances.
- b. Verify that glazing channel surfaces or recesses are clear, free of burrs, obstructions, Irregularities and glass is free of edge damage or imperfections.

24.3.2 Preparation :

- a. Clean contact surfaces with solvent and wipe dry.
- b. Seal porous glazing channels or recesses with substrate compatible primer or sealer.
- c. Prime surfaces scheduled to receive sealant, if required by sealant manufacturer.
- d. Verify that materials used for cleaning edges of sealed insulating units are compatible with sealants and components and will not damage or cause deterioration of integrity of sealed insulating unit.

* Glass shall have safety marking as approved by the CONSULTANT at eye level.

* Installation completed shall be sound, watertight, free from defects and to acceptable standard of CONSULTANT.

C. Tempered Glass

Do not cut, seam, nip or abrade tempered glass.

The contractor shall ensure that the glass is firmly fixed in desired positions and the framing, SS studs, channels are also firmly fixed to the base surface. The edges shall be protected using a protective tapping for all exposed edges of the glass during the execution of works. Holes shall be correctly made prior to toughening the clear glass. The contractor shall ensure that the holes for accommodating SS patch fittings, SS studs, screws, Aluminum framing members etc shall be marked precisely on the glass and alignments are matched before making the holes in glass.

All free intersecting edges of glass to glass, glass to wood, glass to aluminum framing, glass to stone etc shall be sealed properly using a good quality approved make structural silicone sealant. The rates of the contractor shall be inclusive of the sealants.

24.3.3 Protection :

- A. Protect finished work.
- B. After installation, mark glass pane with X by using removable plastic tape or paste.

24.3.4 Cleaning :

The PVC tape, protective covering shall be retained till the glass work is completed and until the CONSULTANT gives instruction for its removal.

24.3.5 General :

24.3.5.1. Remove labels after work is completed.

24.3.5.2. Wash and polish both faces not more than seven days prior to Owner's acceptance of work.

24.3.5.3. Comply with glass manufacturer's recommendations for final cleaning.

24.4 Method of Measurements:

The work shall be measured in **square metre (S.M)** and the rates shall be inclusive of the framework, S.S. studs, S.S. patch fittings of approved make unless otherwise mentioned.

The rates shall be inclusive of making holes, edge polishing using diamond, cutting, cleaning of glass, protection tapes, gaskets, sealants, PVC edge tapes, frosting, acid finishing, etching etc.

ITEM NO.25 :- Providing and fixing factory manufactured PUF (Polyurethane Foam) insulated sandwich roof panels of 50 mm thickness having pre-painted colour coated GI sheet of minimum 0.45 mm thickness on both sides with injected rigid polyurethane foam core of density not less than 40 ± 2 kg/m³, suitable for roofing application. The panels shall be laid over MS purlins with proper alignment and slope, fixed using self-drilling screws with EPDM washers to ensure complete water tightness. The joints shall be interlocked and sealed with approved sealant to prevent leakage. The work shall include cutting to required size, lifting, placing, fixing, finishing edges, ridge/side flashing where required and making the entire roof assembly fully weatherproof. The contractor shall ensure proper slope for drainage and provide water tightness certificate after completion. The work shall be executed to the complete satisfaction of the Engineer-in-charge.

1. Material Specifications

Core: Injected rigid Polyurethane Foam (PUF) with a density of 40 ± 2 kg/m³.

Skinning: Pre-painted colour coated Galvanised Iron (GI) sheets, minimum 0.45 mm thickness on both the top and bottom sides.

Thickness: Total panel thickness of 50 mm.

2. Installation Requirements

Support: Panels must be laid over Mild Steel (MS) purlins, ensuring precise alignment and the correct slope for drainage.

Fixing: Use self-drilling screws equipped with EPDM washers to maintain a watertight seal at all piercing points.

Jointing: Panels must feature an interlocking mechanism. All joints must be sealed with an approved sealant to prevent any water ingress.

3. Scope of Work

Fabrication: Includes onsite/factory cutting to size and finishing of edges.

Hardware: Supply and fixing of necessary ridge and side flashings to complete the roof envelope.

Weatherproofing: The contractor is responsible for the entire assembly being fully weatherproof.

4. Compliance & Quality Assurance

Water Tightness Certificate: The contractor must provide a formal certificate confirming the roof is leak-proof upon completion.

Approval: All works must meet the standards and satisfaction of the Engineer-in-Charge.

Measurement: This item is measured in Square Metres (Sqm) based on the net covered area.

Item No.26 :- Providing and fixing terra cotta blocks of size 8" × 8" × 2.5" in approved pattern using polymer modified adhesive / chemical mortar system, properly aligned and levelled to form ventilated screen wall of required height. The item shall include cutting, alignment, temporary bracing, adhesive application, curing, scaffolding and all labour, materials and incidental works complete as per approved drawings and directions of the Engineer-in-charge.

1. Scope of Work

The work involves constructing a terracotta screen wall (jaali) at the required heights and locations as per the architectural drawings. This includes surface preparation, layout, fixing of blocks, and final finishing.

2. Materials

Terracotta Blocks: Must be of size 8" × 8" × 2.5", uniform in colour, free from cracks, twists, or warping. Blocks should have sharp edges and a consistent finish as approved by the Engineer-in-Charge.

Adhesive: Polymer-modified adhesive or high-grade chemical mortar system specifically designed for terracotta/tile applications to ensure high bond strength and weather resistance.

Water: Clean, potable water free from salts and organic impurities for any required site mixing or curing.

3. Execution & Workmanship

Alignment: The screen must be perfectly plumb, level, and aligned. Blocks should be laid in the approved pattern (e.g., staggered, stacked, or decorative).

Fixing: Blocks are to be fixed using the chemical mortar/adhesive system. Joints should be uniform in thickness as specified in the drawings.

Bracing: Temporary scaffolding and bracing must be provided during construction to ensure the stability of the screen wall until the adhesive has fully cured.

Cutting: Any necessary cutting of blocks shall be done using mechanical stone cutters to ensure clean, sharp edges. Manual hacking is not permitted.

Curing: The finished wall shall be cured as per the adhesive manufacturer's recommendations.

4. Rate Inclusions

The quoted rate shall be comprehensive and include:

Cost of terracotta blocks, adhesive, and all incidental materials.

Labour for layout, cutting, fixing, and alignment.

All scaffolding, temporary supports, and safety equipment.

Cleaning of the surface and removal of excess mortar/adhesive.

All taxes, royalties, and transport charges.

5. Measurement and Payment

Unit of Measurement: Square Metre of the finished face area.

Payment: Based on the actual net area of the screen wall erected and approved.

Item No.27 :-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.

27.1 Details specification same as per the Item.

27.2 The work shall be carried out as per instructions of Engineer-in-charge.

27.3 The rate shall be **per Number**.

Item No.28 :- 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

28.1.0. MATERIALS

The water shall conform to Material Specification. Water Proofing Cement paint shall conform to I.S. 5410-1969

28.2.0 WORKMANSHIP

28.2.1. 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.

28.2.2. PREPARATION OF SURFACE

28.2.2.1 The surface shall be thoroughly cleaned of all dust, dirt, mortar cropping and other foreign matter before white wash is to be applied.

28.2.2.2 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.

28.2.2.3 Oil or grease spots shall be removed by suitable chemical and smooth surface shall be rubbed with wire brushes.

28.2.2.4 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.

28.2.2.5 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 while 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.

28.2.3. PREPARATION OF PAINT

Portland cement shall be prepared by adding paint powder .to water and stirring to obtain a thick paste, which shall then be diluted to a brush-able consistency. Generally, equal volumes of paint powder and water make a satisfactory paint'. 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 thicken, affecting flowing and finish. The lids of cement paint drums shall be kept tightly when not in use.

28.2.4 APPLICATION OF PAINT

28.4.1 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.

28.4.2 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.

28.4.3 To maintain the uniform mixture and to prevent segregation, the paint shall be stirred frequently in the bucket.

28.2.4.4. For under-rooted surfaces. The surfaces shall be treated with minimum two coats of water proof cement paint. 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.

28.2.4.5 The finished surface shall be even and uniform in shade, without patches, brush marks, paint drops, etc.

28.2.4.6 The cement paint shall be applied with a brush with short stiff hog or fibre bristles. The paint shall be brushed in uniform thickness and shall be free from excessive heavy brush marks. The lamps shall be well brushed out.

28.2.4.7 Water proof cement paint shall not be applied on surfaces already treated with white wash colour wash, distemper dry or oil bound varnishes, paint etc. It shall not be applied on gypsum, wood and metal surfaces.

28.2.5. CURING

Painted surfaces shall be sprinkled with water two or three times a day. This shall be done between coats and for at least two days following the final coat. The curing shall be started as soon as the paint has hardened so as not to be damaged by the sprinkling of water say about 12 hours after the application.

28.3.0. MODE OF MEASUREMENTS & PAYMENT

28.3.1. 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 :-

28.3.2 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.

28.3.3. 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.

28.3.4. In case of area of opening exceeding 3 sq. mt. each, deduction shall be made for openings but jambs, soffits, shall be measured.

28.3.5. No deduction shall be made for attachment such as casing, conducts, pipe, electric wiring and the like.

- 28.3.6. 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%
- 28.3.7. 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.
- 28.3.8. The rate shall include the cost of all materials, labour, scaffolding, protective measures etc. involved in all the operations described above.
- 28.3.9. The rate shall be for a unit of **per Square Metre**.

Item No.29 :- Applying Priming coat over new steel and other metal surface after over and including preparing the surface by thoroughly cleaning oil, grease dirt and other foreign matter and scoured with brushed fine steel wool, scrapers and sand paper with ready mixed priming paint brushing red lead.

29.1.0. Materials

Synthetic enamel paint shall conform to I.S. 1932-1964.

29.2.0 Workmanship

29.2.1 **General:** The materials required for work of painting work shall be obtained directly from approved manufactures or approved dealer and brought to the site in maker's drums; kegs. etc. with seal unbroken.

29.2.1.2 All materials not in actual use shall be kept properly protected, lids of containers shall be kept closed and surface of paint in open or partially open containers covered with a thin layer of turpentine to prevent formation of skin. The materials which have become state or flat due to improper and long storage shall not be used. The paint shall be stirred thoroughly in its container before pouring into small containers. While applying also, the paint shall be continuously stirred in smaller container. No left over paint shall be put back into stock tins. When not in use the containers shall be kept properly closed.

29.2.1.3 If for any reasons, things is necessary, the brand of thinner recommended by the manufacturer shall be used.

29.2.1.4 The surface to be painted shall be thoroughly cleaned and dusted. All rust, dirt and grease shall be thoroughly removed before painting is started. No painting on exterior or other exposed part o the work shall be carried out in wet, damp or otherwise unfavorable weather and all the surfaces shall be thoroughly dry before painting work is started.

29.2.2 Application of paint:

29.2.2.1 Brushing operations are to be adjusted to the spreading capacity advised by the manufacture of particular paint. The paint shall be applied evenly and smoothly by means of crossing and laying off. The crossing and laying off consists of covering the area over with paint, brushing the surface hard for the first time over and then brushing alternately in opposite directions two or three times and then finally brushing lightly in a direction at right angles to the same. In this process, no brush marks shall be left after the laying off is finished. The full process of crossing and laying off will constitute one coat.

- 29.2.2.2 Each coat shall be allowed to dry completely and lightly rubbed with very fine grade of sand-paper and loose particles brushed off before next coat is applied. Each coat shall vary slightly in shade and shall be got approved from Engineer-in-charge before next coat is started.
- 29.2.2.3 Each coat the last shall be lightly rubbed down with sand paper of fine pumice stone and cleaned of dust before the next coat is applied. No hair marks from the brush or clogging of paint puddles in the corners of panels, angles of moldings etc. shall be left on the work.
- 29.2.2.4 Special care shall be taken while painting over bolts, nuts, rivets, overlaps etc. Approved best quality brushes shall be used.

29.3.0 Mode of measurements & payment

- 29.3.1 The new steel and other metal surface shall be measured under this item.
- 29.3.2 All the work shall be measured net in the decimal system, as executed subject to the following limits unless otherwise stated hereinafter.
- (a) Dimensions shall be measured to the nearest 0.01 meter.
 - (b) Areas shall be worked out to the nearest 0.01 sq. meter.
- 29.3.3 No deductions shall be made for openings not exceeding 0.5 sq. mt. each and no addition shall be made for painting to beddings, moldings, edges, jambs, soffits, sills etc. of such opening.
- 29.3.4 In case of fabricated structural steel and iron work, priming coat of paint shall be included with fabrication. In case of trusses if measured in sq. m. compound girders, stanchions, lattices, grader and similar work, actual area shall be measured in sq. m. and no extra shall be paid for painting on bolts heads, nuts, washers etc. No addition shall be made to the weight calculated for the purpose of measurements of steel and iron works for paint applied on shop or at site.
- 29.3.5 The different surfaces shall be grouped into one general item, areas of uneven surfaces being converted into equivalent plain areas in accordance with the table given as per Annexure-II for payment.
- 29.3.3.6 The rate shall be for a unit of **square metre**.

Item No.30 :- Painting two coat (excluding priming coat) on new steel and other metal surface with synthetic enamel paint, brushing to give an even shade including cleaning the surface of all dirt, dust and other foreign matters.

30.1.0 Materials :

- 30.1.1 The ready mixed primer, brushing red lead shall conform to IS 102:1972.
- 30.1.2 The thinner (linsed oil) shall conform to IS 75:1973 if for any reason, thinning is necessary in a case of ready mix paint, the brand of thinner recommended by manufacturer shall be used.
- 30.1.3 The enamel paints shall conform to M-44.

30.2.0 Workmanship :

30.2.1 Preparation of surfaces :

The surfaces before painting shall be cleaned of all rust, scale, dirt and other foreign matter sticking to it with wire brushes, steel wool, scrapers, sand paper etc. This surface shall then be wiped finally with mineral turpentine which shall also removed greas and perspiration of hand marks. The surface shall then be allowed to dry.

30.2.2 Application of primer :

After the preparation of the surface, the priming coat shall be applied immediately. The brushing operations are to be adjusted to the spreading capacity advised by the manufacturer of the particular primer. The paint shall be applied evenly and smoothly by means of crossing and laying off. The crossing and laying off consists of covering the area over with paint, brushing alternately in opposite directions, two or three times and then finally brushing

lightly in a direction at right angles to the same. In this process no brush marks shall be left after the laying off is finished. The full process of crossing and laying will constitute one coat. During painting, every time, after the priming coat has been worked out of the brush bristles or after the brush has been unloaded the bristles of the brush shall be opened up striking the brush against portion of the unpainted surface with the end of the bristles held at right angles to the surface, so that bristles thereafter will collect the correct amount of paint when dipped again in to a paint container. The primary coat shall be allowed to dry completely before painting is started.

No hair marks from the brush or clogging at paint puddles in the corner or panels angles of mouldings etc. shall be left on the work.

Special care shall be taken painting over bolts, nuts, rivets overlaps etc.

The container when not in use shall be kept close and free from air so that paint does not thicken and also shall be kept guarded from dust.

30.2.3 General :

The materials required for painting work shall obtained directly from approved manufacturers are approved dealer and brought to the site in maker's drums, bogs etc. with seal unbroken.

All materials not in actual use shall be kept properly protected lid of containers shall be kept closed and surface of paint in open or partially open containers covered with a thin layer of turpentine to prevent formation of skin. The materials which have become state or flat to improper and long storage shall not be used. The paint shall be stirred thoroughly in its container before pouring into and shall be continuously stirred in smaller container. No left over paint shall be put back into stock tins. When not in use the containers shall be kept properly closed.

If for reason, thinning is necessary, the brand of thinner recommended by the manufacturer shall be used.

The surface to be painted shall be thoroughly cleaned and dusted. All dust, dirt and greas shall be thoroughly removed before painting is started. No painting on exterior or other exposed parts of the work shall be carried out in wet, damp or otherwise unfavourable weather and all the surface shall be thoroughly dried before painting work is started.

30.2.4 Application of paint :

Brushing operations are to be adjusted to the spreading capacity advised by the manufacturer of particular paint. The paint shall be applied evenly and smoothly by means of crossing and laying off. The crossing and laying off consists of converging the area over with paint, brushing the surface hard for the first time over and then brushing alternately in opposite directions to or three times and then finally brushing lightly in direction at right angles to the same. In this process no brush marks shall be left after the laying off is finished. The full process of crossing and laying off will constitute one coat.

Each coat shall be allowed to dry completely and lightly rubbed with every fine grade of sand paper and loose particles brushed off before next coat is applied.

Each coat shall vary slightly in the shade and shall be get approved from Engineer-in-charge before next coat is started.

Each coat except the last coat shall be lightly rubbed down with sand paper or fine pumicestone and cleaned of dust before the next coat is applied. No hairmarks from the brush or clogging of paint puddles in the corners of panels, angles of moulding etc. shall be left on the work.

Special care shall be taken while painting over bolts, nuts, rivets, overlaps etc. Approved quality brushes shall be used.

30.3.0 Mode of measurement and payment :

The new steel and other metal surface shall be measured under this item.

All the work shall be measured net in the decimal system as executed subject to the following limits unless otherwise stated hereinafter.

(a) Dimensions shall be measured to the nearest 0.01 mtr.

(b) Areas shall be worked cut to the nearest 0.01 sq.metre.

No. deductions shall be made for openings not exceeding 0.5 sq.metre each and no addition shall be made for painting to beadings mouldings, edges, jambs, soffits, sills etc.of such openings.

In case of fabricated structural steel and iron work,priming coat of paint shall be included with fabrication. In case of trusses if measured in sq.m. compound girders, stanchions, lattices, girder and similar work, actual area shall be measured in sq.m.and no extra shall be paid for painting on bolts, heads, nuts, washers, etc. No addition shall be made to the weight calculated for the purpose of measurements of steel and iron works for paint applied on shop or at site.

The different surfaces shall be grouped into one general item. Areas of uneven surface being converted into equivalent paint areas in accordance with the table given as per Annexure-II for payment.

The rate is for complete item as specified i.e. one primer coat and two coats of oil paint.

The rate shall be for a unit of **Square Metre**.

EXECUTIVE ENGINEER
TRAFFIC BRTS PROJECT CELL
SURAT MUNICIPAL CORPORATION,

SIGNATURE OF THE CONTRACTOR WITH SEAL

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
TRAFFIC BRTS PROJECT CELL
SURAT MUNICIPAL CORPORATION,

SIGNATURE OF THE CONTRACTOR WITH SEAL

SPECIFICATION FOR INTERNAL ELECTRIFICATION WORK

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 points 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 650 V)
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	Specifications 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 Indian 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 installation 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, no wires through conduit, bunching, etc. Shall be as specified in the concealed installation
- 4.1.5 Prior to fixing the conduits, the complete route shall be marked on site for the approval of consultant

4.2 CONCEALED WIRING SYSTEM WITH RIGID PVC CONDUIT

- 4.1.6 The rigid PVC conduits shall be used for concealed wiring system. The conduits shall be concealed in the concrete slab, floor, walls, beams, columns etc

4.1.7 FIXING OF CONDUIT

1. Conduits embedded in concrete shall be installed in the frame work before pouring concrete. The conduits 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 putlet/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 conduits shall be fixed inside the chase by means of staples or by means of saddles not more than 60 cm apart.
2. Conduits 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 looping 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 conduits shall be installed so as to avoid steam and hot water pipes
4. Conduits 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. No run of conduit shall exceed ten mtr. between adjacent draw in points nor shall it contain more than two right angle bends, or other derivation from the straight line
6. Caution 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 more than 60 deg. cel. is prohibited. The entire conduit 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 method shall be subject to the approval of the client
8. Separate conduits shall be provided for the following system.
 - 15 A power outlets.
 - 5 A 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 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 conduit system shall be properly drained and ventilated, but in such a manner as to prevent the entry of insects, etc.
- 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 water tight.

4.4 BUNCHING OF CABLES

- 4.4.1 Cables of AC supply of different phase shall be bunched in separate conduits
- 4.4.2 The number of insulated wires/ cables that may be drawn into the conduits 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 19 mm dia. shall not be used.
MAXIMUM PERMISSIBLE NUMBER OF 650 VOLT GRADE SINGLE CORE CABLES THAT MAY BE DRAWN IN TO 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 pin grip 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 mains and sub mains shall run in independent conduits with an independent earth wire of specified capacity along the entire length of conduit

4.6.4 The conduits 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 table 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 junctions boxes other than for outlet points. Conduits shall be free from sharp edge and burrs. Conduits shall be laid in a neat and organized manner as directed and approved by the client. Conduit runs 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 runs of conduit, inspection type couplers two way junction boxes at reasonable intervals shall be provided or running threads with couplers and lock nuts shall be provided. The bare threaded portion shall be treated with anti-corrosive paints. Threads on conduit pipes in all cases shall be between 11mm to 27mm long, sufficient to accommodate pipes 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 parts of the equipment
- 4.8 BENDS IN CONDUIT
- 4.8.1 All necessary bends in the system including diversion shall be done by bending pipes or by inserting suitable solid or circular inspection type normal box 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 75 mm. 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 pipe 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 out going 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 conduits shall be as per the following table.
- 4.11.3 MAXIMUM PERMISSIBLE NUMBER OF 650/1100 VOLTS GRADE SINGLE CORE CABLE THAT CAN BE DRAWN INTO RIGID STEEL CONDUITS.

CABLE SIZE IN MM SQ.	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 plates 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 it 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 wires 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 wire men 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 looping 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 joints shall be made inside conduits and junction boxes.

4.14.2 Contractors 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 LOAD BALANCING

4.15.1 Balancing of circuit in three phase installation 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

SUPPLY, LAYING, TESTING AND CONNECTING UNARMoured CABLE:

Winding insulation resistance shall be measured from primary and secondary to ground and between primary and secondary.

Test the operation of thermister type sensor relay in accordance with the manufacturer's instructions.

Check the polarity of terminals and the phase sequence. Proforma for transformer tests :

1. Proforma for transformer tests :

☐ Transformer name plate.

☐ Insulation resistance test with 1000 V meagre.

a) between primary to earth

b) between secondary to earth

c) between primary and secondary

☐ Operation of the tap changer. Operation of the tap at tap No. 1 Operation of the tap at tap No. 2
Operation of the tap at tap No. 3 Operation of the tap at tap No. 4 Operation of the tap at tap No. 5

☐ Polarity marking and phase sequence.

☐ Earth resistance: Body & Neutral tank.

[This proforma shall be jointly signed by the CLIENT/ CONSULTANT and the contractor in duplicate].

The item includes supply, laying, testing and commissioning of round 3 X 1.5 sq. mm for LED luminaries 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.

Before electrical panel is energised, the insulation resistance of each bus shall be measured from phase to ground. Measurement shall be repeated with circuit breakers in operating positions and contacts open.

Before switchgear is energised, the insulation resistance of all control circuits shall be measured from line to ground.

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 wherever applicable, shall be checked.

☐ Before switchgear 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. Switchgear 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 breakers latch, check carriage limit switch if provided. Test proper operation of lockout device in the closing circuit. Wherever 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 switchgear 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 discharge device shall be carried out.

☐ All electrical equipment alarms shall be tested for proper operation by causing alarms to sound under simulated abnormal conditions.

2. Performa 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 : Mega ohm
- b) between each phase and earth : Mega ohm
- c) DC and AC control and auxiliary circuits : Mega ohm

INSTALLATION OF CABLE NETWORK

Cable network shall include power, control and lighting cables which shall be laid in underground trenches, hume 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 sockets of both end isolators, junction boxes, remote push button stations, etc. shall be under the scope of the contractor.

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

V megger.

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 cables 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 cable 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 pipe shall be sealed with cotton / bituminous compound.

High voltage (11 KV and above), medium voltage (240 V and above) and other control cables shall be separated from each other by adequate spacing or running through independent pipes / trays.

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 3 M 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 150 mm. thick layers of Charcoal dust and Salt mixture.
4. 20 mm. 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 chamber 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 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.
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 600 mm. below the finished ground level.
9. 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.
10. Overlapping of earth conductors during straight through in joints, where required, shall be of minimum 75mm. long.
11. The earth conductors 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 phosphor 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 pipes shall be laid. Earth lead run on surface of wall or ceiling shall be fixed on saddles so that strip is at least 8 mm 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 earthed 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. Conduits 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. Conduits 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 drops 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 chase 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 bars 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 pipe 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, clamps 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 conduit on surface 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 recommended.
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. pipe 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 alongwith other working draws. 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 300 mm. 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 arrangement shall be made in consultation with client / consultant.
3. For fixing ceiling fans, circular outlet boxes, 100 mm. diameter, complete with 12 mm. dia. Mild Steel rod 300 mm. long, for holding 12 mm. dia. Mild Steel cover 125 mm. dia. at bottom shall be used.

5.3 DRAW OUT JUNCTION BOXES

Steel drawout boxes at angle dimensions shall be provided at a convenient points 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 five sided. 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 / 450 mm. 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 conduits in ceiling.
6. Locating junction boxes on outer surface of exterior walls of building should be avoided as these are in direct 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.

5.0 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 plugs etc.. Within tendered cost which shall be replaced later on by hylem / sheet cover after wiring as required.

6.0 INSTALLATION OF LIGHTING FIXTURES

Scope of work under this item shall start from light point, with a 5 A bakelite connector, 2 core 1.5 mm.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.

6.1 INSTALLATION OF EXHAUST FANS

Scope of work under this system shall start from exhaust fan point, with a ceiling rose, 2 core 2.5 mm.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 brackets shall be made of 38 mm. NB MS class "B" pipe approx. 1.8 mtr. long bent at the centre at an angle 120° C. with necessary holding brackets, hold fasts 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 street light 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 pole shall be grouted inside ground pit (cross-section 600 x 600 mm.) with cement concrete 1:2:4. Before the placement of concrete around pole in the pit, necessary conduit pipes (not less than 25 mm. 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

prematured drying by curing for at least 7 days after pouring. All concrete surface from 150 mm. below ground level to top shall be finished smooth with cement mortar 1:4.

7.3 INSTALLATION OF STREET LIGHT FIXTURES

This includes fixing of street light fittings complete with accessories and lamps at the end of the pole / bracket, connecting it with 3 x 2.5 mm.² aluminium conductor, PVC insulated cable from water tight 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 street light 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 poles shall be 3 mtrs.
4. A loop of 1.5 mtr. of cable shall be provided near each street light 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 / short coming 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 500 V). 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 POLE SWIT

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 of metallic sheathing, the total resistance of the conduit or sheathing from the earthing point any other position in the completed installation 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.

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 (1-2-1)

Primary light point controlled by one SP MCB

Secondary light point controlled by same switch / MCB

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 (1-1-4)

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 (1-2-2)

Item No 6. 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 (1-2-3)
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 (1-2-3)

SOR 1.1.5 but with 4 sq.mm wire for phase & Neutral & 2.5 sq. mm for Earthing

SOR 1.1.6 but With 20 Amp DP switch and socket at different location

- . 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 (1-2-4)

- 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)

- 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 (1-2-6)

- 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 (1-6-2-B)

- . Supplying & erecting approved make LAN cable of following size in existing pipe as per direction [C] CAT - 6 (1-4-8)

- 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 (1-3-2)

- 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(1-3-2)

- 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.

- Supplying, Fabricating, Installtion, Testing & Commissining of the 2 mm thick CRCA sheet Steel Powder Coated MS box as per the approved Design with locking Arrangement.

- 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 (1-3-6)

- 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 (2-16-2)

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 (6-5-4-b)

LED LIGHT TECHNICAL SPECIFICATIONS

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) EN 55015, 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 IEC 61547-EMC Immunity requirement

IEC 60598-2-1 Fixed general purpose luminaires

IEC 60598-1 Luminaires - General requirement and tests

IEC 61000-3-2 Electro Magnetic compatibility (EMC)- Limits for Harmonic current emission — (equipment input current ≤ 16 A per phase.

IEC 60068-2-38 Environmental Testing: Test Z- AD: composite temperature/ humidity cyclic test

IEC 61347-2-13 Lamp control gear: particular requirements for DC or AC supplied electronic control gear for LED modules.

IS 10322 Specification for the luminaires IS 4905 Method for random sampling

LM 79 LED luminaire photometry measurement. LM 80 Lumen Maintenance

IEC 62384 DC or AC supplied electronic control gear for LED modules performance requirements

IEC/ PAS 62612 Self-ballasted LED lamps for general lighting services- Performance requirements

CONSTRUCTIONAL FEATURES:

General:

- a) Luminaires shall be made of die cast aluminium/ extruded Aluminium body with powder coated finish having safety.
- b) Heat sink used should be aluminium extrusion having high conductivity. Heat sink should be integrated within luminaires 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 luminaires 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 luminaires 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 luminaires 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 luminaires. 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 luminaires, shall be low smoke halogen free, fire retardant e-beam 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 luminaire.

- 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 LEDs 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 datasheet.
- b) Adequate heat sink with proper thermal management shall be provided.
- c) Lumen maintenance report as per LM 80 guidelines shall be produced for the power LEDs used.
- d) Thermal management shall be in such a way that LED soldering point temperature shall not go beyond 75° C.
- e) The LED luminaries shall be free of glare.

LED DRIVER specification:

- a) Current waveform should meet relevant nation and international standard.
- b) LED Driver shall withstand, withstand voltage up to level mentioned elsewhere in tender and restore once normal working when normal voltage is applied.
- c) The life of the driver should more than 25000 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 luminaries 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 luminaries 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.

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 (2-15-3)

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 efficiency110 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 (2-15-2)

1 x 12 watt LED Down lighter Fitting with inbuilt driver of Philips make DN193B LED12S 4000 PSU WH S2 (LED color should be warm white) or equivalent to be installed in MS / PVC Housing recessed in RCC slab with necessary wiring Complete in All Respect.

INSTALLATION OF CABLE NETWORK

- ☐ Armoured cables 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 engineer shall be taken. If allowed, proper straight through epoxy resin tight joint shall be made, without any additional cost.
 - ☐ A minimum loop of 3 mtr. 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.
 - ☐ Cable shall be neatly arranged in the trenches / trays in such manner so that criss-crossing is avoided and final take off to the motor / switchgear 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 buildings 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 trenches to motors / switchgears / push buttons, these shall be taken in G.I. pipes of suitable size, for mechanical protection upto 300 mm. 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.
3. LAYING OF CABLES (UNDERGROUND SYSTEM)
- Cables shall be so laid in trench that this will not interfere with other underground structure. All water pipes, sewage lines or other structures which become exposed by excavation shall be properly supported and protected from injury until the filling has been rammed solidly in places 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.
- ☐ Cable shall be laid at minimum depth of 750 mm. in case of L.T. and 1200 mm. 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 75 mm. 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 of 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 back filling the earth shall be made good so as to conform in all respects to the surrounded 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 230 x 230 x 300 mm..
- c) Cable markers should be installed at an interval not exceeding 30 mtr. along the straight routes of cables at a distance of 0.5 mtr. 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 hump pipe for crossing road in cable laying shall be provided by employer. No deduction shall be made for cable laying in hump pipe 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.
- 4. 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.
- 5. LAYING OF CABLES IN CABLE TRAYS
 - ☑ Cable trays and steel members such as M.S. angle / channel / flats etc. shall be provided and fixed by the erector.
 - ☑ Cable 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 alongwith cables.
 - ☑ After laying of cables, minimum 20% area shall be spare.
- 6. 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 size double compression type cable glands. Armour of cable 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 galvanised threaded reducing bushing 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 holes should be drilled in the bottom plate for all the cables in one line, then bottom plate should be split in 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 jointing 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 to sever or damage any strand. All insulation's 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 recommendation should be followed.

☐ DRESSING OF CABLE INSIDE THE EQUIPMENT

After fixing of cable glands, the individual cores of cable shall be dressed and taken along the cable ways (if provided) or shall be fixed to the panels with polyethylene straps. Cable 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 mean of PVC ferrules or self sticking cable markers, wire numbers shall be as per schematic / connection drawing. For power circuit also, wire numbers shall be provided if required as per the drawings of switchgear manufacturer / supplier.

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] (5-1-5)

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.(5-2-3)

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.(5-2-1)

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] (5-3-1)

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 (5-4-1)

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 (3-10-1-B)

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 (816 g/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 gears shall be tested for their proper functioning.

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 (3-11-5)

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

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

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

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 (3-12-1)

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 (3-10-2)

6 to 32 A SP MCB

40 A DP MCB

25 A / 100 mA DP ELMCB

32 A / 100 mA DP ELMCB

40 A / 100 mA DP ELMCB

25 A FP MCB

32 A FP MCB

40 A FP MCB

astronomical Dual Channel Timer equivalent to Legrand Make D22 Cat. No. 004767

40 Amp DP Dinrail Mounded Contactor Equivalent to Legrand make Cat. No. 004068

63 Amp FP Dinrail Mounded Contactor Equivalent to Legrand make Cat. No. 004078

Sheet steel encloser for DP MCB

Sheet steel encloser for FP MCB

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) (1-4-1)
Specification : Same As Item No 1.

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 (1-4-2)
Specification : Same As Item No 1.

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 (1-4-2)
Specification : Same As Item No 1.

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 (4-4-5)
Specification : Same As Item No 56.

Supplying and Laying of 2 nos. of 4 sq mm Cu. flexible wires with 1 nos 2.5 sqmm Cu. flexible wires to be drawn in 25 mm dia Pipe
Specification : Same As Item No 1.

Supplying and Laying of 2 nos. of 2.5 sq mm Cu. flexible wires with 1 nos 2.5 sqmm Cu. flexible wires to be drawn in 25 mm dia Pipe
Specification : Same As Item No 1.

TECHNICAL SPECIFICATIONS FOR LT XLPE CABLE

TECHNICAL SPECIFICATIONS FOR LT XLPE CABLE

1.0 SCOPE OF WORK

This section shall cover supply, laying, testing and commissioning of medium voltage XLPE cables.

1.

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 orders 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 81M above mean sea level	
Ambient temperature		Relative humidity	
Maximum	45 ° C	Maximum	85 %
Minimum	13 ° C	Minimum	25 %
Design 50 ° C		Design 90 % at 50 ° C	
Seismic IS:1893 factor Zone III as per		Rainfall 618mm/year	
Environmental Tropical conditions		Location of Equipment Indoor	
Electrical system data :			
Power supply for Equipment			
Voltage 415 V ± 5 %		Frequency 50 Hz ± 3 %	
Permissible combined voltage & frequency variation		System design faults level (Symmetrical)	15 kA for 1 sec. max.
System earthing LV side neutral solidly earthed		Wiring 3 phase, 4 wire on 415V system	

ply	
Power supply	240V AC, 1-Ph, 50Hz
Control Supply	-----
Space heater power supply	240V AC, 1-Ph, 50Hz
Illumination power supply	240V AC, 1-Ph, 50Hz
Plug-socket power supply	240V AC, 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

Standards 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 cable 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, multi core, 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 4 mm.² size, the conductor shall be solid and above 4 mm.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 cor : 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 helicaly in single layers complete with covering the assembly of cores.

For cable size upto 25 Sq. mm. : Armour of 1.4 mm dia G.I. round wire

For cable 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.

Inner sheath shall be extruded type and shall be compatible with the insulation provided for the cables. Outer sheath 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 outer sheath shall be black. Sequential length marking required at every 1.0 mtr. interval on outer sheath Vendor has to furnish resistance / reactance / capacitances of the cable

4.2.8 Rating:

Up to and including 1100 Volts.

5.0 DRAWINGS & INFORMATION

5.1 Contractor shall submit the as built drawing of the cable laying drawing.

5.2 HANDINGOVER DOCUMENTS

The supplier shall submit following:

1. Data sheet indicating results of tests
2. in house 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 cable 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 alongwith supply. If specified and/or desire by SMC 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 KV A.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 lug to lug basis.

8.0 TRANSPORT, DELIVERY AND STORAGE

8.1 The cable 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 later stage.

8.3 The cable 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 quotes values of parameters shall be within given tolerance for given period of service life.

Supply & Laying of 1.5 sq mm x 3 core round flexible wire in prelaid pipe / Raceway.

Supply & Laying of 2.5 sq mm x 3 core round flexible wires in prelaid pipe / Raceway.

SITC of Cat - 6 wire of Legrand make

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 (4-3-5)

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 (4-6-1)

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. (4-7-1)

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.(4-5-1)

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 (4-5-8)

Specification: Same As Item No.01

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 (4-5-8)

Specification: Same As Item No.01

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. (4-5-7)

Specification: Same As Item No.01

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 (4-6-1)

Specification : Same As Item No 56.

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 (4-7-1)

Specification : Same As Item No 56.

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	RelevantIS/IEC
1	CodeofPracticeforEarthing	IS3043
2	InsulationCo-ordinationApplicationGuide	IS3716
3	CodeofPracticeforProtectionofBuildingsand Allied Structures against Lightning	IS2309
4	IndianElectricityRules,1956	
5	IndianElectricityAct,1910	
6	NationalElectricalCode	
7	LowVoltageElectricalInstallations-Part5-54: Selection&ErectionofElectricalequipment-Earthingarrangement&protectiveconductors.	IEC60364
8	ProtectionAgainstLightning–Part3:Protection of structures & life Hazards	IEC62305

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 2 ohms 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.

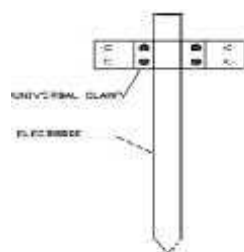
Minimum length for each earthing station to be 3 meters.

- 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 Rods 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 cable 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 boards shall have two distinct earth connections 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 installation 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 earthed 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 switch board, 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 & WARRENTY
- ~~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 installation 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
- 12.3 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.
- 12.4 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/
- 12.5 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

- 12.6 Over lapping of earth conductors during straight through in joints, where required, shall be of minimum 75mm. long and bitumen coated.
- 12.7 The earth conductors shall be in one length between the earthing grid and the equipment to be earthed
- 12.8 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 flashover in case of non-availability of adequate clearance.
- 12.9 The earthing met 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.

Providing and erecting HOT deep Galvanized iron strip wire 8 to 16 SWG. (3-14-5)

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. (3-14-9)

25 x 3 mm G.I. Tape

No.8 gauge bare cu. earth wire

For using salt and charcoal / coke as required for pipe type earthing.(3-14-6-c)

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.

Specification: Same As Item No.31

providing and erecting Approved make single phase electronic energy meter asrating 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 (3-15-2)

Specification: Same As Item No.31

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

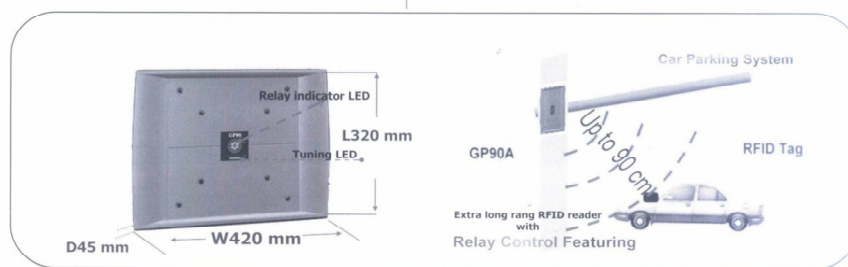
Features:

- 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)

<p>Introduction:</p> <p>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.</p> <p>Features:</p> <ul style="list-style-type: none"> ☆ 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 <p>Applications:</p> <ul style="list-style-type: none"> ● Access Control System ● Car Parking System ● Through-wall Reading Application ● Personal Identification ● Hands Free Application 	<p>Specifications :</p> <table border="1"> <tr> <td>Interfaces</td><td> Wiegand 26 bits MSR ABA Track2 RS232 RS485 or Special Customized Specification </td></tr> <tr> <td>Reading Range</td><td> Up to 90 cm with ISO card in ideal conditions or up to 130 cm with special clamshell card </td></tr> <tr> <td>RFID cards accepted</td><td>125KHz, 64 bits, Manchester encoding</td></tr> <tr> <td>Maximum power switched by internal relay</td><td>Up to 24V / 2A</td></tr> <tr> <td>Operating temperature range</td><td>-10 ~ +60° C</td></tr> <tr> <td>Audio / Visual indication</td><td>Bright blue LED and Buzzer</td></tr> <tr> <td>Dimensions</td><td>420 (W) x 320 (L) x 45(D) mm</td></tr> </table>	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
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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.

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 3 RFID Reader with weatherproof Stainless-Steel enclosure to be fitted near the bus door with Emergency Door operations Switches in Ticket office ,Four Door RF Controller , RFID Reader with weatherproof Stainless-Steel enclosure to be fitted near the bus door + Emergency Door operations Switches in Ticket office (SD unit Per Station .Each Unit comprise two leafs)

MAKE LIST FOR ELECTRICAL WORKS		
SR.NO.	ITEM	STANDARD MAKE
1	LT / AMF PANELS	CPRI / ERDA APPROVED PANEL BUILDER. 70 KA SHORT CIRCUIT WITHSTAND STRENGTH. ACCESSORIES AS PER MENTIONED IN MAKE LIST. Lauritz Knudsen (L&T) / C&S / SIEMENS / PVJ POWER
2	DISTRIBUTION BOARDS	LEGRAND/ SCHNIEDER / HAVELLS / SIEMENS / Lauritz Knudsen (L&T) / C&S/ABB
3	CABLE & WIRE	FINOLEX / POLYCAB / KEI / RR KABEL/ ABB/TORRENT/ABB
4	CABLE TRAY (ALL TYPE)	PROFAB/PRECISION/THINKTRECK /UNIVERSAL/ INDIANA / KEW/RUSHAB/ABB
5	LT SWITCHGEAR (ALL RANGE)	AS PER SPECIFIED PANEL DISCRIPTION IN BOQ. MODEL AS PER SPECIFIED IN BOQ LEGRAND/ SCHNIEDER/ HAVELLS/ SIEMENS / Lauritz Knudsen (L&T) / C&S/ABB
6	LT MCCB	LEGRAND/ SCHNIEDER/ HAVELLS/ SIEMENS / Lauritz Knudsen (L&T) / C&S/ABB
7	LT MCB, ELCB	LEGRAND/ SCHNIEDER/ HAVELLS/ SIEMENS / Lauritz Knudsen (L&T) / C&S/ABB
8	LT SFU	LEGRAND/ SCHNIEDER/ HAVELLS/ SIEMENS / Lauritz Knudsen (L&T) / C&S/ABB
9	LT CONTACTORS	LEGRAND/ SCHNIEDER/ HAVELLS/ SIEMENS / Lauritz Knudsen (L&T) / C&S/ABB
10	CHANGE OVER SWITCH	LEGRAND/ SCHNIEDER/ HAVELLS/ SIEMENS/ Lauritz Knudsen (L&T) / C&S/ABB
11	STARTER (STAR-DELTA / DOL)	LEGRAND/ SCHNIEDER/ HAVELLS/ SIEMENS/ Lauritz Knudsen (L&T) / C&S/ABB
12	SUBMERCIBLE MOTOR/ MONOBLOCK PUMP SET	CROMPTON / KIRLOSKAR / KBL / LUBI
13	METERS (DIGITAL)	ENERCON / CONZERVE / SCHNEIDER / AE / SECURE / ABB/ Lauritz Knudsen (L&T)
14	LOAD MANAGER	ENERCON / SEM / KRYKARD/CONZERVE/ NIPPEN/ Lauritz Knudsen (L&T)
15	RELAYS- EARTH FAULT	LEGRAND/ SCHNIEDER/ HAVELLS/ SIEMENS/ GE / Lauritz Knudsen (L&T) / C&S
16	LUGS	DOWELL'S / 3M / JAINSON / COMET / HMI / (ISI MARKED)
17	BIMETALLIC LUGS	DOWELL'S / 3M / ISMAL / HMI / (ISI MARKED)
18	CABLE GLAND	DOWELL'S / JAINSON / 3D / COMET / HMI (ISI MARKED)
19	PVC CONDUITS AND ACCESSORIES, UPVC TRUNKING	PRECISION / ANCHOR / POLYCAB / NIHIR
20	CASING CAPING	PRECISION / NIHIR / POLYCAB
21	MODULAR SWITCHES, SOCKETS & OTHER ACCESSORIES	LEGRAND /HAVELLS / GM / ANCHOR / Lauritz Knudsen (L&T) / C&S
22	PVC JUNCTION BOX	SINTEX / CLIPSAL /MK / PRECISION / ANCHOR / POLYCAB / NIHIR
23	COAXIAL TV CABLE	DELTON / NATIONAL / HAVELLS /FINOLEX

24	LED LIGHT FIXTURES	LIGHTING TECHNOLOGIES/ PHILIPS / HAVELLS / JAQUAR/WIPRO PER MODEL SPECIFIED IN BOQ/BAJAJ/CG
25	CEILING FAN / EXHAUST FAN	CROMPTON/ USHA / HAVELLS / ORIENT AS PER MODEL SPECIFIED IN BOQ
26	GI JUNCTION BOX / UNDER FLOOR TRUNKING & ITS ACCESSORIES	MK / LEGRAND
27	CMS	MK / LEGRAND
28	EARTHING & LIGHTNING ARRESTOR	GREEN WIRE / ASHLOK / E-LINK
29	SMC PRESS BOX	SINTEX / EPP
30	MODULAR LIGHT POINT WITH ACCESSORIES	ANCHOR / HAVELLS / MK / LEGRAND
31	SOLAR WATER HEATER	HONEYWELL / RACOLD / INTER SOLAR
32	SOLAR POWER SYSTEM	TATA / HAVELLS / SOLARSOKO / WARRI
33	DWC PIPE	Rex Poly Extrusion Ltd / VEC Engineering / GEMINI
34	WATER COOLER & RO	VOLTAS / USHA / BLUESTAR / EUREKA FORBS
35	GI POLE	MARUTI / AMBICA / RR ISPAT
36	CCTV SYSTEM	HICKVISION / INFINOVA / HONEYWELL/ TYCO/ CISCO
37	LED DISPLAY TV	SAMSUNG / PANASONIC / SONY / LG
38	PoE SWITCH	CISCO / AVAYA
39	CAT-6 CABLE	DIGI LINK / FINOLAX / ANCHOR / D LINK
40	COMPUTER OR SERVER	HP / DELL
41	NETWORK RACK	VALRACK / APW
42	FIRE EXTINGUISHER	SAFEX / MINIMEX / AAAG / NEW AGE
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

Special Note:-

1	Client have right to check the challans of supplier.
2	The MCB and MCB DB s 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 material should be ISI and 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	No deviation in the make list shall allowed.

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 Installation of Electrical Engineer (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 cross 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 divider in use.

8. CIRCUITS :

No final lighting or fan circuits from a distribution in boards 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 grin 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 away that the circuit can be easily isolated from the distribution boards) of substantial make and atleast of 5/10 Amp. capacity poecelain 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 cancelled 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. CELLING ROSES AND SOCKETS :

Celling roses and wall sockets shall be of reliable make and subject ot the approva. The subsension 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 shal have not less than a half inch female nipple. All cases must be solid and substantial and of bayonet pattern. Pendent lamp holder shall have a good grips fitted on them so as to carry the weight of the pendent.

15. INTERCHANGE ABILITY :

Similiar 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 cutlets 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 ahdesive 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 solied 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 mainand 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 wired shall be efficiently protected against mechanical damages.

24. PASSING THROUGH WALLS :

The conductor shall be carried in an approved heaby gauge solid drawn or lapwelded conduit tube or porcelain the ducts. Where a wall tube passes outside a building so as to be exposed to the weather, the other end shall be bellomouthed and turned down wards.

25. PLUGGING WALLS :

Plugs for ordinary walls or ceiling shal be of well seasoned teak wood not less than two inches long by one inch. Square on the inner and three forth inch square on the outer or they shall be cemented into the walls to within one fourth inch of surfacer used with plaster or line putting to give the cement hold the plugs, two conterboards 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 BATTONS OR CONDUIT SHALL BE ATTACHED TO THE WALLS OR CEILING IN AMANNER 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 battans 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.battans by means of brass screws or pins set level with the surface of the clips. Pawl plug may be used for fixing battans 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 porcelain 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 supplied 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 conformity with the surrounding architectural design.

30. RATING :

The rating of consuming devices 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 control boards shall be fixed in consultation 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 CELL
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 Should have electric contract license or MOU with Agency who have valled electric contract license
 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 CELL
SURAT MUNICIPAL CORPORATION

I have tendered after studying the above specification.

Signature of the Contractor:-

Address:-

Date:-

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 of 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 our tests as required and furnish detailed drawings on completion of work. The responsible authorised person by the contractor should be available of site dailhy 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.
- (12) Defect Liability Period of all Electrical material 01 (One) Year From the Completion of Project

The Contractor shall provide test report and get the installation approved from Govt. Elect. Authority is required.

CONTRACTORS STAMP AND SIGNATURE. _____

ANNEXURE-II

Equivalent plain Area of a uneven surface (Vide specifications for item relevant to paint and polishing)

Sr. No.	Description of work	How measured	Multiplying factor
1.	Panneled or framed and braced of ledged and battened or ledged and braced joinery cleats etc. shall be deemed to be cluded in the item.	Measured flat (not girthed) including chowkhat or frame. Edges, chocks,	1.30 For each side)
2.	Flush jounery	Measured flat (not girthed) including chowkhat or frame, Edges, Chocks, cleats, etc. shall be deemed to be included in the item.	1.20 For each side)
3.	Fully glazed hauzed joinery	Measured flat (not girthed) including chowkhat or frame, cleats, etc.shall be deemed to be included in the item.	0.80 For each side)
4.	Partly panelled and partly glazed of or glazed journey.	Measured flat (not girthed) including chowkhat or frame etc. shall be deemed cleats, Edges, chocks to be included in the item.	1.0 For each side)
5.	Full Ventilationed or orlouzeredjonyery.	Measured flat (not girthed) including chowkhat or cleats etc. shall be deemed to be included in the item.	1.0 For each side)
6.	Weather boarding	Measurement flat (not girthed) supporting frame work shall not be measured separately.	1.2 For each side)
7.	Wood Shingle roofing	Measurement flat (not girthed)	1.0 For each side)
8.	Boarding with cover fillets and match boarding.	Measurement flat (not girthed)	1.05 For each side)
9.	Tile & slate work one way or two way	Measurement flat over all no deduction shall be made painting for open spaces. supporting over) members shall not be measured separately.	0.08 For each side)
10.	Trellies(or Jafri) work one way or two way for the open spaces	Measured flat over all no deduction shall be madesupporting members shall not be measured separately.	1.00 for painting cover
11.	Guard bars balustrades, rades, gates gratings, grills, expanded metal and	Measured flat over all No deduction shall be made for open	1.00 for painting cover

	railings	spaces, supporting members shall not be measured separately.	
12.	Gates and open palisade fencing including standards.	Measurement flarover all No deductions shall made for open spaces.supporting members shall not be measured separately	1.00 for painting cover
13.	Curved or enriched work	Measured flat over all no no deductions shall be made for open spaces supporting members shall not be measured separately	2.0 (For each side)
14	Steel roller shutters.	Measured flat (size of opening) over all, jamb guides, bottom rails and locking arrangement etc. shall be included in the item (top cover shall be measured seperately).	1.10(for each side)
15.	Plaing sheet steel door and windows)	Measured flat (not girthed) including frame	1.10(for each side)
16.	Fully glazed or gauzed steel door & windows.	Measured flat (not girthed)including frame edges etc.	0.60(for each side)
17.	Partly panelled and partly glazed or gauzed steel doors	Measured flat (not girthed) including frame edges etc.	0.80(for each side)
18.	Collapsible gate	Measured flat (size of opening No separate measurements shall be taken for the top and bottom guide rails, rolls, fittings etc.	1.0 for painting all over

Note : The height shall be taken from the bottom of the lowest rail if the palisades do not go below it (or from the lowerened of palisades, if they protect below the lowest rail) upto the top of palisades but not upto the top of standards if they are higher than the palisades.

The rate shall be for a unit of **Square Metre**.

Signature of the contractor with seal:

Date :

**Executive Engineer
Traffic-BRTS Project Cell
Surat Municipal Corporation**

16.0 AFFIDAVIT *

1. I, the undersigned, do hereby certify that all the statements made in the required attachments are true and correct.
2. The undersigned also hereby certifies that neither our firm M/s. _____ nor any of its constituent partners have abandoned any work on National Highways and Bridges in India nor any contract awarded to us for such works have been rescinded, during last five years prior to the date of this application.
3. The undersigned hereby authorize(s) and request(s) any bank, person, firm or corporation to furnish pertinent information deemed necessary and requested by the Department to verify this statement or regarding my (our) competence and general reputation.
4. The undersigned understands and agrees that further qualifying information may be requested, and agrees to furnish any such information at the request of the Project implementing unit.
5. I/We the undersigned on behalf of our firm M/s. _____ hereby give an undertaking that I/We am/are Jointly responsible to meet all the liabilities over and above the business of the firm and make good the above financial loss sustained by the Surat Municipal Corporation as a result of my/our abandoning the work entrusted to me / us / this firm.

Signed by an Authorized Officer of the Firm

Title of Officer

Name of Firm

Date

* To be given on Rs.300/- Non-judicial stamp paper duly signed by authorized notary.



17.0 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

Note: The Undertaking format as indicated above to be furnished on non judicial stamp Paper of **Rs.300.**

18.0 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**

19.0 List of Banks

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

- 1) Axis Bank
- 2) A U Small Finance Bank
- 3) Bandhan bank
- 4) City Union Bank
- 5) CSB Bank
- 6) DBS Bank India Limited
- 7) DCB Bank
- 8) Dhanlaxmi Bank
- 9) Equitas Small Finance Bank
- 10) Federal Bank
- 11) HDFC Bank
- 12) HSBC Bank
- 13) ICICI Bank
- 14) IDBI Bank
- 15) IDFC First Bank
- 16) IndusInd Bank
- 17) Jammu and Kashmir Bank
- 18) Jana Small Finance Bank
- 19) Karnataka Bank
- 20) Karur Vysya Bank
- 21) Kotak Mahindra Bank
- 22) RBL Bank
- 23) South Indian Bank
- 24) Standard Chartered Bank
- 25) Tamilnadu Mercantile Bank
- 26) Ujjavan Small Finance Bank
- 27) YES Bank
- 28) Ahmedabad Mercantile Co-Operative Bank Limited
- 29) Nutan Nagrik Sahakari Bank Limited
- 30) Rajkot Nagarik Sahakari Bank Limited
- 31) Saraswat Co-operative Bank
- 32) SBPP Co-Operative Bank Ltd.
- 33) SVC Co-Operative Bank LTD.
- 34) The Cosmos Co-Op Bank Ltd
- 35) The Gujarat State Co-Operative Bank
- 36) The Surat District Co-operative Bank
- 37) The Surat Peoples Co-Operative Bank
- 38) The Baroda Central Co-Operative Bank
- 39) The Panchmahal District Co-operative Banks
- 40) Kalupur Commercial Co-Operative Bank Limited
- 41) The Rajkot Commercial Co-Operative Bank
- 42) The Banaskantha Mercantile Co-Operative Bank Limited
- 43) Gujarat Gramin Bank

Such bank guarantee should be encashable at Surat

Note: If in any case the F.D.R., bank guarantee, etc. submitted by bidder of a bank and if the bank is declared defaulter then the bidder needs to update F.D.R., bank guarantee, etc. submitted as per instruction of Surat Municipal Corporation.