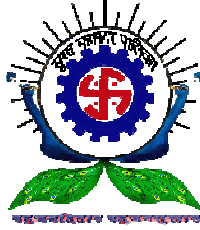


**Surat Municipal Corporation
Surat
Drainage Department**



**Remodelling and Restructuring of Koyli creek
including vehicle track in Surat. (Ch. 8000 mt to 9500
mt)**

**TENDER NOTICE (online) NO:
C.E. /Drainage/ 14/2017-18**

**Volume-I
Condition of Contract & Specifications**

Tender to be submitted to:

**The Chief Accountant,
Surat Municipal Corporation,
Muglisarai, Surat – 395 003.**

YEAR-2017

Surat Municipal Corporation

Drainage Department



Name of work: Remodelling and Restructuring of Koyli creek including vehicle track in Surat. (Ch. 8000 mt to 9500 mt)

E- Tender

TENDER NOTICE (online) NO: C.E. /Drainage/14/2017-18

VOLUME-I: TECHNICAL BID

- Serial No. of the work** : 01
- Last date of download of tender documents from website smc.nprocure.com** : From 25/07/17 to 16/08/17 up to 18.00 Hrs
- Date of Pre-bid conference** : Bidders shall have to post queries on E-mail address exen.drainage@suratmunicipal.org on or before 05/08/2017
- Last date of submission of online tender** : Up to 16/08/17 up to 18.00 Hrs.
- Last date of submission of tender fees, EMD and other documents in hard copy** : During 18/08/17 and 24/08/17 to Chief Accountant SMC, Muglisarai, Surat by R.P.A.D./Speed Post up to 17.00 hrs.
- Estimated Cost** : Rs. 82,41,05,062.17
- Earnest Money Deposit (EMD)** : Rs. 83,00,000/- should be paid 50% shall be in the form of crossed Demand Draft of Nationalized Bank payable at Surat and remaining 50% shall be in the form of Bank Guarantee of Nationalized Bank (en cashable at Surat) or 100% EMD amount shall be in form of crossed Demand Draft of Nationalized Bank payable at Surat.
- Document Fees** : Rs. 18,000.00+18% GST=Rs 21,240.00
- Opening of Tender (Online)** : 18/08/2017, 12.00 hrs. onwards

Tender to be submitted to:

The Chief Accountant,
Surat Municipal Corporation,
Muglisarai, Surat – 395 003.

SURAT MUNICIPAL CORPORATION
DRAINAGE DEPARTMENT

VOLUME-I
CONDITIONS OF CONTRACT AND SPECIFICATIONS
INDEX

1.	NOTICE INVITING TENDERS	3
2.	QUALIFICATIONS OF TENDERERS:	6
3.	INFORMATION TO TENDERER:	9
4.	SUBMISSION OF TENDER	10
5.	DETAILS TO BE SUBMITTED IN QUALIFICATION (online).....	11
6.	PERCENTAGE RATE TENDER AND CONTRACT FOR WORKS	20
7.	TENDER FOR WORKS.....	23
8.	CONTRACT AGREEMENT FOR.....	24
9.	SURETY	25
10.	IMPORTANT POINTS TO BE BROUGHT TO TENDERER'S NOTICE.....	26
11.	SCHEDULE - B.....	55
12.	IMPORTANT INSTRUCTION TO TENDERER	56
13.	MEMORANDUM	57
14.	SPECIAL CONDITIONS OF CONTRACT	58
15.	14- A Additional Special condition	71
	CIVIL SPECIFICATIONS	90
16.	SPECIFICATIONS OF MATERIALS	93
(A)	SPECIFICATIONS OF MATERIALS FOR RETAINING WALL & DIAPHRAGM WALL	
	BANK GUARANTEE	98
	(FORMATE FOR EMD).....	98
17.	General.....	100
18.	Item wish specification.....	109

1. NOTICE INVITING TENDERS

(A) RECEIPT AND OPENING OF TENDER:

Online Tenders will be received from the established and reliable contractors on or before 18.00 hours on 16/08/17 on website smc.nprocure.com. The tender received after due time and date specified will not be accepted.

(B) NAME OF WORK: - Remodelling and Restructuring of Koyli creek including vehicle track in Surat. (Ch. 8000 mt to 9500 mt)

1. Estimated Amount : Rs. 82,41,05,062.17
2. Earnest Money Deposit : Rs. 83,00,000/-
3. Time Limit :27 (Twenty seven) months (including monsoon)
4. Document Fee : Rs. 18,000.00+18% GST=Rs 21,240.00
5. Registration required : 'AA' class

(C) OPENING OF TENDERS:

The tenders will be opened online by opening authority subject to receipt of Tender Fees, EMD and other Documents in hard copy. The tenders will be opened in two stages i.e. Qualification Bid and Commercial Bid.

(D) PURCHASE OF TENDER DOCUMENTS:

Tender Documents can be downloaded from smc.nprocure.com up to 16/08/17.

Tender documents fees of Rs. 18,000.00+18% GST= Rs 21,240.00 towards the cost of tender documents in pay order or by demand draft of any nationalized bank, in favour of "The Commissioner, Surat Municipal Corporation" payable at Surat and shall be submitted 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.

(E) CONTRACT PERIOD:

The total contract period is hereby fixed as 27 (Twenty seven) months (including monsoon) from the 15th Day of issuance of work order.

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

- (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 Security (Earnest Money Deposit) as specified in the tender notice
- (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 (Initial Security Deposit) of an 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.

(G) Tender Validity Period:

The validity period of the tender submitted for this work shall be of one hundred Eighty (180) calendar days from the last day of online submission of tender for this work and the Tenderer shall not be allowed to withdraw or modify the tender offer on his own during the validity period.

(H) Rights Reserved:

Without assigning any reason, The Surat Municipal Corporation reserves the right to reject the lowest or any other or all tenders or part of its. To waive any informality or irregularity in any tender, which in the opinion of the Surat Municipal Corporation does not appear to be in its best interest and the tenderer shall have no cause of action or claim against the Surat Municipal Corporation or its officers, employee, successors or assignees for rejection of this tender.

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

During Tender validity period, if any Tenderer withdraws or makes any modifications or additions in the terms and conditions on his own in this

tender, then The Surat Municipal Corporation shall without prejudice to any right or remedy be at liberty to reject the tender and forfeit the Earnest Money Deposit in full. Such Tenderer may be disqualified from tendering for further works under the jurisdiction of The Surat Municipal Corporation.

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

Signature of the Contractor

**Executive Engineer (Drainage)
Surat Municipal Corporation.**

2. QUALIFICATIONS OF TENDERERS:

QUALIFICATIONS CRITERIA FOR Remodelling and Restructuring of Koyli creek including vehicle track in Surat. (Ch. 8000 mt to 9500 mt)

Sr. No.	Criteria	Documents required for complete submission
1.0 Financial		
1.1	Average Annual financial turnover during the last 3 years, ending 31/03/2017, should be at least 30% of the estimated cost (i.e. 30% of Rs. 82.41 Crores= Rs. 24.72 Crores.)	Copy of certificate from Chartered Accountant along with copy of Balance sheets.
1.2	Solvency Certificate Fresh Solvency certificate from bankers of schedule bank / nationalized bank. Minimum value of solvency shall be 20% of estimated cost of the Tender	from bankers of schedule bank / nationalized bank
2.0-Registration		
2.1	Minimum "AA" class" Registration Class with any government, semi government organization	Registration Certificate
2.2	power of attorney, partnership deed or registration deed.	Attested copy should be submitted
3.0 Relevant Experience		
3.1	<i>Similar works during last 7 years.</i>	attested copies of certificates from head of the office concerned for completion of the works
3.1.1	Three similar completed works, each costing not less than amount equal to 40% of the estimated cost put to the tender(i.e. 40% of Rs. 82.41 Crores= Rs. 32.96 Crores.)	
	Or	
3.1.2	Two similar completed works, each costing not less the amount equal to 50% of the estimated cost put to the tender(i.e. 50% of Rs. 82.41Crores= Rs. 41.20 Crores.)	
	Or	
3.1.3	One similar completed works, each costing not less the amount equal to 80% of the estimated cost put to the tender. (i.e. 80% of Rs. 82.41Crores= Rs. 65.92 Crores.)	
4.0	Other details	

4.1	<p><i>Black list</i></p> <p>The Bidders shall note that in case the Bidder is blacklisted / stated as defaulter / barred participating in tenders by any of government agencies / semi government agencies or any other equivalent agencies during last 5 years then in that case, the Bidders will be disqualified and will not be allowed to participate in the bidding process, though bidder satisfies all the qualification conditions mentioned above. In this regard, the decision of the Surat Municipal Corporation will be final and binding to Bidder.</p>	AFFIDAVIT
4.2	<p><i>Works on hand & Litigation</i></p> <p>The Bidder including any Member shall provide details of all their on-going projects along with stage of litigation, if so, against the Employer / Governments.</p>	ANNEXURE-II

Notes:

1. Joint Venture is not allowed. Experience as sub contractor/Nominated sub contractor shall not be considered for point No.3 titled “Relevant experience” while evaluation
2. The Bidder must require to submit the enlisted documents online along with the Qualification Bid. **If documents are insufficient or it does not match the required criteria mentioned below, then Price Bid of the Bidders shall not be opened.**
3. **Similar works means construction works of bank protection with Diaphragm wall/RCC Retaining wall along banks of River/nalla/creek. Or Bridge on River / Creek/ Intake well.**
4. **It is further to clarify that if any of work(s) is/are on hand with the applicant, but if the amount of the work done at the site is more than 90% of the total Project / Tender cost while submitting qualification documents then those work done amount will also be taken into consideration for point No.3 titled “Relevant experience” while evaluation**
5. Following enhancement factors will be used for the cost of works executed and financial figures to arrive at common base for the value of the works completed in India. **Cut of month shall be considered from month of tender submission**

Year	Multiplying factor
Immediate last year of assessment year *	1.10
Second	1.21
Third	1.33
Fourth	1.46
Fifth	1.61
Sixth	1.77
Seventh	1.95

*Here Assessment year shall be reckon from year & month in which tender is submitted.

Bidder should indicate actual figures of costs and amount for the work executed without accounting for the above-mentioned factors.

6. Declaration regarding the work on hand with the bidders shall also be given in prescribed Performa. Attested copies of work orders, interim certificates if any shall also be attach as supporting documents.
7. Joint venture/Consortium shall not be allowed however experience of joint venture on pro rata basis of the joint venture/Consortium can be considered. Bidders shall have to submit certificate of the Government/semi government clearly indicating sharing of each stake holder for following
 - i. Financial responsibilities
 - ii. Technical & Execution of work.
 Stake holders having experience only of 7(i) showing financial responsibilities will be disqualified out rightly.
8. Even though the bidder meets the above criteria, they are subject to be disqualified and shall be stopped from further processes at any stage if they have.
 - i) Made misleading or false presentations in the forms, statements and attachments submitted in proof of the qualification requirements, and / or
 - ii) Record of poor performance such as abandoning the works, not properly completing the contract, inordinate delay in completion, litigation history, or financial failure etc.

Signature of the Contractor

**Executive Engineer (Drainage)
Surat Municipal Corporation.**

3. INFORMATION TO TENDERER:

- | | |
|--|--|
| 1. Tender validity period | 180 days (One hundred & Eighty days) from the last date of receipt of tender |
| 2 Estimated Cost | Rs. 82,41,05,062.17 |
| 3 Earnest Money Deposit | Rs. 83,00,000/- |
| 4 Initial Security Deposit | Two Percent (2%) of tendered Amount |
| 5 Time of Completion | for the complete contract 27 (Twenty seven) months (including monsoon) |
| 6 Period of liability for defects. | Sixty Months after completion of work |
| 7 Liquidated Damages | Zero Point two percent (0.2%) of the Contract price per day maximum up to ten percent of the contract price. |
| 8 Last date of download of tender | Date: - 16/08/17 up to 18.00 hrs from smc.nprocure.com |
| 9 Last date of submission of online Tender | Date :- 16/08/17 up to 18.00 hrs |
| 10 Last date of submission of Tender fees, EMD and other Documents | From 18/08/17 to 24/08/17 up to 1700 hrs |
| 11 Pre-Bid | Bidders shall have to post their queries on e-mail address exen.drainage@suratmunicipal.org on or before Dt. 05/08/2017. |

Signature of the Contractor

**Executive Engineer (Drainage)
Surat Municipal Corporation.**

4. SUBMISSION OF TENDER

(Following condition supersedes relevant condition mentioned elsewhere)

- **E.M.D & Tender fee shall be submitted in electronic format only through online (by scanning) while uploading the bid. This submission shall mean that E.M.D & tender fee are received for purpose of opening the Bid. Accordingly, offer/tenders of those tenders who's E.M.D & tenders fee is received electronically, shall be opened. However, for the purpose of realization of EMD and tender fee, bidder shall send the EMD as well as Tender fee in required format in original through RPAD/Speed post so as to reach to Account Department (Main office) during 18/08/2017 to 24/08/2017. Punitive action such as abeyance of registration and cancellation of E- tendering code for one year shall be taken for non-submission of EMD & Tender fees in original to Account Department (Main Office) by bidder. All documents of supporting of Bid shall be in electronic format only through online (by scanning) during the bidding period & hard copy will not be accepted separately.”**
- **Documents must be colour scanned to be seen as original. Scanning in Black and White or gray shall not be acceptable.**
- **Documents must be notarized with clearly displaying stamp, number and name of the notary and coloured scanned.**
- **Price Bid shall have to be quoted strictly online only. No hard copy of price bid shall be accepted.**
- **Addenda/corrigenda to these tender documents, if issue must be signed and submitted online only.**

"Following Documents shall be submitted online as well as in HARD COPY to Surat Municipal Corporation by all bidders."

- Earnest Money Deposit as mentioned in the Tender. (i.e., D.D/Bank Guarantee)
- Tender Fees as mentioned in the tender.
- Affidavit on Non Judicial Stamp Paper of Rs.100/- (Annexure-III)
- Under taking by the tenderer for not black listed on Rs.100/- government stamp paper.

Note:-Technical Bid and qualification documents mentioned in the tender and price Bid are not to be submitted in Physical Form. Please note that Non-submission of Hard copies of Technical Bid as well as price bid does not absolve the bidders from any liability created from the bid condition and bidding process. Price Bid shall have to be quoted strictly online only. Technical-Bid in Hard copy shall be submitted only by Successful Bidders upon intimation from SMC."

5. DETAILS TO BE SUBMITTED IN QUALIFICATION (online)

The following details are required to be submitted in electronic format only through online (by scanning)

- a) **The scan copy of Tender fees, EMD, Affidavit paper and under taking of not blacklisted on non-judicial stamp paper.**
- b) Documents/certificate supporting **Annexure-I, II,III. IV, V, VI, VII,VIII** in required Performa.
- c) Necessary documents required for various details mentioned in No. (2) “Qualification of Tenderers”.
 - i. Work completion certificate/**(form-3(A)), duly notarised**
 - ii. Registration Certificate.
 - iii. Solvency Certificate.
 - iv. Balance Sheet for the last 3 years.
 - v. C.A certificate for Turnover of Three years
 - vi. Certificate of Statutory auditors

On failing to submit all the mandatory documents through online (by scanning), bidder will not be qualified for opening of the Price Bid.

Signature of the Contractor

**Executive Engineer (Drainage)
Surat Municipal Corporation.**

ANNEXURE-I

**Performa for list of works of similar nature already completed by the
Tendered 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 absent 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 indicating “Similar work” from relevant authority.

**Signature of the Contractor
With seal.**

Place:

Date:

ANNEXURE-II

Performa for declaration regarding works on hand with the tenderer:

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	Litigation /dispute if any
1	2	3	4	5	6	7	8	9

❖ It is mandatory to submit the supporting documents/certificates through online(by scanning)

**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 tenders are invited).

ANNEXURE-III

AFFIDAVIT

Name of the Work:- _____

- 1.0 I, the undersigned, do hereby certify that all the statements made in the required attachments are true and correct. I also understand that in case of wrongful/false information, Surat Municipal Corporation is entitled to take any civil & criminal punitive action against me/us.
- 2.0 The undersigned also hereby certifies that neither our firm _____ nor any of its constituent partners have abandoned any work in India nor any contract awarded to us for such works has been rescinded during last five years, prior to the date of this bid.
- 3.0 Solemnly affirm and state that on oath that(Name of Tenderer) has not been black listed by any Government/Semi Government/Public Sector Undertaking/Public limited and not has been banned/suspended business dealings with the said firm.
- 4.0 The undersigned hereby authorize(s) and request(s) any bank, person, authorities, government or public limited institutions, firm or corporation to furnish pertinent information deemed necessary and requested by the Surat Municipal Corporation to verify our statements or our competence and general reputation.
- 5.0 The undersigned understands and agrees that further qualifying information may be requested, and agrees to furnish any such information at the request of the Surat Municipal Corporation.
- 6.0 The Surat Municipal Corporation and its authorized representatives are hereby authorized to conduct any inquiries or investigations to verify the statements, documents, and information submitted in connection with this application and to seek clarification from our bankers and clients regarding any financial and technical aspects. This Affidavit will also serve as authorization to any individual or authorised representative of any institution referred to in the supporting information, to provide such information deemed necessary and requested by you to verify statements and information provided in the Tender or with regard to the resources, experience and competence of the Applicant.

Signed by the authorised signatory of the firm

Title of the office

Name of the firm

Date

Note: The affidavit format as indicated above to be furnished on non judicial stamp Paper of ***Rs.100 and duly notarised.***

ANNEXURE-IV

Details of Technical staff with tenderer

Sr. No.	Name of personnel	Qualification	Total experience	Who is proposed to be posted for this work

❖ **It is mandatory to submit the above list through online (by scanning)**

ANNEXURE-V

List of tools, plants and equipments with tenderer (Format as per tenderer's choice)

- ❖ **It is mandatory to submit the list of tools, plants and equipments or supporting documents / certificates through online (by scanning).**

ANNEXURE-VI

Structure and Organisation of the Company

1. Name of Applicant
2. Nationality of Applicant
3. Office Address
Telegraphic Address
Telephone No. (O) (M)
Telex No.
Fax No.
Email address :
4. Year and location of establishment
5. The Applicant is
 - a) An individual
 - b) A proprietary firm
 - c) A firm in partnership
 - d) d) A limited company or Corp.
(if a firm in partnership)
6. For how many years has your organization been in business of similar work under it's present name ? what were your fields when your organization was established?

Signature of Applicant.

Date :

ANNEXURE- VII

UNDERTAKING

Photographs			
Name of partners			
Designation			
Specimen Signature			

Names, Photographs and Specimen Signature of Partners, Managing Director

1. I/We agree that the decision of the Surat Municipal Corporation in pre-qualification/selection of applicants/contractor, Phasing of work and in any other project related matter, will 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 we have no objection if inquiries are made about our works, its related areas and any other inquiry regarding all details, projects and works listed by us in the pre-qualification document at any state.

Signature with seal of the company

NAME AND ADDRESS:

DATE:

ANNEXURE- VIII

Name of Work : **Remodelling and Restructuring of Koyli creek including vehicle track in Surat. (Ch. 8000 mt to 9500 mt)**

‘DECLARATION OF THE CONTRACTOR’

I / We hereby declare that I / We have made myself / ourselves thoroughly conversant with the local conditions including all materials and labour on which I / We have based my / our rates for this tender. The specifications and leads on this work have been carefully studied and understood before submitting this tender. I / We undertake to use only the best materials approved by the Engineer or his duly authorized representative during execution of the work and to abide by the decision.

Signature of Applicant

6. PERCENTAGE RATE TENDER AND CONTRACT FOR WORKS

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 Commissioner.

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. It will also state whether a refund of quarry fees, royalties dues ground rents & water-charges will be granted. 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 Executive Engineer, for the purpose of identification shall also be opened for inspection by contractors at the office of the Executive Engineer, 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 authorizing 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) Any person who submits a tender shall fill up the usual printed form including the column total according to estimated quantities, stating at what rate he is willing to undertake each item of the work. Tenders which

propose any alteration in the work specified in the said form of invitation to tender, or in the time allowed for carrying out the work, or which contain any other conditions of any sort, will be liable to rejection. No single tender shall include more than one work, but contractors who wish to tender for two or more works shall submit a separate tender for each. Tenders shall have the name and the number of the works to which they refer written outside the envelope.

- (5) The Commissioner or his duly authorised Assistant will open tenders in the presence of any intending contractors who may be present at the time, and will enter the amounts of the several tenders in a comparative statement in suitable form. In the event of a tender being accepted, the contractors shall thereupon, for the purpose of identification sign copies of the specifications and other documents mentioned in Rule.1. In the event of a tender been rejected the deposit will be refundable on application.
- (6) The Municipal Corporation shall have the right of rejecting all or of the tenders without assigning any reason.
- (7) 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 Executive Engineer.
- (8) 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 Executive Engineer
- (9) 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.
- (10) Under no circumstances shall any contractor be entitled to claim enhanced rates for any items in this contract except specified elsewhere.
- (11) Every contractor shall, if so desired by the Commissioner, produce along with his tender a banker's certificate of his financial stability. If he fails to produce such a certificate his tender will not be considered.
- (12) All corrections and additions or pasted slips should be initialled.
- (13) The measurements of work will be taken according to the usual method in use in the SMC and no proposals to adopts alternative methods will be accepted. The Commissioner's decision as to what the usual method in use in the SMC will be final.

- (14) The tender for work shall remain open for a period at 180 days from the date of receipt of this tender for this work and that the tenderer shall not be allowed to with draw or modify the offer on his own during this period. If any tenderer with draw or makes modifications of additional in the terms and conditions of his tender not acceptable to the corporation shall without prejudice to any right or remedy be at liberty to forfeit in full the said earnest money absolutely.

Signature of the Contractor

**Executive Engineer (Drainage)
Surat Municipal Corporation.**

7. TENDER FOR WORKS

I/We hereby tender for the execution for the Surat Municipal Corporation (herein before and herein 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 in clause 13 of the annexed conditions of contract and agree that when materials for the work are provided by Municipal Corporation such materials and the rates to be paid for them shall be as provided in schedule A hereto.

Should this tender be accepted I/We hereby agree to abide by and fulfil all the terms and provisions of the conditions of contract annexed hereto so far as applicable, and in default thereof to forfeit and pay to Municipal Corporation in office the sums of money mentioned in the said conditions.

Receipt No. _____ dated _____ from Municipal Corporation in respect of the sum of Rs. _____ (Rupees _____ only) / A crossed order cheque of Rs. _____ (Rupees _____ only) 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 Clause 1 of the said conditions.

Contractor:

Address:

Dated the _____ day of _____ 2017

(Witness)

(Address)

(Occupation)

The above tender is hereby accepted by me on behalf of the Surat Municipal Corporation.

**Addl. City Engineer,
Surat Municipal Corporation**

**Commissioner
Surat Municipal Corporation**

Dated _____ day of _____ 2017

8. CONTRACT AGREEMENT FOR

ENGINEERING, PROCUREMENT AND CONSTRUCTION AGREEMENT

THIS AGREEMENT is entered into on this the day of, 20..... at Surat
BETWEEN

The Surat Municipal Corporation _____

AND {-----}, means the selected bidder having its registered office at, (hereinafter referred to as the “Contractor” which expression shall, unless repugnant to the context or meaning thereof, include its successors and permitted assigns) of the Other Part.

WHEREAS:

The Surat Municipal Corporation has resolved to have the contract for _____, briefly hereafter mentioned as Work on Engineering Procurement and Construction (EPC) basis in accordance with terms and conditions as to be set forth in agreement being entered into.

The Surat Municipal Corporation has invited proposal by its request for offer vide its notification No. _____ Dated _____.

M/s _____ having been found to have made responsive offer conforming to the requirement as set out in the Bid document and being competitive have been selected to be the contractor for the execution of the above mention work on terms, conditions, representation and provisions, are awarded the work and this agreement is being entered into for fulfilment of the obligations thereof as contained in the bid.

The Surat Municipal Corporation has prescribed technical and commercial terms along with conditions for performance which the contractor shall fully abide by and comply with.

The SMC having accepted the offer after selecting the bidder have issued letter of acceptance no. _____ Dated _____.

The Contractor having been conversant with all conditions, specifications, terms, provision and representation and being bound to honour and respect the contents thereof have specifically noted express conditions here by that Project Consultant or its representative or anyone other than Executive Engineer in-charge of the job is not authorised to vary Time or Cost despite any provision, contrarily thereto elsewhere in the contract.

NOW THEREFORE in consideration of the foregoing and the respective covenants and agreements set forth in this Agreement, the sufficiency and adequacy of which is hereby acknowledged, the SMC hereby covenants to pay the Contractor, in consideration of the obligations specified herein, the Contract Price or such other sum as may become payable under the provisions of the Agreement at the times and in the manner specified by the Agreement and intending to be legally bound hereby, the Parties agree to the entire contents for stipulated performance as detailed in the bid document which here after Mutatis Mutandis, be treated as part of the contract.

Contractor,	Executive Engineer (Drainage),	City Engineer,
	Surat Municipal Corporation	Surat Municipal Corporation
	Surat.	Surat.

I am responsible if the Contractor does not abide by the Condition of this contract.
Sealed with the common seal of the Surat Municipal Corporation in the presence of

Surety.

1. _____
2. _____

Members,
Standing Committee,
Surat Municipal Corporation

9. SURETY

This bond is made this _____ day of the month of _____ 2017, between, Shri _____ (here in after called the surety) of the first part and the Commissioner on behalf of the Surat Municipal Corporation of the second part.

WHEREAS the Contractor/Contractors Shri/Ms. _____ of _____ has/have entered into a contract with the Surat Municipal Corporation for the works detailed below:-

Name of the work	Tender Amount	G.B. Resolution No. & date Sanctioning Contract

AND WHEREAS one of the conditions of the contract being that the Contractor/ contractors shall give surety/sureties to the Corporation for the due fulfilment of the contract to the full value of the total expenditure of the work.

NOW THIS BOND WITNESSES and it is hereby agreed and declared as follows:-

I/We Surety/Sureties hereby bind myself/ourselves responsible for the due fulfilment of the contract in all its respects by the Contractor/Contractors and I/We do hereby agree and undertake to indemnify and keep harmless.

The Surat Municipal Corporation jointly as well as severally if the Contractor / Contractors fail / fails to carry out the whole or any part of the contract work as per the conditions and specifications of the work and as agreed to between the parties to the contract to the extent of full value of the total expenditure to be incurred in that behalf by the Municipal Corporation provided always that the expression "the Surety/Sureties" hereinbefore used shall include the heirs, executors, assigns or administrators of each and every person in this context.

IN WITNESS WHEREOF the said surety/sureties and the City Engineer on behalf of the Surat Municipal Corporation have hereinto set their respective hands this _____ day the month of _____ of the year 2017.

Surety

Signed in the presence.

Signed in the presence.

**Commissioner,
Surat Municipal Corporation**

**Sealed with the common seal of the
Surat Municipal Corporation in the
presence of**

1. _____

2. _____

**Member
Standing Committee,
Surat Municipal Corporation**

10. IMPORTANT POINTS TO BE BROUGHT TO TENDERER'S NOTICE

THE TENDER MAY BE REJECTED OUTRIGHT IF THE TENDERER

- A Stipulates the validity period less than what is stated in the form or tender.
- B Stipulates his own conditions.
- C Does not quote his rates inclusive of all the taxes in his rates.
- D Does not disclose the full names and addresses of all his partners in the case of partnership concern.
- E Does not fill in and sign the tender form as well as the bill of quantities and rates, annexure, specifications etc. as well as the bill of quantities and rates online.
- F Does not pay the Earnest Money Deposit with the tender.
- G Does not submit the tender on the stipulated time on the specified date in the accounts office as directed.

Signature of the Contractor

**Executive Engineer (Drainage)
Surat Municipal Corporation**

GENERAL CONDITIONS OF CONTRACT

Clause 1.

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 / Executive Engineer, any officer authorised by the Municipal Corporation.
- 1.2 The "Contractor" shall mean the person or the persons, firm of company whose tender has been accepted by the owner and includes his legal representative successors and permitted 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 Asstt. to the Engineer-in-charge designated from time to time by the Engineer-in-charge to perform duties set forth in the Tender documents whose authority shall be notified in writing to the Contractor by the Engineer-in-charge.
- 1.5 "Tender" The offer or proposal of the Tenderer submitted in the prescribed form setting forth the prices for the work to be performed, and the details thereof.
- 1.6 "Contract Price shall mean total money payable to the Contractor under the contract documents.
- 1.7 "Addenda" shall mean the written or graphic notices prior to submission of tender which modify or interpret the contract documents.
- 1.8 "Contract Time" - The number of consecutive calendar months for the completion of work as stated in the executed contract agreement.
- 1.9 "Contract" shall mean agreements between the parties for the execution of works including therein all contract documents.
- 1.10 "Tender document" shall mean Designs, Drawings, specifications, agreed variations, if any, and such other documents constituting the tender and acceptance thereof.

1.11 "The Sub-Contractor" means any person, firm or company (other than the contractor) to whom any part of the work has been entrusted by the Contractor with the written consent of the Engineer-in-charge and the legal personnel representative, successors and permitted 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) hereunder.

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 of business address at Registered Office of the Contractor.
- 1.20 The "Alteration/Variation order" means an orders given in writing by the Engineer-in-charge to effect additions to or deletion from and alterations in the work.
- 1.21 "Final Test Certificate" shall mean the final test Certificate issued by the owner within the provisions of the Contract.
- 1.22 The "Completion Certificate" shall mean a certificate to be issued by the Engineer-in-charge when the work has been completed to his satisfaction.
- 1.23 The "Final Certificate" shall mean the final certificate issued by the Engineer-in-charge after the work is finally accepted by the owner.
- 1.24 "Defect Liability Period" shall mean the specified period between the issue of completion Certificate and the final certificate as specified in the tender.
- 1.25 "Approved" shall mean approved in writing including subsequent modification in writing of previous verbal approval and "Approval" means approved in writing including as aforesaid.
- 1.26 "Letter of Acceptance" shall mean an intimated by a letter to tenderer that the tender has been accepted in accordance with provisions contained therein.
- 1.27 "Order" and "Instruction" shall respectively mean any written order or instruction given by the Engineer-in- charge within the scope of his powers in terms of the Contract.
- 1.28 "Running Account Bill" shall mean a Bill for the payment of "On Account" money to the contractor during the progress of work on the basis of work done and the non-perishable materials to be incorporated in the work supplied by the Contractor.
- 1.29 "Security Deposit" shall mean the deposit to be held by the owner as security for the due performance of contractual obligations.

1.30 Retention Money shall mean the money retained from R.A.Bill for due completion of "NET WORK".

1.31 Unless otherwise specifically stated, the masculine gender shall include the feminine and natural genders and vice-a-versa and the singular shall include the plural and vice-versa.

Clause 1-A.

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.

Such bank guarantee should be en-cashable at Surat.

Total Security deposit shall be recovered at the rate of 4% of approved tender Cost from contractor. Out of which, 50% of amount as a Initial security Deposit shall be payable at the rate of 2% of approved Tender Cost in form of Bank guarantee / Fixed Deposit of any Nationalized bank (negotiable/encashable at Surat city). The remaining amount of the Security deposits i.e. 2% of tendered amount shall be recovered from the running account bills in form of retention money at the rate of 2% of the gross amount of each bill, so as to make the total Security Deposit of 4% of the tendered amount up to the Final bill.

The amount recovered from the running bills/retention money 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, issued in favour of "The Municipal Commissioner, Surat Municipal Corporation, Surat" by a Nationalized Bank located at Surat only. The initial security deposit at the rate of 2% submitted in form of Bank guarantee will be refunded after payment of final bill and remaining 2% of security deposit deducted in form of retention money, from the running bill shall be refunded only after the expiry of defect liability period, audit related procedure and rectification of defects if any found so.

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 Two percent (2%) of the tendered amount accepted by the competent authority shall have to be paid towards security deposit at the time of execution of agreement.

Remaining two percent, (2%) shall be deducted from running bills as retention money.

SMC will pay interest on FDR (that is deducted from running bill and converted into FDR) for one year, after completion of work. After that no further interest shall be paid for any extended period whatsoever.

If the initial security deposit is not paid within 15 days from the date of work order then penalty at the rate of 0.065% per day of the amount of security deposit will be charged, if the security deposit is not paid within one month with interest, necessary actions as per the conditions of contract will be taken.

STAMP DUTY:

The successful tenderer shall have to enter into an agreement on a non-judicial stamp paper of Rs. 100/- as per the form of the agreement approved by the Municipal Corporation, Surat.

The agreement shall be executed on stamp paper worth Rs. 100/-.

The Surety shall be executed on stamp paper worth Rs. 100/-.

Tenderer have to submit additional stamp papers @ 4.25% of initial Security deposit paid in FDR

Clause 2.

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

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

Clause 3.

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

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

In the event of any of the above courses be adopted by the Commissioner the Contractor shall have no claim to compensation for any loss sustained by him by reason of his having purchases or procured any materials or entered into any engagements, or made any advances on account of or with a view to the execution of the work or the performance of the contract. And in case the contract shall be rescinded under provision aforesaid, the Contractor shall not be entitled to recover, or be paid any sum for any work thereto actually performed by him under this contract unless and until the Engineer –in-charge shall have certified in writing the performance of such work and the amount payable to him in respect thereof, and he shall only be entitled to be paid the

amount so certified.

for any work thereto actually performed by him under this contract unless and until the Engineer in-charge shall have certified in writing the performance of such work and the amount payable to him in respect thereof, and he shall only be entitled to be paid the amount so certified.

Clause 4:

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

Clause 5.

In any case in which any of the powers conferred upon the Commissioner by clause 3 and 4 hereof shall have become exercisable and the same shall not have been exercised the non-exercise thereof shall not constitute a waiver of any of the conditions hereof such powers shall notwithstanding be exercisable in any future case default by the Contractor for which by any clause or clauses hereof he is declared liable to pay compensation amounting to the whole of his security deposit and the liability of the Contractor for past and future compensation shall remain unaffected.

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

Clause 6.

If the Contractor shall desire an extension of the time for completion of the work on the ground of his having been unavoidably hindered in its execution or on

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

Clause 7.

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

If the Contractor shall fail to comply with the requirements of this clause as to the removal of scaffolding, surplus materials and rubbish, and cleaning off dirt on or before the date fixed for the completion of the work, the Engineer-in-charge may, at the expense of the Contractor remove such scaffolding surplus materials and rubbish, and dispose of the same as he thinks fit and clean off such dirt as aforesaid; and the Contractor shall forthwith pay the amount of all expenses so incurred, but shall have no claim in respect of any such scaffolding or surplus materials as aforesaid except for any sum actually realized by the sale thereof.

Clause 8.

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

All such intermediate payments shall be regarded as payments by way or advance against the final payments only and not as payments for work actually done and completed and shall not preclude the Engineer-in-charge from requiring bad, unsound imperfect of unskilful work to be removed and taken

away and reconstructed, or re-erected, nor shall any such payments be considered as an admission of the due performance of the contract or any part thereof in such respect of the accruing of and claim; nor shall it conclude, determine or affect in any way the Powers of the Engineer-in-charge as to the final settlement and adjustment of the accounts or otherwise, or in any other way vary or affect the contract. The final bill shall be submitted by the Contractor within one month of the date fixed for the completion of the work, otherwise the Engineer-in-charge's certificate to the measurement and of the total amount payable for the work shall be final and binding on all parties.

Clause 9.

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

Clause 10.

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

Clause 11.

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

Clause 12.

If the specification or estimate of the work provides for the use of any special description of materials to be supplied from the SMC Store or if it is required that the Contractor shall use certain stores to be provided by the Engineer-in-charge (such materials and stores and the prices to be charged thereof as hereinafter mentioned being so far as practicable for the convenience of the Contractor but not so as in any way to control the meaning or effect of the contract specified in the schedule or memorandum hereto annexed) the

Contractor shall be supplied with such materials and stores as may be required from time to time to be used by him for the purpose of the Contract only and the value of the full quantity of materials and stores so supplied shall be set off deducted from any sums then due, or thereafter to become due to the Contractor under the contract, or otherwise from the security deposit or the proceeds of sale thereof shall be held in Government securities; the same or a sufficient portion thereof shall in that case be sold for the purpose. All material supplied to the Contractor shall remain the absolute property of the Municipal Corporation, and shall on no account be removed from the site of the work, and shall at all times be opened to inspection by the Engineer-in-charge. Any such materials unused and in perfectly good condition at the time of completion or determination of the contract shall be returned to the Drainage Department store, if the Engineer-in-charge so requires by a notice in writing given under his hand, but the Contractor shall not be entitled to return any such materials except with such consent and he shall have no claim for compensation on account of any such materials supplied to him as aforesaid but remaining unused by him or for any wastage in or damage thereto.

Clause 13.

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

Clause 14.

The Engineer-in-charge shall have power to make any alterations in, or additions to the original specifications, drawings, designs and instructions 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 on 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 the 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 the 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 the 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 be 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 a 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.

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

Clause 15 A

A. If at any time after the execution of the contract documents, the Engineer-in-charge shall for any reason whatsoever, require the whole or any part of the work as specified in the tender, to be stopped for any period or shall not require the whole or part of the work to be carried out at all or to be carried out by the Contractor, he shall give notice in writing of the fact to the Contractor who shall thereupon suspend or stop, the work totally or partially, as the case may be. In any such case, except as provided herein under, the Contractor shall have no claim to any payment or compensation whatsoever on account of any profit or advantage which he might have derived from the execution of the work in full but which he did not so derive in consequence of the full amount of the work nor having been carried out, or on account of any loss that he may be put to on account of materials purchased or agreed to be purchased, or for unemployment of labour recruited by him. He shall not also have any claim for compensation by reason of any alteration having been made in the original specifications, drawings, designs and instructions may involve any curtailment of the work as originals contemplated. Where which however, materials have already been purchased or agreed to be purchased by the Contractor, before

receipt by him of the said notice, the Contractor shall be paid for such materials at the rate determined by the Engineer-in-charge, whose decision shall be final. If the Contractor suffers any loss on account of his having to pay labour charges during the period during which to stoppage of work has been ordered under this clause the Contractor shall on application be entitled to such compensation on account of labour charges as the Engineer-in-charge, the labour could have been employed by the Contractor elsewhere for the whole or part of the period during which the stoppage of the work has been ordered as aforesaid.

Clause 15 B.

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

- i Difficulties relating to the supply of railway wagons and availability of Government controlled materials.
- ii Force Majeure.
- iii Act of Goods.
- iv Act of the Nation's enemies or any other reasonable cause beyond the control of the Municipal Corporation.

In the cause of such delay in the supply of materials 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 Commissioner as to the extension of item shall be accepted as final by the Contractor.

Clause 16.

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

Clause 17.

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

Clause 18.

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

contract in accordance with the samples.

Clause 19.

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

Clause 20.

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

Clause 21.

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

Clause 22.

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

Clause 23.

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

Clause 24.

If at any time before the security deposit is refunded to the Contractor, it shall appear to the Engineer-in-charge or his subordinate in charge of the work that any work has been executed with unsound imperfect, or unskilful workmanship or with materials of inferior quality; or that any materials or articles provided by him for the execution of the work are unsound, or of a quality inferior to that contracted for, or otherwise not in accordance with the contract, it shall be lawful for the Engineer-in-charge to intimate this fact in writing to the Contractor and then notwithstanding the fact that the work, materials or articles complained of may have been inadvertently passed, certified and paid for, the Contractor shall be bound forthwith to rectify, or remove and reconstruct the work so specified in whole or in part as the case may require, or

if so required, shall remove the materials or articles so specified and provide other proper and suitable materials or articles at his own charge and cost; and in the event of his failing to do so within a period to be specified by the Engineer-in-charge in the written intimation aforesaid, the Contractor shall be liable to pay compensation at the rate of one percent on the amount of the estimate for every day not exceeding ten days, during which the failure so continues and in the event of any such failure as aforesaid the Engineer-in-charge may rectify or remove and re-execute the work or remove and replace the materials or articles complained or as the case may be at the risk and expense in all respects of the contractor, should the Engineer-in-charge consider that any such inferior work or materials as described above may be accepted or made use of it; shall be within his discretion to accept the same at such reduced rates along with the appropriate penalty as the Commissioner may deem fit. The period to be counted from that date of final completion and handing over of the work to the Municipal Corporation during which the Contractor is so liable for any defects in the work shall be the Defects Liability Period shown in the attached Memorandum.

Clause 25.

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

Clause 26.

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

Clause 27.

If the Contractor or his workmen; or servants shall break, deface injure or destroy any part of a building in which they may be working, or any building,

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

Clause 28.

The Contractor shall supply at his own cost all materials [except such special materials, if any, as may be supplied from the S.M.C. Stores in accordance with the contract]. Plant tools, appliance implements, ladders, cordage, tackle, scaffolding and any temporary works which may be required for the proper execution of the work, in the original; altered or substituted from, and whether included in these specification or, other documents forming part of the contract or referred to in these conditions he is entitled to be satisfied, or which he is entitled to require together with carriage there for, to and from the work, the Contractor shall also supply without charge the requisite number of persons with the means and materials necessary for the purpose of setting out works and counting, weighing, and assisting in the measurement of examination at any time and from time to time of the work or materials, failing this the same may be provided by the Engineer-in-charge at the expense of the Contractor and the expense may be deducted from any money due to the Contractor under the contract, or from his security deposit or the proceeds of sale there for of sufficient portion thereof. The Contractor shall provide all necessary fencing and lights required to protect the public from accident; and shall also be bound to bear the expenses of every suit, action or other legal proceedings, at law, that may be brought by any person for injury sustained owing to negligence of the above precautions, and to pay damages and costs which may be awarded in any such suit, action or proceedings, to any such person, or which may with the consent of the Contractor be paid in compromising any claim by any such person.

Clause 29.

The Contractor shall make his own arrangements for drinking water for the labour employed by him.

Clause 30.

Compensation for all damage done intentionally or unintentionally or by the contractor's labourers whether in or beyond the limits of the Municipal property shall be estimated by the Engineer-in-charge or such other office as he may appoint and estimates of the Engineer-in-charge subject to the decision of the Commissioner on appeal be final and the Contractor shall be bound to pay the

amount of the assessed compensation on demand failing which the same will be recovered from the Contractor as damage from the security deposit or deducted by the Engineer-in-charge from any sum that may be due or become due from the Municipal Corporation to the Contractor under this contract or otherwise.

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

Clause 31.

No work shall be done on Sunday/Holidays without the sanction in writing of the Engineer-in-charge.

Clause 32.

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

Clause 33.

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

Clause 34.

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

Clause 35.

All works to be executed under the contract shall be executed under the

directions and subject to the approval in all respects of the Engineer –in-charge who shall be entitled to direct at what point or points and in what manner they are to be commenced, and from time to time carried on.

Clause 36.

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

Clause 37.

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

Clause 38.

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

Clause 39.

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

Clause 40.

All quarry fees and royalties shall be paid by the Contractor. All octroi, taxes shall also be paid by the Contractor according to the Municipal/Government rules in force at the time and no refund shall be given. If any new taxes will be levied then the same shall be reimbursed subject to proof of payment to

government.

Clause 41.

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

Clause 42.

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

Clause 43.

No compensation other than price escalation and star rate difference shall be allowed for any delay caused in the starting of the work on account of any acquisition of land in the case of clearance work, for any delay in accordance to estimate.

Clause 44.

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

Clause 45.

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

Clause 46.

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

No Contractor shall employ donkeys or other animals with breeching of string or thin rope. The breeching must be at least three inches wide and should be of tape [Nawar].

No animals suffering from sores, lameness or emaciation or which is immature shall be employed on the work.

The Engineer-in-charge or his agent is recognized to remove from work any

person or animal found working which does not satisfy these conditions and no responsibility shall be accepted by the Municipal Corporation for any delay caused in the completion of the work by such removal.

The Contractor shall pay fair and reasonable wages to the workmen employed by him in the contract undertaken by him in the event of any dispute arising between the Contractor and his workmen on the grounds that the wages paid are not fair and reasonable, the dispute shall be referred without delay to the Executive Engineer (Drainage) who shall decide the same.

The decision of the Engineer in-charge shall be conclusive and binding on the Contractor but such decisions shall not in any way affect the condition in the contract regarding the payment to be made by the Municipal Corporation at the sanctioned tender rates.

Clause 47.

Payment to the Contractors shall be made by cheque drawn on any bank in Surat, provided the amount exceeds Rs. 10. Amounts not exceeding Rs. 10 will be paid in cash.

Clause 48.

Any Contractor who does not accept these conditions shall not be allowed to tender for works.

Clause-49

The work contract tax/Service Tax shall not be paid or reimbursed to the contractor by SMC.

Clause-50.

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 resolved, the same shall be referred to the court subject to Surat Jurisdiction only. No arbitration shall be allowed under any circumstances

Clause-51

The following conditions are being included in this tender and shall be considered as a part of tender document.

In case the total amount of work done is 5% less than 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.

If there is increase in amount of work more than 5% of the Contract value. The Additional S.D. shall be recovered from the running bill. When the total of any of work done by the Contractor up to running bills under consideration is more

than 5% of the contract value. However, such S.D. shall be recovered in the round figure of Rs. 1000/- i.e. the amount of work done when it exceeds 5% of the contract value it shall be rounded off to the nearest multiple of Rs.25000/- such additional S.D. shall be recovered for the works amount to Rs. 5 Lakhs or more at the rate of 4% of the additional amount.

In many cases, the contractors are stopping the work half-way due to number of reason and when the department has to take actions in accordance to clause 3(a) or (b) or (c) of the contract the remaining work has to be carried out by advertising the tender for the remaining work and the whole administrative process right from inviting tenders to finalizing the tender etc.

In such cases a fixed amount of Rs. 1000/- should be recovered from the original contract 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.

Clause 52.

The tender is sent to you with one set of conditions of contract, technical specification and one set of Schedule-B with one set of drawings, please return the same duly filled in along with all the set in a sealed cover. The mode of submission of tender shall be as indicated in tender notice.

The Tender submission shall be by Registered Post A.D./Speed post/online.

Clause 53.

A sum of money on account of Earnest Money should be paid in pay order or demand draft only to the Municipal Commissioner. Earnest Money in the form of cheque will not be accepted. The amount will be forfeited if, after his quotation is accepted, the contractor does not complete the contract documents and pay the amount of Security Deposit of 2% of tender amount within the specified time as mentioned in clause 1 of condition of contract, otherwise it will be refunded. The work is to be completed within stipulated time from the date of written order to commence the work. The Insurance Company's bond will not be accepted against the Security Deposit.

Clause 54.

On online bidding, The contractor will quote item rate, both in words and figures. The final total as per the item-rates quoted above shall also be given both in words and figures.

Clause 55.

No alteration in the form of quotation and in schedule of quantities and no additions in the shape of special stipulation will be permitted. Quotations which

do not fulfil all or any of the above conditions or are incomplete in any respect are liable to be rejected.

Clause 56.

The tenderer must obtain for himself on his own responsibility and at his own expense all the information which may be necessary for the purpose of filling this tender and for entering into a contract for the execution of the same from the office of the Executive Engineer (Drainage), Surat Municipal Corporation, Surat, during the office hours between 11:00 A.M. to 6:00 P.M. On weekdays except Sunday & Holidays and must examine the drawings and Inspect site of the work and acquaint him with all local conditions and matters pertaining thereto before submitting the tender.

Clause 57.

Successful bidder shall Each of the pages (having reference for signature of the contractor) of the tender documents is required to be signed by the person or persons submitting the tender in token of his/their having acquainted himself/themselves with General Conditions etc., as laid down. Any tender with any of the documents not so signed which will be rejected.

Clause 58.

The tender form must be filled in English and all entries must be made by hand written in ink, if any of the documents is missing or unsigned, the tender shall be considered invalid.

Clause 59.

The rates quoted by the contractor shall include all eventualities such as heavy rain, sudden floods, etc. which may cause damage to the executed work or which may totally wash out the work. Until the completion certificate is issued to the contractors, S.M.C. shall not be responsible for such damage or wash out to the construction work.

Clause 60.

Time is the essence of the contract. The work should be completed within stipulated time from the date of the work order issued to the contractor to commence the work. The successful contractor will have to give a schedule of the various items of work to be done so that the work is completed within the stipulated time.

Clause 61.

Rate for extra items, as far as possible will be derived from the SOR of quoted tender items(Surat irrigation circle) where it is not possible to do so, the same shall be carried out from the Surat R & B S.O.R. 2015-2016 where it is not possible to do so, the same shall be carried out from SOR of GWWSS & B where it is not possible to do so, the same shall be else arrived at by adding 15% towards overhead and profits on the actual cost of labour, material and plant and machinery input as approved by the Engineer-in-charge.

Clause 62.

In case of delay in execution of work the liquidated damages at the rate of 0.2% of contract value per day subject to the maximum of 10% of the contract value, shall be payable by the contractor to the Corporation towards compensation.

Clause 64.

No claim for any extra or compensation for damage will be entertained on account of such variation, No claim for any extra or compensation for damages will be entertained on account of such variation where the quantity is decreased to any percentage or where the item is totally deleted.

Clause 65.

Construction Programme

- The contractor shall submit a detailed programme within 30 days from the date of work order. Whenever necessary, contractor shall also submit a revised programme indicating how he plans to catch up with the slippages. Each programme shall include the order in which he intends to carry out the work including the anticipated timing of each stage of design, procurement, deployment of resources and quantities involved. The programme will be projected as Bar Chart / CPM – Network presentation. Contractor shall promptly give notice of probable future events or circumstance which may adversely affect the work. The programme should include deployment of financial resources commensurate with the work planned each month.
- If at any time actual progress is too slow to achieve target programme and/or progress has fallen behind the current programme then the engineer may instruct the contractor to submit revised programme with plan to mitigate time.

Clause 66.

The Contractor shall also arrange to obtain the license from the competent Authority under the contract labour (regulation and abolition) Act 1970.

Clause 67.(Deleted)

~~Before payment of final bill on completion of the work, total amount of that work done at sanctioned rate shall be considered with the total amount of work done, had it been executed at the rate of second tenderer. While comparing total amount, quantity to be taken into consideration will be the quantity executed and not the quantity put to tender and will also include variation of quantity within the limits of quantity executed i.e. 30% of the estimated quantity. In case the latter is less than the total amount of work done at sanctioned rate; than the amount of difference the two shall be deducted from the final bill before making payment. In other words the work when executed shall not exceed as compared to the rate of second lowest tenderer. It may be noted that extra items shall not be included in comparing the rates with the second lowest tenderer.~~

Clause 68.

The following additional information shall be forwarded by the tenderer along with the submission of the tender:

- a A list of works of comparable nature executed, along with their value and time of completion.
- b A list of works in hand showing the cost of the work to be completed against each with the certificate from the Head of the office concerned.
- c A list of machinery in their possession and which they will bring for the proposed work.
- d Solvency certificate without which such tenders are liable to be rejected. Solvency certificate shall be submitted by the bidders .it should be for the amount equal to 20% of the estimated cost of the work.
- e Every contractor shall furnish along with the tender, information regarding income-tax the circle of the district in which he is assessed for income-tax the reference No. and year of assessment.

Clause 69.

Acceptance of quotation will rest with the competent authority who does not bind himself to accept the lowest and reserves the right to reject any or all quotations/tenders and no reasons will be given for acceptance or rejection thereof. The tenderers whose quotation is accepted will have to enter into a regular contract and abide by all rules and regulations embodied in the tender.

Clause 70.

The tender will be liable to be rejected outright, if while submitting it ---

- a 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.
- b Any of the pages of the tender are removed or replaced.
- ~~c In the case of item rate tender, the rates are not entered in ink in figures and words and the total of each item and grand total are not struck by the tenderer in ink in the last column of Schedule 'B' under his signature.~~
- d Any errors are made by him in the tender.
- e All corrections and additions or pasted slips are not initiated by tenderers.
- f The tenderer or in the case of a firm each partner thereof does not sign or the signature/signatures is/are not attested by a witness on page of the tender in the space provided for the purpose.
- g The tenderers which do not fulfil any of the conditions of those in the printed form and those tenders which are incomplete.

Clause 71.

The contractor has to make all arrangements for procuring the materials required on his own work.

Clause 72.

in case of any discrepancy with tender document the contractor may contact the Executive Engineer (Drainage), Surat Municipal Corporation, Surat.

Clause 73.

In view of the difficult position regarding the availability of foreign exchange, no foreign exchange would be released by the SMC for the purchase of plant and machinery required for the execution of the work contracted

Clause 74.

The contractor will have to construct shed for storing valuable materials at works site having locking arrangement. The material will be taken for use in the presence of the SMC person. No materials will be allowed to be removed from the site of works.

Clause 75.

Tender once accepted shall be binding on the contractor even if the formal agreement is not signed.

Clause 76.

Tender once offered cannot be withdrawn except with the express permission of the Municipal Corporation.

Clause 77.

~~The successful tenderer may be required to furnish surety of 20% of the contract value on stamp paper if so desired by the Commissioner.~~

Clause 78.

The tenderers are requested to give complete specification of prices quoted.

Clause 79.

For all R.C.C. works such as Footings, Columns, Beams, Slabs, Chhajjas, Pardis, Lintels, etc., a 15 cm x 15 cm x 15cm sizes test cube as per the P.W.D. Standard will have to be taken by the contractor and as per instructions and directions of the Engineer-in-charge. These test cubes will be for 7 days and 28 days respectively. After 7 days, 28 days these test cubes will be tested in the Government approved laboratory by the contractor at his own expense and results will be submitted directly to the respective head of the SMC.

Clause 80.

This tender document contains all pages (Technical Bid), which should be furnished by successful full bidders, duly filled in and signed. No pages can be removed from the conditions of contract, specifications of drawings, otherwise it will be considered as an intentional fault and the tender will be liable for rejection and the amount of earnest money deposit forfeited.

Clause 81.

If the work executed is found to be of inferior quality OR of any substandard

quality not conforming to the specifications at any point of time during the inspection of by Engineer-in-charge or any Higher Authority, the contract shall be terminated without assigning any reasons there off and no payment shall be made towards the probable damages or loss caused to the contractor and materials purchased by him for this work and no compensation whatsoever either shall be paid to contract by Municipal Corporation.

Clause 82.

The Successful contractor shall take all contract risk insurance policy" for the tendered cost of the work. "Work's man compensation policy" for all workers and labour of contractor and clients working at site and "Third party insurance policy" to fully cover all third party type risk for the whole contract i.e. Construction, supply, installation, testing and commissioning and Operation & maintenance. The insurance policy so taken by the contractor for such purpose shall be in the joint name of the contractor and the client and the policy shall be deposited with the clients.

Clause 83.

The Contractor should note that the conditional tenders shall be out rightly rejected.

Clause 84.

Out of the amount payable/creditable to contractor's account, the Central Government /State Government tax/taxes shall be deducted at source in accordance with the relevant laws/rules from time to time prevailing.

Clause 85.

Now no octroi is to be paid as the same is exempted and therefore the question of reimbursement does not arise. The contractors shall quote their rates considering this aspect of exemption of octroi.

Clause 86.

Surat Municipal Corporation shall not provide 'C' or 'D' Form for tax purposes.

Clause-87

No price variation or escalation other then stipulated in tender shall be paid to the contractor.

Clause-88

The final bill shall be paid only after the successful completion of the gabion pitching works, retaining wall & road and other development work in all respect.

Signature of the Contractor

**Executive Engineer (Drainage),
Surat Municipal Corporat**

Shifting of utilities:

Wherever the Retaining wall, Diaphragm wall, Gabion Pitching work, construction of Vehicle track works and structures requiring shifting of high tension / low tension power lines, transmission towers, electrical poles, telephone cables, gas pipelines either permanently or temporarily, the contractor may have to arrange for such shifting of the power lines, transmission towers, electrical poles, telephone cables, gas pipelines through the concerned authorities of the organizations who own and maintain such utilities. The cost as per the estimate given by such authorities shall be paid by the SMC to the concerned statutory or other organizations. The engineer-in-charge will process the proposals submitted by the contractor to the concerned authorities and organizations for their approval. The price quoted by the contractor is deemed to be exclusive of such cost.

Signature of the Contractor

**Executive Engineer (Drainage),
Surat Municipal Corporation.**

SCHEDULE -A

Surat Municipal Corporation shall issue only bitumen to be used for this work. Contractor to take the delivery of bitumen from the place as suggested by Surat Municipal Corporation as and when required. Carting and delivery rate is payable as mentioned in the BOQ.

Surat Municipal Corporation shall not issue cement and reinforcement steel to be used for this work.

The cement and reinforcement steel required for the above said work shall be procured by contractor at its own cost.

The brands for cement shall be Ambuja, Ultrateck, Hathi, Siddhi, Sanghi and J. K. Laxmi confirming to IS 12269/87 (with its latest amendments) of OPC - 53 grade only.

Concrete should be made and supply by RMC/Batching plant with approved make of Cement Company.

Approved make of HYSD/TOR/TMT/CRS reinforcement steel:- TATA, SAIL, Rastriya Ispat, Electrotherm (India) ltd. and J.S.W. Steel ltd. If Steel purchased from Electrotherm (India) ltd. and J.S.W. Steel ltd. than purchase bill / testing certificate of that product shall be obtained from company it self and the name of the contractor /work shall be appeared on the bill /testing report.

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

WASTAGE OF CEMENT AND REINFORCEMENT STEEL :

As the contractor is to bring the cement and steel, the question of considering the wastage on the basic of issue rate does not arise i.e. no separate payment shall be made for any kind of wastage in the materials. The payment for reinforcement bar will be made on the theoretical weight basis. 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.

The allowable wastage for cement and steel shall be +5% and +7.5% respectively.

TESTING OF CEMENT AND STEEL :

It should be specifically noted that the cement and steel brought by the contractor at site of work shall be used only after the same is tested at the

approved laboratory as per the direction of the Engineer- in-charge. Such approved laboratory may be located at Surat, Baroda, Ahmedabad or Mumbai.

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

Signature of Contractor

**Executive Engineer (Drainage),
Surat Municipal Corporation,
Surat.**

11. SCHEDULE - B

AS PER SEPARATE PRICE BID uploaded

Note:

1. All works shall be carried out as per Government of Gujarat's P.W.D. Handbook and our specifications contained in this document and as directed.
2. The Schedule of Quantities and Rates are to be read for the purpose of pricing in conjunction with instructions of tenderers, technical specifications, drawings and General conditions for contract for Civil works.
3. The price quoted in the summary of costs, sheets of schedule of quantities and rates shall be of all inclusive value for the work described including all costs and expenses which may be required in for the execution of the work described together with all general risks, liabilities and obligations set forth or implied in the document on which the tender is based.
4. The quantities furnished are approximate. In the event of actual quantities varying from those furnished herein below or items deleted or added, the percentage (Plus/Minus) quoted for the entire work shall remain, firm and no extra claims in this respect will be entertained. The payment shall be made based on the actual quantities executed for the completion of work.
5. All works shall be carried out strictly as per detailed specification whether actually specified or not. If not specified, as per directions of owner/Engineer-in-charge.
6. Percentage (Plus/Minus) quoted by tenderer shall be firm even if the contract is split.
7. Percentage (Plus/Minus) and the total amount entertained in the summary of cost, sheet of schedule of quantities and Rates shall be written online and shall be entered both in figures and words.
8. Detailed specifications of items of work are described under section Detailed Technical Specification for each item of schedule of quantities and Rates. The section gives guidelines to the reference of relevant clauses of specifications and mode of measurement. Tenderer shall read this in conjunction with other technical specifications and quote accordingly.
9. The measurements shall be as described in the detailed Technical specification of items of work, all measurements being not in accordance with the drawings with no allowance for waste.
10. If Tenderers need any clarifications, they should obtain the same in writing from Owner/Engineer-in-charge. No notice will be taken of any verbal discussion in such matters.
11. Rates quoted include clearance of site (prior to commencement of work and at its close before handing over) in all respects and hold good for work under all conditions, site, moisture, weather etc.

Signature of the Contractor

**Executive Engineer (Drainage),
Surat Municipal Corporation.**

12. IMPORTANT INSTRUCTION TO TENDERER

1.

Affix latest Passport size photo of tenderer
--

Specimen Signature of the Contractor

2.

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

Specimen signature of all partners in case of partnership agency.

- i. _____ Submission of Registered
ii. _____ Agreement is
compulsory
iii. _____ in case of partnership
agency.
iv. _____

3. Submission of income tax clearance certificate 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. All partners of tenderer should put their specimen signature at the relevant places in the tender. A Passport size photograph of all partners who have signed the tender shall be affixed in the tender.

The successful tenderer shall be required to execute necessary agreement where in the same partners shall put on their signatures.

Signature of the Contractor

**Executive Engineer (Drainage),
Surat Municipal Corporation,
Surat.**

13. MEMORANDUM

1. General Description of Work: - Remodelling and Restructuring of Koyli creek including vehicle track in Surat. (Ch. 8000 mt to 9500 mt)

2. The tenders will be received up to 16/08/17, up to 18.00 hrs. and will be opened (online) on 18/08/17 at 12 hrs. [Part-A: Qualification Bid] if possible in the presence of those tenderers who choose to remain present on the occasion.
- 3 Estimated Amount: Rs. 82,41,05,062.17/-
- 4 Earnest Money Deposit: Rs. 83,00,000/-
- 5 Security Deposit:
- i Pay order or F.D.R.or D.D.of any Nationalized Bank. :- -
- ii In form of Bank guarantee of any Nationalized Bank :- 2% of Tender Amount (Shall be released at the time of final bill)
- iii To be deducted from Running Bill in form of Retention Money: - 2% (Shall be released during defect liability period on pro rata basis)
- 6 Time allowed for the completion of work 27 (Twenty seven) months (including monsoon)
- 7 Delay damages/ (Liquidated Damages) Zero Point two percent (0.2%) of the Contract price per day maximum up to ten percent of the contract price.
- 8 The progress of the work should 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 Percentage to be retained from running account bills:- Additional **6%** of gross amount of bill (Shall be released during defect liability period on pro rata basis)
- 10 Defect Liability Period :- 60 months (After completion of work)
- 11 Water Charges
- a. Water charges shall have to be paid by the Contractor at the rate of corporation and shall be deducted from the running account bill, if water supplied by SMC.
- b. Exemption shall be granted if the contractor makes its own arrangement of water supply and inform SMC.

Signature of the contractor.

**Executive Engineer (Drainage),
Surat Municipal Corporation**

14. SPECIAL CONDITIONS OF CONTRACT

1.0 GENERAL CONDITIONS :

1.1 Location of site & accessibility

- i The proposed site is located within the jurisdiction of SMC and is as per location plan.
- ii Service roads are laid within and up to the site of the work. These will be available to the contractor subject to any limitations imposed by SMC.
- iii The contractor shall have to obtain tokens for himself and obtain gate passes for removing any of his materials outside the premises. The contractor's person's entry and exit will be by main gate only.
- iv Non availability of access roads or railway siding or permits for entry of vehicles and equipment at any specific area shall in no case be the cause to condone any delay in the execution of the works or be the cause for any claims or extra compensations.

1.2 Scope of Work

This tender enquiry covers the **Remodelling and Restructuring of Koyli creek including vehicle track in Surat. (Ch. 8000 mt to 9500 mt)**

The schedule of quantities is given separately in tender. The work shall be carried out strictly in accordance with specifications and instructions of Engineer-in-charge issued from time to time. The contractor shall provide all necessary materials equipment, labour etc. for the execution and maintenance of work till completion unless otherwise mentioned in the tender documents. All materials that go with the work shall be approved by the Engineer in charge prior to procurement and use.

- Any and all other works indicated and considered necessary for the execution of this work whether or not specifically mentioned or called for.
- Any type of service utilities such as electrical, telephone, any other cables damaged or disturb should be put in use at the cost of contractor. No payment will be given for such damages by SMC.

1.3 Water Supply & water charges

The contractor shall be allowed to make arrangement for necessary construction water in two ways.

- (a) The contractor can make its own arrangement of water supply through private boreholes or through tankers. However, the contractor shall be required to inform Surat Municipal Corporation within 30 days of starting of work and shall have to produce necessary test certificate that conform the construction water grade as per relevant IS.

If contractor wishes to use the municipal water for construction purpose, he/she shall have to apply to get the water connection through license plumber from relevant zone office. He shall have to bear all the cost towards getting water connection. The contractor shall be liable to pay all the charges as per the prevailing rules and regulation of Surat Municipal Corporation for making use of water. Further, the contractor shall have to produce the copy of payment of water charge bill to the undersigned, otherwise the water charges shall be deducted from his running bills.

Where, the water supply network is not available, the contractor may borrow the tanker from any of the municipal water distribution centre on the payment of necessary water charges, as per the prevailing rules and regulations.

Most importantly, the contractor shall be responsible for disconnecting the water connection on completion of work and shall have to inform the department accordingly.

1.4 *Electric Supply for construction purpose.*

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

~~2.0 SUBMISSION OF TENDER:~~

~~2.1 Tender must be submitted in original and without making any additions, alterations and as per details given in other clauses given here under. The requisite details shall be filled in by the contractor in the tender documents. The item rates shall be filled in the given schedules in this tender and bills of quantity should be clearly brought out in a separate letter.~~

~~2.2 Addenda / corrigenda to this tender document, if issued must be signed and submitted along with the technical bid (i.e. Cover 1).~~

~~The tenderer should write clearly the revised quantities in Bills of Quantity of tender documents and should price the work based on revised quantities when amendments for quantities are issued in addenda.~~

~~3.0 DOCUMENTS~~

~~3.1 The Tenders as submitted will consists of the following:~~

- ~~i Complete set of tender documents as sold duly filled in and signed by the tenderer as prescribed in different clauses of the tender documents.~~
- ~~ii Declaration showing all works as similar types and~~

~~magnitudes carried out and on hand with the contractor and the value of works that remains to be executed in each case must accompany the tender.~~

- ~~iii Solvency Certificate of Bank or a Revenue Officer of an amount up to 20% of the tendered cost plus the amount of works on hand still to be executed will have to be produced by the Contractor. In respect of the tenders from the co-operative society, a solvency certificate of an amount equal to 20% of the amount of work put to tender will have to be produced along with the tender or a certificate regarding the borrowing capacity of the society issued by the Legal Assistant, Director of Cottage Industries will have to be produced along with the tender.~~
- ~~iv Demand draft or pay order for earnest money deposit must accompany the tender. Tenderer may pay earnest money in the 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.~~
- ~~v The contractor shall have to furnish Income Tax Clearance Certificate before his tender is accepted and intimate Assessment No. & Ward under which he is assessed.~~
- ~~vi Tenderer should submit the True Copy of the Certificate of Registration along with the tender without which the tender will not be considered.~~

~~3.2 All pages to be initialled~~

~~All signatures in tender documents shall be dated as well as all the pages of the sections of tender documents shall be initialled at the lower right hand corner and signed wherever required in the tender papers by the tenderer or by a person holding power of attorney, authorizing him to sign on behalf of the tenderer before submission of tender.~~

~~3.3 Rates to be in figures & words~~

~~The tenderer shall quote in English both in figures as well as in words the percentage rate in annexure /schedules.~~

~~3.4 Corrections & Erasures~~

~~All corrections and erasures in the entries of tender papers will be signed in full by the tenderer with date. No erasures or over writings are permissible.~~

3.5 Discrepancies & Adjustments of Errors

Any error in quantity or amount in schedule `B' showing items of works to be carried out shall be adjusted in accordance with the following rules

- a In the event of a discrepancy between description in words & figures

quoted by a tenderer in the `rates' column, the descriptions in words shall be prevailed.

- 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 unit rate shall be regarded as firm and multiplications shall be amended on the basis of the rates.
- c All the errors in totalling in `amount' column and in carrying forward totals shall be corrected.
- d Any rounding off of amounts against `items' 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.

3.6 ~~Signature of Tenderer~~

~~The tender shall contain the name, residence and place of business of person or persons making the tender and shall be signed by the tenderer with his usual signature. Partnership name by all the partners or by duly recognized representative followed by the name and designation of the person signing. Tender by a corporation limited company shall be signed by a recognized representative and a power of attorney in behalf shall accompany the tender. A copy of the constitution of the firm with the name of all the partners to be furnished.~~

3.7 ~~Details of Experience~~

~~The tenderer should enclose documents to show that he has previous experience in having successfully completed in the recent past works of this nature like flood protection work using gabion, gabion mattresses, geo-textile, RCC retaining wall and WBM road together with the names of owners, location on sites and values of contracts. The tenderer should have successfully completed river training work of Major Rivers in India.~~

4.0 TRANSFER OF TENDER DOCUMENTS

Transfer of tender documents purchased by on intending tenderer to another is not permissible.

5.0 VALIDITY (As per Instruction to Tenderers)

~~The validity period of the tender submitted for this work shall be of One hundred and Eighty calendar days (180 days) from the due date of the tender 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 modification or addition in the terms & conditions of 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.~~

6.0 *ADDENDA/CORRIGENDA*

Addenda/Corrigenda to the tender documents may be issued prior to the date of opening of tenders to clarify documents or to effect modifications in the design or contract terms. All addenda/corrigenda issued shall become part of tender.

7.0 *RIGHT TO OWNER TO ACCEPT OR REJECT TENDER*

The right to accept the tender will rest with the S.M.C. The S.M.C., however, does not bind itself to accept the lowest tender, and reserves to itself the authority to reject any or all the tenders received without assigning any reason whatsoever. Tenders in which any of the particulars and prescribed information are missing or are incomplete in any respect and/or the prescribed condition is not fulfilled are liable to be rejected.

In addition to the above, the tender will also be liable to be rejected outright if ---

- i the tenderer proposes any alterations in the works specified or in the time allowed for carrying out the work or any condition or correction made in any code or mode of schedule 'B' or specifications.
- ii Any of the page or pages of the tender is/are removed or replaced.
- iii All corrections, additions or pasted slips are not initialled by the tenderer.
- iv The tenderer or in the case of a firm, each partner or person holding the power of attorney thereof does not sign or the signature(s) is/are not attested by a witness.

8.0 *RETENTION MONEY As mentioned elsewhere*

~~As per memorandum. This amount will be deducted progressively from each running bill of the contract by the SMC the above referred retention money will be released on virtual completion of work in the final bill.~~

~~In Addition to 2% (Percent) of RMD / SD, additional 5% (Percent) Amount shall be retained from each Bill which shall be Released in Final Bill. Under no circumstances the said retention shall be released prior to Final Bill.~~

9.0 COLLECTION OF DATA TENDERERS' RESPONSIBILITY

The tenderer shall visit the site and acquaint himself fully of the site and no claims whatsoever will be entertained on the plea of ignorance or difficulties involved in execution of work or carriage of materials.

10.0 SIGNING OF THE CONTRACT

The successful tenderer shall be required to execute an agreement in the Performa attached with the tender documents within ten days of the receipt by him of the notification of acceptance of tender. In the event of failure on the part of the successful tenderer to sign the agreement within the above stipulated period, the acceptance of the tender shall be considered as cancelled and Earnest Money Deposit amount will be forfeited.

11.0 CO-ORDINATION OF WORK

The Engineer-in-charge shall co-ordinate the works of various agencies engaged at site to ensure minimum disruption of work carried out by different agencies. It must be the responsibility of the contractor to plan and execute the work strictly in accordance with site instructions to avoid hindrance to the work being executed by other agencies.

12.0 INTERPRETATION OF CONTRACT DOCUMENTS

12.1 Except if and to the extent otherwise provided by the contract, the provisions of the special conditions shall prevail over General Conditions of Contract.

Between two or more Clauses of this Agreement, the provisions of a specific Clause relevant to the issue under consideration shall prevail over those in other Clauses;

Several documents forming the contract are to be taken as mutually explanatory and not in isolation or stand alone, should there be any discrepancies, inconsistencies, errors or commissions in the contracts or any of them, the matter may be referred to the Engineer-in-charge who shall give his decisions and issue to the contractor instructions directing in what manner the work is to be carried out. The decision of the Engineer-in-charge shall be final and conclusive and the contractor shall carry out the work in accordance with this decision.

12.2 Works shown upon the drawings but not mentioned in the specifications or described in the specifications without being shown on the drawings shall nevertheless be held to be included in the same manner as if they had been specifically shown upon the drawings and described in the specifications.

12.3 i The various documents forming the contract are the essential parts

of the contracts and a requirement occurring in one is as binding as though occurring in all, they are intended to be mutually explanatory and complementary and to describe and provide for a complete work.

ii In the event of any discrepancies, the various documents forming the contract or in any one document, the following order of precedence should apply

a] Dimensions & quantities ---

i Drawings.

ii Schedule `B' of the tender form.

On drawings, figures, dimensions, unless obviously incorrect will be followed in preference to shown 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/directions in what manner the work is to be carried out, it being understood that the best modern practice is to be followed. The contractor should forthwith comply with such instructions

The contractor should take no advantage of any apparent error or omission or ambiguity in drawings or specifications or Schedule-B or Addenda - Corrigendum and the Engineer-in-charge shall make such corrections and interpretations as necessary to fulfil the intent of the plans and specifications and the same shall be binding .

13.0 FORCE MAJEURE

Any delays in or failure of the performance of either part here to shall not constitute default hereunder or give rise to claims for damages, if any, to the extent such delays or failure of performance is caused by occurrences such as Acts of Gods or the public enemy; expropriation or confiscation of facilities by Government authorities, compliance with any order or request of any Governmental authorities, acts of war, rebelling or sabotage or fires, floods, explosions, riots or illegal strikes. The contractor shall keep records of the circumstances referred to above and bring these to the notice of the Engineer-in-charge in writing immediately on such occurrences.

14.0 FORFEITURE OF RETENTION MONEY

Whenever any claim against the contractor for the payment of a sum of money arises out of or under the contract, the S.M.C. shall be entitled to recover such sum by appropriating in part or whole of the retention money

of the contractor. In case, the retention money is insufficient or if no retention money has been taken from the contractor, then the balance or the total sum recoverable, as the case may be, be deducted from any sum then due or which at any time thereafter may become due to the contractor. The contractor shall pay on demand any balance remaining due.

15.0 NO COMPENSATION FOR ALTERATION IN OR RESTRICTION OF WORK

If at any time after the commencement of the work, the corporation shall for any reason whatsoever not require the whole or part thereof as specified in the tender to be carried out, the Engineer-in-charge shall give notice in writing of the fact to 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 the execution of the work in full, but which he did not derive in consequence of the full amount of the work not having been by reason of any alterations having been made in the original specifications, drawings, designs and instruction which shall not involve any curtailment of the works as originally contemplated.

16.0 ~~RIGHT OF THE CORPORATION TO DETERMINE/TERMINATE CONTRACT~~

~~i The Corporation shall, at any time, be entitled to determine and terminate the contract, if in the opinion of the Corporation the cessation of the work becomes necessary owing to paucity of funds or for any other cause whatsoever, in which case the cost of approved materials at the site as verified and approved by the Engineer in charge and of the value of the work done to date by the contractor shall be paid for in full at the rate specified in the contract. A notice in writing from the Corporation to the Contractor of such determination and the reason, thereof shall be the conclusive proof of the fact that the contract has been so determined and terminated by the Corporation.~~

~~ii Should the contract be determined under sub clause (i) of this clause and the contractor claims payments to compensate expenditure incurred by him in the expectation of completing the whole of the work, the Corporation shall consider and admit such claims as are deemed fair and reasonable and are supported by vouchers to the satisfaction of the Engineer in charge. The decision of the Commissioner on the necessity and propriety of any such expenditure shall be final and conclusive and binding on the contractor.~~

17.0 DRAWINGS TO BE SUPPLIED BY THE CORPORATION

17.1 The tender purpose drawings attached herewith give layout drawing.

17.2 The detailed construction drawings shall be issued by the S.M.C. progressively during construction in line with civil general arrangement drawing given by the contractor.

18.0 SETTING OUT WORKS

The Engineer-in-charge shall furnish the contractor with only the four corners of the work site and a level bench mark and the contractor shall set out the works and shall provide an efficient staff for the purpose and shall be solely responsible for the accuracy of such setting out.

19.0 RESPONSIBILITY FOR LEVEL & ALIGNMENT

The contractor shall be entirely and exclusively responsible for the horizontal and vertical alignment, the level and correctness of every part of the work and shall rectify any errors or imperfections therein. Such rectifications shall be carried out by the contractor at his own cost, when instructions are issued to that effect by the Engineer-in-charge.

20.0 DISCREPANCIES BETWEEN INSTRUCTIONS

Should any discrepancy occur between the various instructions furnished to the contractor, his agents or staff, or any doubt arises as to the meaning of any such instruction or, should there be an misunderstanding between the contractor's staff and the Engineer-in-charge's staff, the Contractor shall immediately report the matter in writing to the Engineer-in-charge whose decision thereon shall be final and conclusive and no claim for losses alleged to have been caused by such discrepancies between instructions, doubts or misunderstanding shall in any event be admissible.

21.0 INSPECTION OF WORK

The Engineer-in-charge or his representative will have full power and authority to inspect the works at any time wherever in progress, either on the site or at the Contractor's premises/workshops wherever situated, premises/workshop of any person, firm or corporation where materials are being made or are to be supplied, and the contractor shall afford or procure for the Engineer-in-charge or his representative every facility and assistance to carry out such inspection. The contractor shall at all times during the usual working hours and at all other times at which reasonable notice of the intention of the Engineer-in-charge or his representative to visit the works shall have been given to the Contractor, either himself be present to receive orders and instructions or have a responsible agent duly accredited in

writing present for the purpose. Orders given to the Contractor's agent shall be considered to have the same force as if they had been given to the Contractor himself. The Contractor shall give not less than seven day's notice in writing to the Engineer-in-charge or his representative before covering up or otherwise placing beyond reach of inspection and measurement any other work in order that the same work may be inspected and measured. In the event of breach of the above, the same shall be uncovered at contractor's expense for carrying out such measurements or inspections.

22.0 TESTS FOR QUALITY OF WORK

All workmanship shall be of the respective kinds described in the contract documents and in accordance with the instructions of the Engineer-in-charge and shall be subjected from time to time to such tests at Contractor's cost as the Engineer-in-charge may direct at the place of manufacture or fabrication or on the site or at all or any such places. The Contractor shall provide assistance, instruments, labour and materials as are normally required for examining, measuring and testing any workmanship as may be required and selected by the Engineer-in-charge.

23.0 THE CORPORATION MAY DO PART OF THE WORK

Upon failure of the Contractor to comply with any instructions given in accordance with the provisions of this contract, the Corporation has the alternative right, instead of assuming charge of entire work, to place additional labour force, tools, equipments and materials on such parts of the works, as the Corporation may designate or also engage another Contractor to carry out the work. In such cases, the Corporation shall deduct from the amount which otherwise becomes due to the Contractor, the cost of such work and materials with 10% added to overall departmental charges and should the total amount thereof exceed the amount due to the Contractor, the Contractor shall pay the difference to the Corporation.

24.0 The Corporation shall not accept any offer submitted by the contractor on its own design. It should be specifically noted that wherever bank guarantee is required to be submitted, it should be from Nationalized Banks only.

25.0 Contractor to note that SMC shall appoint Project Management Agency /Third Party Agency for the supervision / inspection of the work and contractors are obliged to work under them. However decision of SMC shall be final.

26.0 CONTROLLED MATERIALS (ESSENTIALITY CERTIFICATE) :

- [i] As regards controlled materials, the corporation will help to arrange for the permit as far as possible and help the contractor in securing the same. All incidental charges not within procuring these materials shall be borne by the Contractor himself. Though the Corporation will help to manage 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 month, the monthly returns in the prescribed forms as to the receipt and actual use of the controlled materials during the months.
- [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 representative(s) desire(s).

27. *PROCEDURE OF MEASUREMENT/BILLING OF WORK IN PROGRESS FOR EXTRA ITEMS:*

MEASUREMENTS:

- 27.1 All measurements shall be in metric system as specified by joints measured by the representative of the Engineer-in-charge and the Contractor's recognized agent progressively. Such measurement will be got recorded in the measurement book by the Engineer-in-charge or his recognized representative and signed in token of acceptance by the contractor or his recognized representative.
- 27.2 All works shall be measured by standard measure and accordance to the rules and custom of the Public Works Department without reference to any local custom.
- 27.3 The measurements of work will be taken according to the usual methods in use in the Public Works Department and no proposals to adept alternative methods will be accepted. The Engineer-in-charge decision as to what is the usual method is use in the Public Works Department will be final.
- 27.4 Rate for extra items, as far as possible will be derived from the SOR of quoted tender items(Surat irrigation circle) where it is not possible to do so, the same shall be carried out from the Surat R & B S.O.R. 2015-2016 where it is not possible to do so, the same shall be carried out from SOR of GWWSS & B where it is not possible to do so, the same shall be else arrived at by adding 15% towards overhead and profits on the actual cost of labour, material and plant and machinery input as approved by the Engineer-in-charge.

28.0 ACCIDENT LIABILITIES:

The Contractor shall be responsible for all liabilities under workman compensation act and criminal liability under Indian penal code, as under:

- (a) On occurrence of accident, resulting in death of workman employed by the Contractor which is so serious as is likely to result in death of such workman who meet with accident, the Contractor shall within 24 hours of accident, will intimate in writing to Engineer-in-charge of such incidence. The Contractor shall indemnify client, against all criminal liability and losses/damages sustained by the client resulting directly or indirectly from his failure to give such intimation to client including penalties/fines if any, payable by client as a consequence of client's failure to give notice under workman's compensation act or otherwise to conform the provision of this act in regard to such accidents.
- (b) In case when such compensations as above becomes payable under workman's compensation act, whether by contractor or by client as principal employer, it shall be law full for the Engineer-in-charge to retain out of money due and payable to the Contractor, such sum or sums of money as may in the opinion of the Engineer-in-charge be sufficient to meet such a liability, the opinion of the Engineer-in-charge shall be final in regard to all matters arising under this clause.

29.0 INSURANCE:

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

30.0 Contractors shall have to use maximum machinery for the work as per the direction of Engineer-In-Charge.

31.0 If possible, space for stacking the surplus excavated earth will be provided by SMC. Otherwise the contractor shall arrange for the same at no extra cost to SMC.

32. *DEFECTS LIABILITY PERIOD*

The defects liability period as defined in General Conditions of Contract, shall be 60 months from the date of total commissioning of work or 60 months from the date of completion of the work in all respects

For the failure of the contractors in the matter of guarantee, testing, trial run, performance, commissioning and handing over and meeting the defects liability, the owner shall have the full right to make necessary recovery from security deposit as may be necessary.

~~33. *TERMS OF PAYMENT*~~

~~The civil and interconnecting Gabion Pitching works, RCC Retaining Wall & WBM road between units including appurtenances are invited on item rate basis. Billing for this would be done progressively according to the rules and practice followed by SMC. All civil work that comes under Electrical/Mechanical work that has to be executed under the Supervision of Civil Engineer in charge and vice versa.~~

34. The option for selection of the Make/product/Brand shall rest with Surat Municipal Corporation, i.e. the contractor shall have to supply the materials, equipments, plants of a make as approved by the Surat Municipal Corporation.

35. *INCOME TAX*

Income tax at the rate of 2% (or at the prevailing rate) on the gross amount billed shall be deducted from the contractor's bills as per section 194C of the Income Tax Act and relevant rules/laws from time to time prevailing. Exemption shall be given on the basis of Circular/note issued on the basis of Income Tax Department

36. *INCOME TAX CLEARANCE CERTIFICATE E (DELETED)*

~~Attested copy of the latest income tax clearance certificate in the Performa prescribed by the Government of India should accompany the tender. The I.T.C. Certificate should be in the name of the firm/individual, quoting for the tender.~~

37. Wherever mentioned in the tender document, "Q.R.O." or "Q" quantity means Quote Rates only and "B.O.Q." means Bill of Quantities.

38. No compensation of any item shall be paid in case any of the items is omitted i.e. not executed at all.

Signature of the Contractor

**Executive Engineer (Drainage),
Surat Municipal Corporation**

15. 14- A Additional Special condition

These conditions shall supersede relevant portion /condition in this tender

1. Tender validity period is for 180 calendar days from the last date of online submission. EMD shall be submitted accordingly.
2. Defect liability period is 60 months for both the tenders, on percentage basis
3. Ready Mix Concrete can be used for all grade of concrete except Construction of kerb as per norms of SMC (Attached herewith) as an option to conventional mixing. Moreover, the minimum cement content and maximum water cement ratio permissible in the R.C.C. / PSC components shall be as per Design Criteria and as per the suitability of Ready Mix Concrete.
4. Police protection for execution of work, if considered necessary will have to be arranged by the Tenderer at his own cost. Recommendation required, if any, will be given by the Owner on request of the tenderer. Moreover any official payment made to Police department shall be reimbursed to the contractor on production of necessary and sufficient proof of payment.
5. Power and water supply if required will have to be arranged by the tenderer. Surat Municipal Corporation does not take any guarantee for power and water supply at the site. SMC staffs will however, extend help in resolving for obtaining permission, obtaining power supply etc.
6. Contractor shall make his arrangement for temporary approach road and material stacking yards, casting yard, labour camp, machinery yard and installations etc. at his cost. However it should not create nuisance to surrounding areas. If it found so, upon direction from SMC, contractor has to shift the same to other place without any extra cost.
7. The Contractor shall execute the works efficiently and with his best skill and attention. He shall be solely responsible for means, methods, techniques, procedures and sequences of construction. The contractor shall co-ordinate all parts of the work and shall be responsible to see that the finished work complies fully with the contract documents, and such instructions and variation orders as the Engineer may issue during the progress of the works.
8. The Contractor shall keep on the work at all times during its progress a competent Project Manager to the satisfaction of the Owner/Engineer, who shall not be replaced without 1 month prior notice in writing to the Engineer except under extra-ordinary circumstances. The Project Manager shall be the Contractor's representative at the site and shall have authority to act on behalf of the contractor. All communications, instructions and directions given to Contractor's Representative shall be binding as if given to the Contractor by the Engineer not otherwise

required to be in writing, will be given or confirmed in writing upon request of the Contractor.

9. The Contractor shall not commence operations on land allotted for work except without prior approval of the Engineer. If these lands are not adequate the Contractor may have to make his own arrangements for additional lands required for his use.
10. The contractor shall not demolish, remove or alter any of the structures, trees or other facilities on the site without prior approval of the Engineer-in-Charge.
11. All the area of Contractor's operations shall be cleared before returning the same to SMC.
12. No part of the work or new and existing structures, scaffolding, shoring, sheeting, construction machinery and equipment, or other permanent and temporary facilities shall be loaded more than its capacity. The Contractor shall bear the cost of correcting damage caused by loading or abnormal stresses or pressures.
13. Blasting/controlled blasting is not permitted for this work.

14. USE OF APPROVED SUBSTITUTIONS OR EQUALS:

The contractor shall bear all extra expenses resulting from providing or using approved substitutions or equals where they affect the adjoining or related work, including the expenses of required engineering, redesigning, drafting and permits where necessary, whether the Engineer's approval is given after receipt of tenders

15. RIGHT TO WITHHOLD:

The Engineer-in-charge may refuse to approve any payment, Due to subsequently discovered evidence or the results of subsequent inspections or tests, nullify any such payment previously approved and paid to such extent as may be necessary in the opinion of the Engineer-in-charge to protect him from loss because....

- (a). The work is defective,
- (b). Third party claims have been filed or there is reasonable evidence indicating probable filing of such claims,
- (c) of the Contractor's failure to make payment properly to sub-contractors or for labour, materials or equipment,
- (d) of damage to another Contractors or to the property of other caused by the Contractor,
- (e) of reasonable doubt that the work cannot be completed for the unpaid balance of the contract price,

- (f) of reasonable indication that the work will not be completed within the contract time,
- (g) of the Contractor's negligence or unsatisfactory proceeding of the work including failure to clean up.

Once the reasons that enable or require the Engineer-in-charge to withhold such payments are removed, payment will be made for amounts withheld to the extent the contractor is entitled to.

16. CONTINUING OBLIGATION OF THE CONTRACTOR:

The Contractor's obligation to perform and complete the work in accordance with the contract document is and shall be absolute. Neither the observation during construction and final inspection of the work by the Engineer, nor any payment to the Contractor under the Contract documents, nor any use or occupancy of the work or any part thereof by the Engineer nor any act of acceptance of the defective work by the Engineer shall constitute acceptance of work not in accordance with the contract documents.

17. INTERFERENCE WITH TRAFFIC AND ADJOINING PROPERTIES:

In case any operation connected with traffic which necessitates diversion, obstruction or closure of any road, railway or any other right of way, the approval of the Engineer-in-charge or the Engineer-in-charge's Representative and the concerned authorities shall be obtained well in advance by the Contractor.

If it is found necessary for the Contractor to move one or more loads of heavy constructional plant and equipment, materials or pre-constructed units or parts of units of work over roads, highway, bridges on which such oversized and overweight items are not normally allowed to be moved, the Contractor shall obtain prior permission from the relevant authorities. Payments for complying with the requirements, if any, for protection of or strengthening of the roads, structures or bridges shall be made by the Contractor and such expenses shall be deemed to be included in his Contract Price'

18. Materials left on site

All works and materials brought and left upon the Site of the work either by the Contractor(s) or by his/their Orders for the purpose of forming part of the work are to be Considered to be the property of the Surat Municipal Corporation and the same shall not be removed or taken away by the contractor(s) or any other person without the special leave on consent in writing of the Engineer-In-Charge, but the Surat Municipal Corporation Shall not in any way be answerable for any loss or damage which may

happen to or in respect of any such work or materials on account of the same being lost or stolen or injured by weather or otherwise.

19. Liability for damages arising from non-provision of light, fencing, Safety Boards etc.

The Contractor(s) shall provide all necessary fencing and lights and safety boards required to protect the public as well as workmen and staff of employer from accident and shall be bound to bear the expenses of defence of every suit, action or other legal proceedings that may be brought by any person for injury sustained by him owing to neglect of the above precautions and to pay any damages and costs which may be awarded to any such person in any such suit, action or proceedings or which may, with the consent of the contractor(s), be paid for compromising any claim by any such person.

20. For percentage rate tender, Total 10% of the amount of the actual total work done shall be retained for five years after completion of the work. This amount shall be released in five equal annual instalments per year after successful completion of Maintenance, repair & other obligation to be complied during the 5 year of defect liability period.

21. Security deposit/ performance guaranty and retention money and mode of recovery and release of the same.

- For percentage rate tender basis, Initial security deposit of 2% of the Contract price shall be submitted in form of cash/Fix deposit Receipt/Bank Guarantee of any Nationalised bank (Encashable at surat) and about 8% of amount for the work done shall be recovered from contractors running bill as retention money/Security deposit. Out of this 8%, 6% can be converted in Fix deposit receipt (FDR) and the said amount can be released in the running bill. However, before preparation of Final bill, Contractor shall submit fix deposit receipt of five numbers of FDR of equal amount totalling to 10% amount of actual work done to SMC, thereafter retention money/SD deducted from running bill & converted in FDR shall only be released.
- The bank guarantee submitted as initial security deposit shall be released just after the payment of Final bill.
- If contractor choose to get deducted 8% amount of actual work done as a retention money/security deposit in form of cash than the said amount can be released in Final bill as soon as contractor submit five numbers of FDR of equal amount totalling to 10% of actual work done as performance guarantee. Or 10% of Amount in cash shall be deducted from final bill.

- Any tax / stamp duty liability due to FDR shall be invariably borne by Contractor

Release of Performance Security

- The SMC shall return the 10% of Performance Security to the Contractor on each year at the rate of 2% till the defect liability period of 60 months are over . Notwithstanding the aforesaid, the Parties agree that the SMC shall not be obliged to release the Performance Security until all Defects identified during the Defects Liability Period have been rectified. SMC shall have no liability in event of any delay caused in release/ return of the performance security on any ground what so ever.

(22) Bidders shall read and consider following points.

- Contractors shall arrange sampling of materials as per requirements of item's specification in presence of representatives of TPI and PMC at respective source of materials. Contractors shall bear all costs of sampling and transportation of samples up to approved laboratory by SMC.
- Contractors shall have to provide full height shuttering in case of Retaining wall as per design given by design consultant, no extra payment shall be given for this. Accordingly, necessary arrangements for required mix design and pouring of concrete shall also be made by the contractor without any extra payment.
- Bidders shall have to quote their price including taxes / Duties / Levies / Cess or any other incidentals etc.
- GST (GOODS & SERVICE TAX) has come in existence from 1st July, 2017. Contractor / Successful Bidder is bound to pay the 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 amount actually remitted by the successful bidders/ 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. Further the nonpayment of the GST to the Government may lead to the termination of contract and forfeiture of Security Deposit /Performance Guarantee Amount.

If any other new taxes / Duties / Levies / Cess or any other incidentals etc. are imposed 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 Contractor / successful Bidder only, in no case SMC shall be liable for the same and obliged to reimbursed and no dispute regarding same shall be entertained by SMC.

Decision of Municipal Commissioner regarding above points No. 3 and 4 shall be final conclusive and binding to contractor.

- The construction labour welfare cess shall be deducted from RA bill of the contractor at the prevailing rate. The current rate of Labor Cess is 1% of the capital amount.

(23) Following procedure must be adopted for use of Ready Mix Concrete (RMC) for works in SMC.

(1) Mix Design as per relevant BIS Code/Tender Specification shall be done plant wise. In case of change of RMC plant, or change in material quality of any ingredient of concrete in a part for approved Mix design shall be done once again and fresh or new approval shall be obtained.

(2) The said Mix Design shall be approved by respective Executive engineer/Head of Department.

(3) Approval for RMC plant(s) shall only be given to plant(s) having system of measuring various concrete components and recording the same on electronic slip / statement

(4) Each Batch of production of RMC must be supervised at RMC plant by deploying technical person of SMC /Project Management Constancy (PMC) having Diploma/Degree in Civil Engineering.

(5) In case of Cement provided by contract, approved brand of Cement mentioned in tender in bulk may be used by RMC plant(s) subject to cement testing certificate from Manufacture for each batch of production of cement shall be made available to SMC. Moreover testing shall also be done for cements as per the norms prescribed under tender specifications of the work.

(6) Each transit mixture must be accompanied with Electronic slip/statement duly signed by authorized person of SMC who is deployed at RMC plants as above (4)

Cement Consumption for RMC duly Supported with electronic slip/statement must be recorded daily for each batch of transit exist from RMC plant in cement consumption register and shall be marked as cement used for RMC. The same slip should be acknowledge and duly signed by concern engineer at site of construction.

(7) Cement Consumption for RMC shall be taken into account for total Consumption of work and permissible variation.

(8) All electronic slip/ statement must be enclosed along with final bill of respective work.

(24) OBLIGATIONS OF THE CONTRACTOR

- Subject to and on the Terms, Conditions. Provisions and Representation of this Agreement, the Contractor shall undertake the survey, investigation, design, engineering, procurement, construction, and maintenance of the Work and observe, fulfil, comply with and perform all its obligations set out in this Agreement or arising hereunder.
- The Contractor shall comply with all Applicable Laws and Applicable Permits (including renewals as required) in the performance of its obligations under this Agreement.
- The Contractor shall discharge its obligations in accordance with Good Industry Practice and as a reasonable and prudent person.
- The Contractor shall remedy any and all loss or damage to work from the commencement until the end of the Construction Period at the Contractor's cost, save and except to the extent that any such loss or damage shall have arisen from any default or neglect of the SMC.
- The Contractor shall remedy any and all loss or damage to work during the Defects Liability Period at the Contractor's cost to the extent that such loss or damage shall have arisen out of the reasons specified in contract.
- The Contractor shall remedy any and all loss or damage to work during the Maintenance Period at the Contractor's cost, save and except to the extent that any such loss or damage shall have arisen on account of any default or neglect of the SMC or on account of a Force Majeure Event.
- The Contractor shall, at its own cost and expense, in addition to and not in derogation of its obligations elsewhere set out in this Agreement: -
- Ensure that the Contractor and its Sub-contractors comply with the safety and welfare measures for labour in accordance with the Applicable Laws and Good Industry Practice;
- Keep, on the Site, a copy of this Agreement, publications named in this Agreement, the Drawings, Documents relating to the Project, and Change of Scope Orders and other communications given

under this Agreement. The SMC's Engineer and its authorised personnel shall have the right of access to all these documents at all reasonable times;

- Cooperate with other contractors employed by the SMC and personnel of any public SMC; and
- Not interfere unnecessarily or improperly with the convenience of the public, or the access to and use and occupation of all roads and footpaths, irrespective of whether they are public or in the possession of the SMC or of others.
- The Contractor shall undertake all necessary superintendence to plan, arrange,
- direct, manage, inspect and test work.
- The Contractor shall maintain all records as per Instructions of Engineer in Charge.

(25) Obligations relating to sub-contracts and any other agreements

- The Contractor shall not sub contract any part or portion of the actual construction to any sub contractor without prior permission of the SMC which shall ordinarily not withhold any reasonable request thereof if the same is found in opinion of SMC to be in interest of the work.
- In event any sub contract is approved by SMC the entire responsibility and liability as contained in the original contract shall continue to remain unaltered and diluted and the contractor shall be completely and fully responsible to SMC as is SMC is having no privity of contract with the sub contractor.
- It is expressly agreed that the Contractor shall, at all times, be responsible and liable for all its obligations under this Agreement notwithstanding anything contained in the agreements with its Sub-contractors or any other agreement that may be entered into by the Contractor, and no default under any such agreement shall excuse the Contractor from its obligations or liability hereunder.

(26) Contractor's personnel

- The Contractor shall ensure that the personnel engaged by it or by its Sub-contractors in the performance of its obligations under this Agreement are at all times appropriately qualified, skilled and experienced in their respective functions in conformity with Good Industry Practice.
- The SMC's Engineer may, for reasons to be specified in writing, direct the Contractor to remove any member of the Contractor's or Sub-contractor's personnel. Any direction issued by the SMC's Engineer shall specify the reasons for the removal of such person.
- The Contractor shall on receiving such a direction from the SMC's Engineer order for the removal of such person or persons with immediate effect. The Contractor shall further ensure that such persons have no further connection with work or Maintenance under this Agreement. The Contractor shall then appoint (or cause to be appointed) a replacement.

(27) Contractor's care of work

- The Contractor shall bear full risk in and take full responsibility for the care of work, and of the Materials, goods and equipment for incorporation therein, from the Date of entry upon the site until the date of completion, defect liability, maintenance period as specified or date of final take over certificate whichever is the last date.

(28) REPRESENTATIONS AND WARRANTIES

Representations and warranties of the Contractor

- The Contractor represents and warrants to the SMC that:
 - (a) it is duly organised and validly existing under the laws of India, and has full power and SMC to execute and perform its obligations under this Agreement and to carry out the transactions contemplated hereby;
 - (b) it has taken all necessary corporate and/or other actions under Applicable Laws to authorise the execution and delivery of this Agreement and to validly exercise its rights and perform its obligations under this Agreement;
 - (c) this Agreement constitutes its legal, valid and binding obligation, enforceable against it in accordance with the terms hereof, and its obligations under this Agreement will be legally valid, binding and enforceable obligations against it in accordance with the terms hereof;
 - (d) it is subject to the laws of India, and hereby expressly and irrevocably waives any immunity in any jurisdiction in respect of this Agreement or matters arising there under including any obligation, liability or responsibility hereunder;
 - (e) the information furnished in the Bid and as updated on or before the date of this Agreement is true and accurate in all respects as on the date of this Agreement;
 - (f) the execution, delivery and performance of this Agreement will not conflict with, result in the breach of, constitute a default under, or accelerate performance required by any of the terms of its memorandum and articles of association or any Applicable Laws or any covenant, contract, agreement, arrangement, understanding, decree or order to which it is a party or by which it or any of its properties or assets is bound or affected;
 - (g) there are no actions, suits, proceedings, or investigations pending or, to its knowledge, threatened against it at law or in equity before any court or before any other judicial, quasi-judicial or other SMC, the outcome of which may result in the breach of this Agreement or which individually or in the aggregate may result in any material impairment of its ability to perform any of its obligations under this Agreement;

- (h) it has no knowledge of any violation or default with respect to any order, writ, injunction or decree of any court or any legally binding order of any Government Instrumentality which may result in any material adverse effect on its ability to perform its obligations under this Agreement and no fact or circumstance exists which may give rise to such proceedings that would adversely affect the performance of its obligations under this Agreement;
- (i) it has complied with Applicable Laws in all material respects and has not been subject to any fines, penalties, injunctive relief or any other civil or criminal liabilities which in the aggregate have or may have a material adverse effect on its ability to perform its obligations under this Agreement;
- (j) no representation or warranty by it contained herein or in any other document furnished by it to the SMC or to any Government Instrumentality in relation to Applicable Permits contains or will contain any untrue or misleading statement of material fact or omits or will omit to state a material fact necessary to make such representation or warranty not misleading;
- (k) no sums, in cash or kind, have been paid or will be paid, by it or on its behalf, to any person by way of fees, commission or otherwise for securing the contract or entering into this Agreement or for influencing or attempting to influence any officer or employee of the SMC in connection therewith;
- (l) all information provided by the {selected bidder/ members of the Consortium} in response to the Request for Qualification and Request for Proposals or otherwise, is to the best of its knowledge and belief, true and accurate in all material respects; and
- (m) nothing contained in this Agreement shall create any contractual relationship or obligation between the SMC and any Sub-contractors, designers, consultants or agents of the Contractor.

(29) Bank Guarantee (BG)

- 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 (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 (i.e final date of completion of work). 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.

(30) Responsibility of clear Construction and Demolition waste (C.D.Waste)

- It shall be sole responsibility of contractor to clear Construction and Demolition waste (C.D. waste) by their own risk and cost. The contractor shall ensure that their site must be clear in all respect by

disposing C.D Waste generated during the work. If it's found that contractor is irregular and showing negligence to dispose C.D. Waste, than Surat Municipal Corporation is empowered to disposed the said C.D. Waste through Surat Municipal Corporation authorized C.D. Waste Contractor/Agency. All the necessary expenditure made towards disposal of this C.D. Waste shall be recovered from the contractor along with the administration charges and penalties.

(31) UTILITIES AND TREES

- **Existing utilities and roads**

Notwithstanding anything to the contrary contained herein, the Contractor shall ensure that the respective entities owning the existing roads, right of way, level crossings, structures, or utilities on, under or above the Site are enabled by it to keep them in continuous satisfactory use, if necessary, by providing suitable temporary diversions with the SMC of the controlling body of that road, right of way or utility.

- **Shifting of obstructing utilities**

The Contractor shall, in accordance with Applicable Laws and with assistance of the SMC, cause shifting of any utility (including electric lines, water pipes and telephone cables) to an appropriate location or alignment, if such utility or obstruction adversely affects the execution of Works or Maintenance of work in accordance with this Agreement.

- **New utilities**

The Contractor shall allow, subject to such conditions as the SMC may specify, access to, and use of the Site for laying telephone lines, water pipes, electric cables or other public utilities.

The SMC may, by notice, require the Contractor to connect any adjoining road to the Work, and the connecting portion thereof falling within the Site shall be constructed by the Contractor at the SMC's cost which shall be pre negotiated between the parties.

The SMC may by notice require the Contractor to connect, through a paved road, any adjoining service station, hotel, motel or any other public facility or amenity to the Work, whereupon the connecting portion thereof that falls within the Site shall be constructed by the Contractor on payment of the cost. The cost to be paid by the SMC to the Contractor shall be determined by the SMC's Engineer.

In the event the construction of any Works is affected by a new utility or works undertaken, the Contractor shall be entitled to a reasonable Time Extension as determined by the SMC's Engineer.

- **Felling of trees**

The SMC shall assist the Contractor in obtaining the Applicable Permits for felling of trees to be identified by the SMC for this purpose if and only if such trees cause a Material Adverse Effect on the construction or maintenance of the Work. The cost of such felling shall be borne by the SMC. The Parties hereto agree that the felled trees shall be deemed to be

owned by the SMC and shall be disposed in such manner and subject to such conditions as the SMC may in its sole discretion deem appropriate. For the avoidance of doubt, the Parties agree that if any felling of trees hereunder is in a forest area, the Applicable Permit thereof shall be procured by the SMC within the time specified in the Agreement.

(32) Extension of time for completion

- The work shall have to be completed within originally stipulated period as indicated in the contract. Time is essence of contract and failure to adhere to the time of completion shall attract liability for the contractor to pay Liquidated Damages as specified separately. However, it has been agreed between the parties that in event of any variation or change taking place affecting the time of completion, time adjustment shall be made by SMC for which no additional cost (except star rate difference and price escalation) will be payable. Such time extension shall ordinarily be for exceptionally adverse climatic conditions, enforceable shortage in availability of materials or any delay, impediment or prevention caused by or attributable to the SMC.
- If contractor considered himself to be entitled to an extension of time for completion, the contractor shall give engineer a notice within 10 days from the cause justifying such extension indicating the period justified. The engineer of SMC shall evaluate the Time Impact and make an adjustment in time for completion. Such extension, it is reiterated shall not be associated with any compensation.

• Liquidated Damage/Delay Damages

If contractors fails to comply with time for completion the contractor being given notice to make good the time fails to do so to the satisfaction of engineer he shall be liable to pay LD/Delay Damages for the default. The Delay Damages shall be the sum stated in Bidding data which shall be payable for delay for each day that is caused in completion. The total amount of such delay damages shall not exceed the amount named in the contract. It is agreed between the parties that the amount so named and the limit so fixed as compensation is the true and correct estimated damage caused to SMC resulting from extension of time and which otherwise is not subject to any arithmetic computation. These damages shall not release the contractor from its obligation to complete the job or from any duties or responsibilities which he may have under the contract. Moreover SMC does not bind herself to recover the delay damages immediately at the instance of delay. Non recovery of the delay damages instantaneously cannot be construed at anytime as waiver of right of recovery.

(33) Inspection and technical audit by the SMC

- The SMC or any representative authorised by the SMC in this behalf may inspect and review the progress and quality of the construction of Work and issue appropriate directions to the SMC's Engineer and the Contractor for taking remedial action in the event work are not in accordance with the provisions of this Agreement.

(34) External technical audit

- At any time during construction, the SMC may appoint an external technical auditor to conduct an audit of the quality of work. The findings of the audit, to the extent accepted by the SMC, shall be notified to the Contractor and the SMC's Engineer for taking remedial action in accordance with this Agreement. The Contractor shall provide all assistance as may be required by the auditor in the conduct of its audit hereunder. Notwithstanding anything contained in the contract, the external technical audit shall not affect any obligations of the Contractor or the SMC's Engineer under this Agreement.

(35) Inspection of construction records

The SMC shall have the right to inspect the records of the Contractor relating to work.

(36) Monthly progress reports

During the Construction Period, the Contractor shall, no later than 10 (ten) days after the close of each month, furnish to the SMC and the SMC's Engineer a monthly report on progress of work in the format approved by SMC's engineer and shall promptly give such other relevant information as may be required by the SMC's Engineer.

(37) Inspection

- The SMC's Engineer and its authorised representative shall at all reasonable times:
 - (a) have full access to all parts of the Site and to all places from which natural Materials are being obtained for use in work; and
 - (b) during production, manufacture and construction at the Site and at the place of production, be entitled to examine, inspect, measure and test the Materials and workmanship, and to check the progress of manufacture of Materials.
- The Contractor shall give the SMC's Engineer and its authorised agents access, facilities and safety equipment for carrying out their obligations under this Agreement.
- The SMC's Engineer shall submit a monthly inspection report (the "Inspection Report") to the SMC and the Contractor bringing out the results of inspections and the remedial action taken by the Contractor in respect of Defects or deficiencies. For the avoidance of doubt, such inspection or submission of Inspection Report by the SMC's Engineer shall not relieve or absolve the Contractor of its obligations and liabilities under this Agreement in any manner whatsoever.

(38) LAND FOR TEMPORARY USE

- Land for labour camps, storage yards temporary site sheds etc., will be arranged by the Contractor at his own cost. Land for batching plant, casting yard shall be arranged by the contractor at his own cost. The employer may render all possible assistance to the contractor to enable him to obtain such lands as may be required for purposes of completion of this work but no guarantee can be given. Non-availability of Land will

not be considered as a reason for delay in progress.

- On written request from contractor, the SMC may allocate any land belonging to SMC and which is presently not required for concerned department and in that case, token rent at Rs. 10/Sqmt per month + GST will be recovered from the contractor. The contractor shall have to return/ evacuate such land/ plot in original condition as and when needed by SMC within a week from intimation given by SMC. Further contractor shall have to return/ evacuate/ handover such land/ plot within 15 days after completion of the physical project on site or inauguration of the project. If the said land is not returned by the contractor within 15 days after the completion of the project as above then rent at the rate of Rs.15/sqmt. per month +GST instead of Rs.10/sqmt. per month +GST shall be charged/ levied. The contractor shall have to pay all the taxes levied by government/ SMC. No extra payment shall be made for same.

Signature of the Contractor.

**Executive Engineer (Drainage),
Surat Municipal Corporation**

15-B PRICE VARIATION FOR CEMENT & TOR STEEL

The amount payable to the contractor for the work done shall be adjusted for increase or decrease in the rates of cement & steel as under:

The star rates for cement and TOR steel to be brought by the contractor shall be considered at site as per RBI indices.

Cement (OPC) : Rs. 300/- per bag of 50 Kg.
CRS steel : Rs. 38500/- per MT

(The above star rates shall be linked with Whole Sale price Index to be obtain from Office of Economic Adviser Govt. of India. price index for steel (STEEL :- LONG) and cement (Grey Cement) for the month in which the Tender Documents shall be received).

Further, the contractor shall procure cement and steel required for this work. Contractor shall consider basic rate of cement and steel in Surat for the purpose of quoting. Any difference in rates of cement and steel in Surat shall be adjusted in the bills payable to the contractor as per star rate formula as below. Contractor will not be paid for any transport, handling and storage expenses separately and he should quote for the works accordingly. Price variation for cement and steel shall not be applicable to RCC pipe, perforated Jali's and PVC steps, binding wires, MH frames with cover Gabion mesh, etc.

The fluctuations in rates of cement steel and structural steel shall be adjusted in the bills payable to the contractors as under:

$$A = B \times (CI/C0-1) \times D$$

A = Amount payable or recoverable

B = Star rate of steel / cement

CI = The (monthly) average corresponding index for steel, cement for the month in which goods are received at site (date of delivery Challan). Index as published on website of Office of Economic Adviser (OEA).

C0 = Price index of cement/steel for the month in which the tender documents are received, (as published on website of Office of Economic Adviser (OEA)).

D = Quantity of cement/steel actually brought by the contractor on site of work and consumed in the work during the month duly supported with bill as recorded in cement consumption register or MB (for steel).

Conditions for variation in prices of cement and steel only

1. No ceiling for escalation for difference of steel and cement will be applicable.
2. This clause shall be operative from the date of issue of work order and up to the expiry of original and extended time limit.

3. This formula shall be used individually for cement and steel for calculating adjustment.
4. The cement and steel brought by the contractor on site of work shall be used only after the same is tested by the Department at the cost of contractor or after production of test certificate by Manufacturer as desired by the authority.
5. If such materials are not found as per the IS specification, the same shall be removed by the contractor for which no claim shall be entertained.

15-C PRICE ESCALATION CLAUSE

For (a) Labour, (b) Materials, (c) P.O.L (Purchase of Oil & Lubricant)

The amount to be paid / recoverable to the contractor for the work done shall be adjusted for increase or decrease in the rates for labour and materials excepting the cost of those materials supplied by corporation or the cost of those materials on which price escalation / star rate difference is being paid separately.

(a) LABOUR

Increase or decrease in the cost due to labour shall be calculated quarterly in accordance with the following formula.

$$V_i = 0.85 \times (pl/100) \times R_p((L - L_0)/ L_0)$$

V_i = increase or decrease in the cost of work done during the quarter under consideration due to change in rates for labour.

R_p = Value of net work done in rupee during the quarter under consideration after deducting the cost of material on which price escalation / variations or star rate difference is being paid separately and deducting the cost of extra items, whose rates are derived by rate analysis based on market rates and the cost of those materials which are being supplied by Surat Municipal Corporation and full assessed value of secured advance or any advance payment.

L_0 = The average consumer Price index (Whole sale prices) for industrial workers for the quarter in which tenders are received as applicable to Ahmedabad as published by RBI for Consumer Price Index Numbers for Industrial Workers.

L = the average consumer Price index (whole sale prices) for industrial workers for the quarter under consideration as above.

pl = Percentage of labour components of the item = 25

(b) MATERIAL

The increase or decrease in the cost of materials shall be calculated quarterly in accordance with the following formula.

$$V_m = 0.85 \times (P_m/100) \times R_p((I - I_0)/ I_0)$$

Vm= Increase or decrease in the cost of work during the quarter under consideration due to change in rates for material.

Rp = as above

Io = the average whole sale price index (all commodities) as published by Office of Economic Advisor for the quarter in which Tenders are received.

I = the average Whole sale price index (All commodities) as published by Office of Economic Advisor for the quarter under consideration as above.

Pm = Percentage of material components = 70

(C) FUEL

Vd. = $0.85 \times Pd / 100 \times RP (D - Do) / Do$

Vd = Increase or decrease in the cost of work done during the quarter under consideration due to change in the rates of petrol, oil and Lubricants (P.O.L.)

Pd = Percentage of P.O.L., component of the item. = 5.

Rp = as above

D = The average price of high speed diesel for Surat from either IOCL or BPCL or HPCL in the quarter in which tenders are received. (As per details provided by District Civil Supply Office, Surat)

Do = The average price of high speed diesel for Surat from IOCL or BPCL or HPCL for the quarter under consideration as above. (As per details provided by District Civil Supply Office, Surat)

Conditions for Price escalation

i) The Price escalation shall be paid on the work done after one year till the extension of time limit from the date of commencement of the work.

ii) Price escalation clause shall be applicable for the work that is carried out within the stipulated time or approved extension thereof, No claim for price adjustment other than those provided herein shall be entertained.

iii) The percentage of Material, Labour and Fuel for the entire work will be 70, 25 and 05 accordingly.

(iv) "Ceiling limit in respect of percentage for escalation shall be up to 7.5% of the sanctioned tender amount or Total Amount of work done under this tender whichever is less

In short no payment shall be made beyond the ceiling limits in any case.

- (v) If liquidated damages/work delay penalty to be imposed than price escalation for that period shall not be payable.
- (vi) Star Rate difference on cement/reinforcement/bitumen are paid separately, therefore to derive “Rp”, amount deduction shall be done based on basic rate multiply by Quantity of cement /Steel used.
- (vii) Quarter shall be considered as per the Calendar quarter i.e. from Jan. to March , from April to June and so on.

Signature Of The Contractor.

**Executive Engineer (Drainage),
Surat Municipal Corporation**

CIVIL SPECIFICATIONS

GENERAL TECHNICAL SPECIFICATIONS

General ---

1. In the specifications, "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 late edition of the same in force on the date of agreement.
3. In "Mode of Measurement" in the specifications wherever a dispute arises in the absence of specific mention of a particular point or aspect, the provisions on these particular points 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 Meter |
| ii | Areas | ... 0.01 Sq.Mt. |
| iii | Cubic Contents | ... 0.01 Cu.Mt. |

All measurements and calculations shall be in the metric system and calculations done to 2 (two) decimal places, with the third digit of 5 (five) or above being rounded up and below 5 (five) being rounded down

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 practical 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. Height shall be measured from plinth.
8. Up to "floor level" means actual height of floor (Maxi. 4 M) up to 3 Mts. above plinth level.
9. Definite particulars covered in the items of work, though not mentioned or elucidated in it specifications shall be deemed to be included therein.
10. Reference to specifications of materials as made in the detailed specification of the items of works is in the form of a designation

containing the number of the specification of material and prefix 'M' e.g. 'M-5'.

11. Approval to 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.
12. The contract rate of the item of work shall be for the work completed in all respects.
13. No collection of materials shall be made before it is approved by the Engineer-in-charge.
14. Collection of approved materials shall be done at site in a systematic manner. Materials shall be stored in such a manner so as to prevent damage, deterioration or intrusion of foreign matter and to ensure the preservation of their quality and fitness for the work.
15. Materials, if and when rejected by the Engineer-in-charge shall be immediately removed from the site of work.
16. No materials shall be stored prior to, during and after execution of a structure in such a way so as to cause or lead to damage or overloading of the various components of the structure.
17. All works shall be carried out in a workmanship like manner as per the best techniques for the particular item.
18. 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.
19. The mode, procedure and manner of execution shall be such that it does not cause damage or over-loading of the various components of the structure during execution or after completion of the structure.
20. 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.
21. 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.
22. 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 the Government from time to time.
23. 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.
 24. The testing charges of all materials shall be borne by the contractor.
 25. Approval to any of the executed items for the works done 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.
 26. The drawings of all the equipments shall be got approved by S.M.C. prior to dispatch.
 27. ~~For R.C.C. items, the payment shall be made at 96% of the tender rate when the R.C.C. work is executed. The remaining 4% shall be released after receipt of satisfactory results of the tests which are to be carried out at the end of 28 days.~~

Signature of the Contractor

**Executive Engineer (Drainage),
Surat Municipal Corporation.
Surat**

16. SPECIFICATIONS OF MATERIALS

NOTE: Latest versions of all the I.S. codes mentioned below shall be considered.

(A) SPECIFICATIONS OF MATERIALS FOR RETAINING WALL & DIAPHRAGM WALL

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. 269-1976. Any indication of unsoundness, change in time of setting by 30 minutes or more or decrease of more than 10 percent in strength of mortar prepared with water sample when compared with the results obtained with mortar prepared with distilled water shall be sufficient cause for rejection of water under test.
- 1.3 Water for curing mortar, concrete or masonry should not be too acidic or too alkaline. It shall be free of elements which significantly affect the hydration reaction or otherwise interfere with the hardening of mortar or concrete during curing or those which produce objectionable stains or other unsightly deposits on concrete or mortar surfaces.
- 1.4 Hard and bitter water shall not be used for curing.
- 1.5 Portable water shall generally be found suitable for curing mortar or concrete.
- 1.6 Permissible limit for solids:

	Tested as per	Permissible Limit Max.
Organic	IS: 3025	200 mg/lit.
Inorganic	IS: 3025	3000 mg/lit.
Sulphates (as SO ₃)	IS: 3025	400 mg/lit.
Chlorides (as Cl)	IS: 3025	2000 mg/lit. for concrete work not containing embedded steel and 500mg/lit. for pre stressed/reinforced concrete work.
Suspended matter	IS: 3025	2000 mg/lit.

M-3 Fabrication

Gabions shall be manufactured with all components mechanically connected at the production facility. The front, base, back and lid of the gabions shall be woven into a single unit. The ends and diaphragm(s) shall be factory connected to the base. The lid may be a separate piece made of the same type mesh as the basket. All perimeter edges of the mesh forming the basket and top, or lid, shall be selvedge with wire having a larger diameter.

The gabion is divided into cells by means of diaphragms positioned at approximately 1m centres. The diaphragms shall be secured in position to the base so that no additional lacing is necessary at the jobsite.

1 Table 1 – Typical Gabion sizes (10 X 12 -mesh type)

Length, m	Width, m	Height, m	Number of Diaphragms
4.0	1.0	1.0	3
3.0	1.0	1.0	2
2.0	1.0	1.0	1
1.5	1.0	1.0	0
4.0	1.0	0.5	3
3.0	1.0	0.5	2
2.0	1.0	0.5	1

M-4 Stone

The stone for gabions shall be hard, angular to round, durable and of such quality that they shall not disintegrate on exposure to water or weathering during the life of the structure. Gabion rocks shall range between 0.15 m and 0.25 m. The range in sizes shall allow for a variation of 5% oversize and/or 5% undersize rock, provided it is not placed on the gabion exposed surface. The size shall be such that a minimum of three layers of rock must be achieved when filling the gabions of 1m thick.

Naturally occurring rounded stone or quarried stone are acceptable. The stone materials with high specific gravity are preferable since the gravity behaviour of the structure is predominant. To insure the durability of the structure the stone must be weather resistant, non fragile, insoluble and sufficiently hard. The most appropriate size of the stone varies from 1.5 to 2.0 times dimension of the mesh. The stone should be large enough to prevent escape through the mesh.

The sample of the stone to be used should be approved before the work is started.

Delivery, storage and handling

1. Gabion mattresses in collapsible box form should be delivered to site in bundles weighing between 600kg to 800kg.
2. The products should be stored away from the site traffic to avoid the risk of accidental damage and should remain packaged until required.
3. Bundles of gabion mattresses must be handled with due care to avoid damage to the PVC coating.

Method of Measurement

- The payment quantities for excavation shall be determined by the outside limits of the gabion structure. Quantities will be determined from cross sections and the linear distance, and paid for under the appropriate excavation bid items.
- The quantity to be paid for “In place Gabion Mattress” shall be the number of square meters of mattress. Project conditions and material availability will determine the actual size of mattress to be used.

Basis of Payment

Accepted mattress will be paid for at the unit price for each pay item included in the contract.

M-5 SELECTED EARTH:

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. 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.

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-6 CEMENT:

The contractor shall have to procure cement directly from the main producer, which shall confirm I.S.I. The cement so purchased only shall be permitted to be used. The contractor shall provide satisfactory evidence to the Engineer in – charge in support of such purchase.

1) Cement shall conform to as per I.S. 1489 for Portland Pozzolona Cement. The type of cement as to whether it shall be ordinary Rapid Hardening or low Heat cement shall be specified. When no type is specified ordinary Portland cement shall be used.

2) The cement after it is brought on site (store) by the contractor can only be allowed to use after obtaining necessary certificate of the test from Government Laboratory about its suitability for the use on the concerned works. The contractor shall produce/ submit the laboratory test results of cement samples as prescribed in to test version of I.S. 1489. The contractor shall collect the required samples from the cement bags brought on site of work in the presence of Engineer- in –charge or his authorized supervisory staff for the department. Each sample shall be of 15 kg. by weight. The number of sample shall be taken as prescribed in I.S. 1489 or as revised from time to time and test schedule. The contractor shall bear the cost of laboratory test of cement.

3) The cement shall be measured by one bag weighing 50kg for all uses in concrete, mortar and masonry etc. In no case cement shall be measured by the boxes or other means for the proportion of concrete and mortar. The cement shall have to be used as per actual weight and the contractor shall not be entitled for any compensation for loss in weight due to shifting of bags or on account of any reasons.

M-7 FINE AGGREGATE:

Sand shall be of natural river sand having F.M. from 2.11 to 3.37 .for concrete work. Sand shall be clean, well graded, hard durable and strong. It shall be free from any deleterious materials and shall be got approved from E.I.C. before stacking at site. Silt content shall not be more than 3 percentages and shall conform to IS -383. Sand for masonry mortar and plastering work shall only be used after screening through proper number screen. And shall confirm to I.S. - 2116 for masonry mortar and to IS-1526 for plaster work. The grading of the fine aggregate (sand) shall be as per Table-A given below. (IS-383 page no- 11 table-4)

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

M-8 COURSE AGGREGATE:

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.

The aggregate shall generally be cubical in shape. Unless special stones or particular quarries are mentioned, aggregate shall be machine crushed from the best black trap stone as approved by the Engineer – in – charge. Aggregate shall have no deleterious reaction with cement. The size of the coarse aggregate for plain cement concrete shall generally be as per the table given below.

However in case of reinforced cement concretes the maximum limit may be restricted to 6mm. Less than the minimum lateral clear distance between bars or 6mm. less than the cover whichever is smaller.

Grading of Coarse Aggregate:-

The grading of single size or graded coarse aggregate when tested as per Is. 2386 (part-I)

shall be within following limit or subsequent revised I.S.

I. S. Sieve Designation.	Percentage passing for single size aggregate of Normal Size.		
	40mm	20mm	10mm
80mm	-	-	-
63mm	100	-	-
40mm	85-100	100	-
20mm	0-20	85-100	100
16mm	-	-	85-100
12.5mm	-	-	-
10mm	0 - 50	0-20	0-30
4.75mm	-	0- 50	0-50
2.36mm	-	-	-

Note (i). This percentage may be varied somewhat by the Engineer- in-charge, when considered necessary for obtaining better density and strength of concrete. The material shall be tested in field laboratory for its gradation. The material shall also be subjected to tests for flakiness and elongation, abrasion value, soundness, crushing/impact value, and deleterious materials etc as per IS-383. Following are the acceptance limit.

I	Flakiness and elongation.	30% maximum
II	Abrasion value.	50% maximum
III	Soundness.	12% loss with Na ₂ So ₄ and 18% with MgSo ₄ .
IV	Crushing value.	45% for concrete and 30% for wearing surface
V	% of deleterious material.	5%

M-9 PVC PIPE:

P.V.C. Pipe shall confirm to I.S.-4985.PVC Pipe shall be of ISI mark with minimum 4.0 kg/cm² pressure quality.

**BANK GUARANTEE
(FORMATE FOR EMD)**

To,
Commissioner,
Surat Municipal Corporation,
Surat – 395003.

Dear Sir,
GUARANTEE NO. _____
AMOUNT OF GUARANTEE: _____
GUARANTEE COVER FROM:- _____ to _____.
LAST DATE FOR LOGEMENT OF CLAIM:- _____.

This deed to guarantee executed by the Bank of _____,
(hereinafter referred to as “The Bank”) in favour of The Commissioner, Surat Municipal Corporation, Mugalsarai, Surat – 395003. (Hereinafter referred to as “The Beneficiary”) for an amount not exceeding Rs. _____ (Rupees _____) at the request of _____ (name of Bidder), _____ (address) (hereinafter referred to as “The Bidder”). This guarantee is issued subject to the condition that the liability of the Bank under this Guarantee is limited to a maximum of Rs. _____ (Rupees _____). The Guarantee shall remain in full force up to under this Guarantee served on the Bank on or before _____ SUBJECT TO AS AFORSAID, The Commissioner, Surat Municipal Corporation, Mugalisara, Surat – 395003.

Whereas, (Bidder) _____ (hereinafter called “The Bidder”) has submitted his bid Dtd. _____ for Remodelling and Restructuring of Koyli creek including vehicle track in Surat. (Ch. 8000 mt to 9500 mt). against Tender Notice no..ce/drainage/14/ 17-18. (Hereinafter call “The Bid”).

KNOW ALL MEN by these present that we, Bank of _____, _____ (hereinafter called “The Bank”) are bound unto The Commissioner, Surat Municipal Corporation, Surat, (hereinafter called “The Employer”) in the sum of Rs. _____

(Rupees _____) for which payment well and truly to be made to the said Employer, the Bank binds, himself, his successors and assigns by these presents sealed with the common seal of the said Bank this (Date)_____.

THE CONDITIONS OF obligations are:

1. If the Bidder withdraws his Bid during the period of bid validity.
2. If the Bidder, having been notified of the acceptance of his bid by the Employer during the period of bid validity.
 - a) Fails or refuse to execute the Contract Agreement in accordance with tender documents, if required; or
 - b) Fails or refuse to furnish the Performance Security, in accordance with tender documents;

We undertake to pay to the Employer up to above upon receipt of his first written demand, without the Employer having to substantiate his demand, provided that in his demand the Employer will note that the amount claimed by him is due to him owing to the occurrence of one or both of two conditions, specifying the occurred condition or conditions.

This guarantee will remain in full force up to, or as it may be extended by the Employer, notice of which extension (s) to the Bank is hereby waived. Any demand in respect thereof should reach the Bank not later than the above date.

Notwithstanding anything-contained hereinabove our liability under this guarantee is restricted to Rs. _____ (Rupees _____). Our guarantee shall remain in full force until Unless a demand or claim under the guarantee is received by us in writing on or before all your rights under the said guarantee shall be forfeited and we shall be relived and discharged from all liabilities there under.

Date: _____.

Signature of the Witness

17. I. General

This specification shall be supplemented by the technical specification as given here under in this document and also the provision in the relevant IS & MORTH codes.

In case of any discrepancy or contradiction if any in the provision of above specification the order of the precedence shall be followed.

1. IS Provisions
 2. Technical Specification in this Volume
 3. MORTH
 4. Sound Engineering Practice
 5. Manufacture specification for special items
- All work shall be carried out in confirmation with the above specifications. These specifications broadly cover all major aspects of the work involved. Minor details may not be specified here however if these are necessary for completion of work the contractor shall execute such minor items without any additions to the costs.
 - All work shall be executed in accordance with good engineering practices.
 - The Contractor shall remain responsible for workmen's compensation if any, when such case occurs, the contractor shall arrange for red lamps at night and fencing etc. shall be responsible for any damage of life and or property if any happen, during the execution of work. In case of dispute for unseen or overlooked items, the decision of Engineer in charge shall be final. The Contractor shall have to give site clean of all rubbish on completion of work and handover the site with final finishing as directed. All the rejected materials shall be removed from site within 24 hours by Contractor at his risk and cost.
 - The Contractor shall have to make his own arrangement for water required for the work.
 - If in the interest of SMC, it is necessary to change either any site or the design of the proposed work the Contractor shall carry out the works and he will be paid at the rates quoted by him and no claim for extra for subsequent changes made, entertained.
 - The cubical contents of the cement bag shall be taken as per actual weight of bag and the Contractor shall have to prepare the concrete mixes using weigh batches.
 - Contractor will be fully responsible for compliance of the various provisions under Contract Labour Act, 20.70 and the Rules framed there under.
 - Contractor is requested to procure their quarry materials required for construction work through legal sources i.e. only from the quarry lease holders permit holders or middleman who satisfies the contractor as to the legality of the source of purchase by him of these materials.

GENERAL DETAILS

- All work shall be carried out in confirmation with these specifications. In general, provisions of Indian Standard and other national standards shall be followed unless otherwise specified. These specifications are not intended to cover the minor details. The work shall be executed in accordance with best modern practices & all latest codes and standards referred to in these specifications shall be read in conjunction with the various other documents forming the contract, tender specifications, BOQ, contract drawings and other related documents.

Measurement and payments

- a) The methods of measurement and payment shall be as described under various items and in Price Bid. Where specific definitions are not given, the methods described in IS code

will be follow. Should there be any detail of construction of materials which has not been referred to in the specifications or in Price Bid and drawings but the necessity for which may be implied or inferred there from, or which are usual or essential for the completion of the work in the trades, the same shall be deemed to be included in the rates quoted by the contractor in Price Bid.

b) Unacceptable work

All defective works are liable to be demolished, rebuilt and defective materials replaced by the contractor at his own cost. In the event of such works being accepted by carrying out repairs etc. as specified by the engineer in charge, the cost of repairs will be borne by the contractor and will be paid for the works actually carried out by him at reduced rates of the tendered rates, as may be considered reasonable by the engineer in charge, in the preparation of final or on account bills.

II .Applicable Standards for Civil Works

1	Conversion factors	IS:786
2	Method of measurement of building works	IS:1200
3	Code of practice for measurement of civil engineering works	IS:3385
4	Materials and workmanship for earthwork and excavation	IS:1200 (PART I)
5	Safety code for blasting and related drilling operations	IS:4081
6	Safety code for excavation work	IS:3764
7	Moisture content in sand for filling	IS:2720
8	Determination of moisture content	IS:2720 (PART II)
9	Determination of moisture content & dry density relation using light compaction	IS: 2720 (PART VIII)
10	Determination of dry density of soils in-place by the sand replacement method	IS:2720(PART XXVIII)
11	Determination of dry density of soils in-place by the core cutter method	IS:2720 (PART XXIX)
12	Anti termite treatment	IS:6313(PART I TO III)
13	Construction water	IS:456
14	Methods of sampling and test (physical and chemical water used in industry)	IS:3025
15	Ordinary (33 grade)/low heat Portland cement	IS:269
16	Ordinary Portland cement (43 grade)	IS:8112
17	Ordinary Portland cement (53 grade)	IS:12269
18	White Portland cement	IS:8042-E
20.	Portland pozzolana cement	IS:1489
20	Rapid hardening Portland cement	IS:8041, IS:269
21	Portland(blast furnace) slag cement	IS:455
22	Hydrophobic cement	IS:8043
23	High alumina cement	IS:6452
24	Super sulphated cement	IS:6909
25	Oil well cement	IS:8229E
26	Standard for testing of cement	IS:650
27	Methods of physical tests for hydraulic cement	IS:4031
28	Specification for standard sand for testing of cement	IS:650
29	Coarse and fine aggregates for concrete	IS:383, IS:515
30	Gradation of coarse aggregates	IS:383(TABLEII)
31	Gradation of fine aggregates	IS:383 (TABLE III)
32	All-in-aggregates	IS:383 (TABLE IV)
33	Method of tests for aggregates for concrete	IS:2386 (PART I TO VIII)
34	Methods of determination the maximum qty. of deleterious materials in aggregate	IS:2386 (PART II)
35	Limiting values of the maximum quantities of deleterious materials in aggregate	IS:383 (TABLE I)
36	Flakiness index of aggregates	IS:2396 (PART I), IS:5640

37	Moisture content test for aggregates	IS:2386 (PART III)
38	Specification for mild steel and medium tensile steel bars and hard drawn steel wire for concrete reinforcement.	IS:432 (PART I & II)
39	Specification for plain hard drawn steel wire fabric for cement concrete	IS:1566
40	Specification for cold twisted steel bars for concrete reinforcement	IS:1786
41	Specifications for hot rolled mild steel and medium tensile steel deformed bars	IS:1139, IS:1739
42	Code of practice for bending and fixing of bars for concrete reinforcement	IS:2502
43	Mild steel binding wire	IS:280
45	Code of practice for plain and reinforced concrete	IS:456
46	Code of practice for general construction of plain and RCC for dams	IS:457
47	Testing of reinforced cement concrete	IS:516
48	Method of tests for strength of concrete	IS:516
49	Methods of sampling & analysis of concrete	IS:120.9
50	Code of practice for concrete structures for storage of liquids	IS:3370 (PART I TO IV)
51	Code of practice for composite construction	IS:3935
52	Code of practice for construction of reinforced concrete shell roof	IS:2204
53	Criteria for the design of RCC shell structures and folded plates	IS:2210
54	Specification for batch type concrete mixers	IS:1791
55	Specification for portable swing weigh batchers for concrete	IS:2722
56	Specification for roller pan mixer	IS:2438
57	Specification for concrete vibrators immersion type	IS:2505
58	Specification for screed board concrete vibrators	IS:2506
59	Specification for concrete vibrating tables	IS:2514
60	Specification for pan vibrators	IS:3366
61	Specification for form vibrators for concrete	IS:4656
62	Code of practice for use of immersion vibrators for consolidated concrete	IS:3558
63	Air entraining agent	ASTM:6260
64	Criteria for design and construction of precast concrete trusses	IS:3201
65	Pre-stressed concrete	IS:1343
66	Specification for high tensile steel bars used in code of practice for pre-stressed concrete	IS:2090
67	Specification for plain hard drawn steel wire for pre-stressed concrete	IS:1785 (PART I)
68	Specification for plywood for concrete	
69	Shuttering work	IS:4990
70	Code of practice for steel tubular scaffolding	IS:4014 (PART I & II)
71	Specification for steel scaffolding	IS:2750

72	Safety code for scaffolds and ladders	IS:3696
73	Common burnt clay building bricks	IS:1077
74	Classification of burnt clay bricks	IS:3102
75	Burnt clay building bricks, heavy duty	IS:2180
76	Burnt clay facing bricks	IS:2691,IS:1077
77	Method of sampling and testing clay building bricks	IS:3495 (PART I - IV)
78	Mortar for brick work	IS:2250
79	Code of practice for brick work	IS:2221
80	Masonry works	IS:3466
81	Structural safety etc. Of building masonry walls	IS:20.05
82	Load bearing hollow concrete blocks	IS:2185
83	Lime - cement - cinder hollow concrete blocks	IS:5498
84	Lime - cement - cinder solid blocks	IS:3115
85	Code of practice for construction of stone masonry	IS:1597 (PART I)
86	Stone tests	IS:1124
87	Code of practice for design and installation of joints in buildings	IS:3414
88	Joint sealing compound	IS:834
89	Pre-moulded bituminous joint filler	IS:1838
90	Timber door, window and ventilator frames	IS:4021
91	Material & workmanship for wood work	IS:883, IS:4021
92	Wooden flush door shutters (solid core type)	IS:2202 (PART I)
93	Timber panelled and glazed shutters	IS:1003 (PART I & II)
94	Method of tests for wooden flush doors, type tests	IS:4020
95	Plywood & tests	IS:303
96	General tests for wood work	IS:1659
97	Red lead for wood knot	IS:103
98	Oil type wood preservative	IS:218
99	Particle board	IS:3087
100	Hydraulic lime & storage	IS:712
101	General tests for lime	IS:6932 (PART I TO X)
102	Field tests for lime	IS:1624
103	Lime mortar preparation	IS:1625
104	Slacked lime	IS:1639
105	Surkhi	IS:1344
106	Code of practice for application of lime plaster finish	IS:2394
107	Rough cast plaster	IS:1661(CLAUSE-165)
108	Specification for integral cement water proofing compounds	IS:2645
109	Water proofing asphalt/maxphalt	IS:702
110	Bitumen saturated layer	IS:1322
111	Bitumen felt	IS:1322
112	Bitumen	IS:702
113	Code of practice for laying and finishing of cement concrete flooring tiles	IS:1443
114	Material & workmanship for flooring	IS:120.7, IS:1344

115	Code of practice for laying in situ terrazzo floor finish	IS:2114
116	Code of practice for laying in-situ cement concrete flooring	IS:2571
117	Marble chips & marble mosaic terrazzo	IS:2114
118	Plain cement tiles & tests	IS:1237
120.	Marble slab	IS:1130
120	Oxy-chloride	IS:658
121	Magnesium chloride	IS:657
122	C.I. grid tiles	IS:210
123	Pigment for terrazzo flooring	IS:459
124	Rivets	IS:1148
125	Electrodes for welding	IS:814
126	Code of practice for use of electric arc welding for general construction in steel	IS:813
127	Tests for welding works	IS:1181
128	Welding works	IS:816
129	Bolts and nuts	IS:1367
130	Tests for bolts and nuts	IS:1608
131	Structural steel sections & tests	IS:226
132	Structural steel plates	IS:2062
133	Defects in structural steel	IS:229
134	Dimension & properties of steel section	IS:808
135	Structural steel work	IS:226, IS:4948
136	Expanded metal steel sheet	IS:412
137	Mild steel wire gauze jali	IS:280
138	Welding procedure & edge preparation	IS:823
139	Washers	IS:2016
140	Storage of welding wire & electrodes	IS:816
141	Primer to structural surface for bolts	IS:2074
142	Chequered tiles	IS:3502
143	Code of practice for painting of ferrous metal in building and allied finishes	IS:1477 (PART I & II)
144	Code of practice for painting concrete, masonry and plaster surfaces	IS:2395
145	Enamel paints	IS:2933
146	Coat of zinc chromate	IS:104
147	GI sheets	IS:227
148	Ac sheets	IS:459
149	Ac sheet fixing	IS:730
150	Fibre glass reinforced polyester	IS:4154
151	Galvanized steel for barbed wire	IS:278
152	Concrete pipes	IS:458
153	Threads for screwed pipes	IS:554
154	Lead jointing	IS:718
155	Heavy C.I. pipes	IS:1729
156	Concrete mix design	IS:10262

157	Code of practice for construction of floor and roof with joists and filler blocks	IS:6061 (PART I)
158	Code of practice for construction of light weight concrete block masonry	IS:6042
159	Specification for load bearing light weight concrete blocks	IS:3590
160	Code of practice for construction of hollow concrete block masonry	IS:2572
161	Specification for concrete masonry units (hollow and solid concrete blocks)	IS:2185 (PART I)
162	Chemical composition of ordinary Portland cement	IS:4032
163	Sulphate resistant cement	BS:4027 & ASTMC-150 TYPE II
164	Specifications for circular hollow sections	IS:1161
165	Properties of rectangular & square hollow sections	IS:4923
166	Cold formed welded & seamless carbon steel structural tubing	ASTMA 500
167	Cold but not formed welded & seamless carbon steel structural tubing	ASTMA 501
168	Hot formed welded & seamless high strength low alloy tubing	ASTMA 618
169	Hot rolled structural steel hollow section	BS:4848/

1.	Cement (OPC 53 grade Only)	Ambuja, Ultratech, Birla plus ,Sanghi,Binnani
2.	Bricks	As per sample approved
3.	White Cement	Birla, J.K.
4.	TMT – Fe 500 CRS STEEL	SAIL, RINL (VIZAG), Tata, National ,Electro, NRI make only
5.	Structural Rolled Steel sections-beams, channels, tee, flats, angles, bars(round, square, hexagonal)	SAIL, RINL, Jindal, Essar, Tata
6.	Structural Hollow steel sections (Square & Rectangular)	SAIL, Asian, Tata or equivalent as approved.
7.	Structural tubular sections	Tata, SAIL, Asian
8.	Coarse Aggregates 6mm to 40mm sizes	Approved quarry by Engineer in Charge
9.	Stone Rubbles & Gravels	Approved quarry by Engineer in Charge
10.	Shuttering plywood	Kitply, Anchor, Green or equivalent as approved based on performance.
11.	Marine Grade plywood – IS - 710	Green, Kitply, Duro, Century, Anchor or equivalent as approved based on performance.
12.	Construction chemicals	Fosrock, Sika, pidilite or equivalent as approved.
13.	Hardware	Kitch, Dunex, EPPW, Ebco, Palladium, Dorma or equivalent as approved based on performance.
14.	Anchor fastener / bolts	Fischer, Hilti
15.	Adhesives	Fevicol, Kitcol, Araldite, BAL or equivalent as approved.
16.	Polysulphide Sealant	Choksi chemicals, pidilite or equivalent as approved.
17.	Polyurethane Foam Filler	Capcell HD-100 of Supreme or equivalent as approved.
18.	Polyurethane paint	Asian, ICI, Nerolac, MRF or equivalent as approved.

III .List of Approved Make

IV. Ministry Of Road Transport and Highways (MORT&H) Specification for road and bridge works (Fifth Revision (2013))

Section	Title / Clause
100	General
200	Site Clearance
300	Earthwork, Erosion control and drainage
400	sub bases, bases (non bituminous) and shoulders
500	Bases and surface courses (bituminous)
600	Concrete Pavement
700	Geosynthetics
800	Traffic signs, markings and other road appurtenances
900	Quality control for road works
1000	Materials for structures
1100	Pipe foundations
1200	Well foundations
1300	Brick masonry
1400	Stone and concrete block masonry
1500	Formwork
1600	Steel reinforcement
1700	Structural concrete
1800	Pre-stressing
1900	Structural steel
2000	Bearing
2100	Open foundation
2200	Substructure
2300	Concrete superstructure
2400	surface and subsurface geotechnical investigation
2500	River training and protection work
2600	Expansion joint
2700	wearing coat and appurtenances
2800	Repair of structures
2900	pipe culverts
3000	Maintenance of road
3100	reinforced earth
3200	soil nailing

18. Item wish specification .

Item No 1:

Clearing the creek land width including removing the shrubs, bushes, cactus, weeds other vegetation including cutting down trees up to 0.50 cm girth and depositing the removed materials outside the creek land width with all lead and lifts as directed etc complete.

1. Relevant Specifications of MORT&H fifth revision 100,200 etc shall apply to this item.
2. The measurement shall be in Square meter.

Item No 2:

Cutting downs trees of different girths (30cms and higher of periphery) including removing and grubbing roots below ground level within the creek boundary including stacking the wood outside the creek boundary as directed etc complete

1. Relevant Specifications of MORT&H fifth revision shall apply to this item.
2. The measurement shall be in Numbers.

Item No 3:

Carry out complete alignment survey work by total station along creek alignment, cross roads 50m. Both sides, 100m. additional length from both ends of creek including marking of centre line of alignment, taking ground level details of existing structures, details of all manholes, catchpits, existing utility services, light poles, trees, overhead electrical lines, BSNL section pillar/ box, electrical boxes, road dividers, foot paths, etc. within construction area and additional areas/ lengths if required. Rate includes fixing necessary reference pillars, establishing bench mark, establishing foundation layout on ground, including submission longitudinal section, cross section and drawing report of survey work in three hard colour copies with soft copy in CD to Engineer-in-charge. Submission of drawing in hard copy and soft copy. Relevant specifications of MORT&H (Fifth revision) shall be used.

1. Relevant Specifications of MORT&H fifth revision Section – 1100, 2400, 2500 shall apply to this item.
2. The measurement shall be in square meter basis.
3. The rate includes marking of alignment, taking ground level details of existing structures, details of all manholes, catch pits, pipeline, valves, light poles, trees, over head electrical lines, BSNL section pillar/box, Torrent electrical boxes, road dividers, foot paths, etc. within 50 m from centre line and providing, fixing necessary reference pillars, establishing bench mark, establishing foundation layout on ground, including submission longitudinal section, cross section and drawing report of survey work in three hard copies with soft copy in CD to Engineer-in-charge as directed. Submission of drawing including all existing and newly laid U.G. utilities and over ground laid in hard copy and soft copy as per specifications shall be paid in relevant item.

Item No. 4

a) PCC

Dismantling of existing structures like building, compound wall and other structure comprising of masonry, cement concrete, steel work, including tools, plants and scaffolding wherever necessary, sorting the dismantled material, disposal of unserviceable material and stacking the serviceable material with all lifts and leads as directed by engineer in charge.

1. Relevant Specifications of MORT&H fifth revision Section – 200 shall apply to this item.

2. The rate includes tools, plants and scaffolding wherever necessary, sorting the dismantled material, disposal of unserviceable material and stacking the serviceable material with all lifts and leads as directed by engineer in charge.

The measurement shall be in Cum for plain cement concrete.

Item No. 4

b) Brick works

Dismantling of existing structures like building, compound wall and other structure comprising of masonry, cement concrete, steel work, including tools, plants and scaffolding wherever necessary, sorting the dismantled material, disposal of unserviceable material and stacking the serviceable material with all lifts and leads as directed by engineer in charge.

Relevant Specifications shall be followed as per item no. 4.

The measurement shall be in Cum for dismantled brick work.

Item No. 4

c) Existing road surface (any type of road surface) up to required depth

Dismantling of existing structures like building, compound wall and other structure comprising of masonry, cement concrete, steel work, including tools, plants and scaffolding wherever necessary, sorting the dismantled material, disposal of unserviceable material and stacking the serviceable material with all lifts and leads as directed by engineer in charge.

Relevant Specifications shall be followed as per item no. 4.

The rate is based on Sq.mt for any type of road surface up to required depth.

Item No. 4

d) RCC

Dismantling of existing structures like building, compound wall and other structure comprising of masonry, cement concrete, steel work, including tools, plants and scaffolding wherever necessary, sorting the dismantled material, disposal of unserviceable material and stacking the serviceable material with all lifts and leads as directed by engineer in charge.

Relevant Specifications shall be followed as per item no. 4.

The measurement shall be in Cum for dismantled reinforced concrete structure including clearing straightening and cutting of bars and separating them out from RCC

Item No. 4

e) Removing any type of Pipes for sewer and storm water line above 300 mm dia

Dismantling of existing structures like building, compound wall and other structure comprising of masonry, cement concrete, steel work, including tools, plants and scaffolding wherever necessary, sorting the dismantled material, disposal of unserviceable material and stacking the serviceable material with all lifts and leads as directed by engineer in charge.

Relevant Specifications shall be followed as per item no. 4.

The rate is based on Rmt for any type of sewer and storm water line above 300 mm dia.

Item No. 4

f) Removing of any type of Water supply lines of any dia

Dismantling of existing structures like building, compound wall and other structure comprising of masonry, cement concrete, steel work, including tools, plants and scaffolding wherever necessary, sorting the dismantled material, disposal of unserviceable material and stacking the serviceable material with all lifts and leads as directed by engineer in charge.

Relevant Specifications shall be followed as per item no. 4.

The rate is based on Rmt for any type of Water supply lines of any dia.

Item No. 4

g) Structural steel work

Dismantling of existing structures like building, compound wall and other structure comprising of masonry, cement concrete, steel work, including tools, plants and scaffolding wherever necessary, sorting the dismantled material, disposal of unserviceable material and stacking the serviceable material with all lifts and leads as directed by engineer in charge.

Relevant Specifications shall be followed as per item no. 4.

The rate is based on Kg. for Steel work / structures.

Item No 5:

Excavation/De-silting of (creek/streams) as per design profile in all sorts of soils (including wet and slushy condition of soils) including yellow, sandy and gravelly soil sand soft murrum including depositing the excavated stuff in uniform layers in creek banks or in spoil banks or as and where directed all lead and lift including clearing the site, dewatering, dressing the section etc. complete as per MORT&H Specification no. 300 and engineer in charge

1. The relevant specification for excavation for foundation for open foundation given in MORT&H fifth revision Clause-300 shall applicable to this item.
2. The measurement shall be in Cu mt basis.
3. The rate includes shoring, strutting if required, dewatering, as necessary and disposing of the excavated stuff as directed. The mode of payment shall be in per cu.mt. basis.

Item No 6:

Providing temporary Earthen embankment for construction of guide wall in creek in breaking clods, dressing to the design section with all lead and lift and height of embankment as under including dewatering, Rolling, Compaction, removing earth from the creek after construction work is complete to attain original section of creek as per MORT&H Specification no.300 and engineer in charge

1. Relevant Specifications of MORT&H fifth revision Section – 300 shall apply to this item.
The construction of guide bund towards khadi / creek side consists of granular filling and IP (impervious) filling. The quantity of IP filling will be paid as per the rates of granular filling and no separate rate will be payable. The item and rate of guide bund also includes removal and disposing of earthwork carried out and the guide wall with all lift and lead beyond diaphragm wall towards khadi / creek side.

A guide wall on either face of the diaphragm wall shall first be constructed as shown on the drawings.

2. The measurement shall be in Cum

Item No 7:

Excavation for cut off trench / Diaphragm wall 60 cm thick by mechanical equipment or any approved technique in overburden of all kinds of soil coarse and fine sand, pebble, etc. from top of pre trench level to cutoff level excluding boulders, soffit of sides of the trench from collapsing by circulation of bentonite slurry etc. including construction of guide wall from EGL to required depth, complete in all respect with all leads and lifts and contractor's own material as per specification and as directed by Engineer-in-charge.

&

Item No 8:

Providing & Placing M30 Grade concrete for Diaphragm wall by tremie method as per design & specification from tip of diaphragm wall to cut off level (Ready Mix Concrete)

&

Item No 9:

Providing and placing in position reinforcement cage in diaphragm wall with cutting, tying, fixing including cost of binding wire, welding, etc., complete in all respects, etc. complete with all leads and lifts and as per specification and as directed by Engineer-in-charge.

(TMT - CRS) Fe 500

Diaphragm Wall

General

The recommendations of IS: 9556, IS: 4651 and IS: 456 shall be followed in so far as they are applicable to diaphragm wall construction.

The attention of the Contractor is drawn to the fact that in some locations the walls may be close to existing structures and / or within allocation where headroom is limited, and shall take full account of such restrictions.

The Contractor shall pay particular attention to safety aspects of the work, employing barriers and covers as necessary.

Dewatering should be fully foreseen and allowed for while quoting for the item. Contractors are required to device their construction methods based on this and other relevant information about the site of work. Employer will extend full assistance to the successful bidder in ensuring minimum hindrance due to water in the creek / khadi. All preparatory works for easy working shall be carefully planned. Costs of all such works are deemed to have been covered by the quoted rates.

The construction of guide bund towards khadi / creek side consists of granular filling and IP (impervious) filling. The quantity of IP filling will be paid as per the rates of granular filling and no separate rate will be payable. The item and rate of guide bund also includes removal and disposing of earthwork carried out and the guide wall with all lift and lead beyond diaphragm wall towards khadi / creek side.

A guide wall on either face of the diaphragm wall shall first be constructed as shown on the drawings.

Method Statement

The diaphragm wall shall be constructed as per the details shown in the Drawings. Generally, diaphragm wall shall be constructed in 5 meter to 6 meter lengths.

The Contractor shall submit a method statement giving the full details of materials, plant and operations, time cycles of each activity involved in the construction of diaphragm walls. It shall include details of:

- Dimension of walls and lengths of panels;
- Dimensions and details of guide walls;
- The formation of the joints between panels, including sealing the joints;
- The sequence of excavation and concreting of panels;
- The methods of monitoring and checking the stability of neighboring properties, highways, services and other underground structures;
- The methods of monitoring and checking the tolerances associated with the diaphragm wall panels;
- The methods of monitoring and checking the stability of the diaphragm wall trench;
- The mixing, transporting and placing equipment for the bentonite slurry;
- The cleaning and re-use of bentonite slurry;
- The method of disposal of contaminated bentonite slurry; and
- The type, source, chemical and physical properties of the bentonite to be used;

Calculations to show that the density of the bentonite and lowest head of slurry are sufficient to maintain the stability of the trench, in the ground conditions envisaged, to its entire length.

Methods of protection of any adjacent structure and utilities existing close to the trench.

Construction of diaphragm walls shall not commence until the Contractor's proposals have received a 'Notice of No Objection' from the Engineer. Unless otherwise directed by the Employer's Representative, the construction of panels shall be continuous once excavation has commenced from excavation to completion of concreting of the panel. Excavated panels or part panels shall not be left open for more than four hours or at night or during weekends. Special care shall be taken to ensure stability of vertical faces of the excavated trenches against collapse.

Levels of Work

Diaphragm walls shall be concreted to the levels shown on the consented – to drawings.

The top of diaphragm wall is given up to the top of bund and top of bund is kept above the water level. Instead of Breaking/ Chipping / dismantling contaminated concrete, concept of over flowing contaminated concrete of equivalent volume (i.e. 0.45cum, 0.60m width x 0.75m height) is given. The diaphragm wall will be finished at specified level in green stage of concrete only and over flow concrete shall be disposed and laid at a location as specified by the engineer in charge.

Length of Panels

The length of the panels to be concreted shall be defined in the Contractor's method statement and shall be subjected to a 'Notice of No Objection' from the Employer's Representative.

Tolerances

Construction shall be carried out in accordance with the following normal tolerances, unless otherwise defined by the Contractor's drawings or procedures.

i) For straight or other specified profile panels, the minimum clear distance between the faces of the guide walls shall be the specified diaphragm wall thickness plus 25mm, and the maximum distance shall be the specified diaphragm wall thickness plus 50mm. The guide walls shall be propped as necessary, to maintain these tolerances, and the inner guide wall shall be constructed to the line as shown on the drawings. Finished faces of guide walls towards the trench shall be vertical and shall have no ridges or abrupt changes. Variations from straight line or specified profile shall not exceed 25mm in 3m.

The trench face of the guide wall on the side of the trench nearest to the subsequent main excavation shall be vertical to within 1:80. The top edge of this wall face shall not vary from a straight line or the specified profile by more than + 15mm in 3m and shall be without ridges or abrupt irregularities.

ii) The plane of the wall face to be exposed shall be vertical to within a tolerance of 1:80, relative to a vertical line projected from the base of the guide wall. In addition to this tolerance, 75 mm shall be allowed for protuberances resulting from irregularities in the ground excavated beyond the general face of the wall.

iii) The ends of panels shall be vertical to within a tolerance of 1:80.

iv) Where recesses are to be formed by inserts in the wall, they shall be positioned within a vertical tolerance of ± 75 mm, a horizontal tolerance measured along the face of the wall of ± 75 mm, and a horizontal tolerance at right angles to the face of the wall as constructed of ± 75 mm.

v) The tolerance in positioning reinforcement shall be as follows:
Longitudinal tolerance of cage head at the top of the guide wall and measured along the trench: ± 75 mm.

Vertical tolerance at cage head in relation to the top of the guide wall: ± 5 mm.
Lateral tolerance of reinforcement position in the direction across the width of the wall shall be ± 50 mm.

The tolerance in positioning anchored slab bars for structural connections shall be as follows:

Longitudinal tolerance measured along the trench: ± 75 mm. Vertical tolerance: ± 50 mm.

Lateral tolerance in the direction across the width of panel shall be ± 50 mm.

- vi) A minimum cover to main reinforcement of 65 mm shall be maintained.
- vii) Notwithstanding the requirements of this Subsection the tolerances may be aggregated only to the extent that they do not exceed 250 mm.

If, during the general excavation, it is detected that the above stated tolerances have been exceeded, the Contractor shall draw up proposals for remedying or compensating for the defects. The Contractor should review his method statement for all subsequent diaphragm wall construction.

Access

The Contractor shall note the restricted access to portions of the Works and shall satisfy himself that his method of excavation, positioning of equipment, spoil handling, placement of reinforcement cages, stop ends, and concreting can be accommodated within these restrictions.

Adjacent Properties

- i) The Contractor shall be responsible for any damage or movement in adjacent utilities, buildings, highways and underground structures of any type.
- ii) Allowance shall be made for all ancillary treatment and all work necessary to ensure the stability of road works, adjacent structures and underground constructions and utilities.

Reinforcement

Fe500 TMT – CRS bars reinforcement conforming to IS and structural steel sections conforming to IS: 226 shall be used. Structural steel sections shall be inserted into the cage where openings shall be made at subsequent stages. All reinforcement bars and other structural steel section used shall be clean and free from loose mill scales, dust, rust, oils, grease, paint or other coatings which may reduce the bond with concrete. Front and rear of cages shall be marked on Site to identify them during placement, and lifting points and design of lifting lugs shall not cause distortion of the cage. Distance spacers shall be of an approved type, capable of resisting displacement during cage placement within the trench and shall not entrap slurry during cage placement or concreting. The reinforcement shall be adequately fixed to avoid displacement and to maintain the minimum specified cover during concreting. Welding of cold worked high tensile reinforcement bars shall normally not be permitted as a method of splicing cages. If permitted the requirements of IS: 9417 - 1989 shall be adhered to. Welding of hot rolled high tensile steel bars will be permitted provided that a method is used which will not adversely affect the properties of the bars.

Concrete

Trench Cleaning

To lift the spoil at founding level before concreting, trench hole shall be agitated by jetting with fresh drilling mud at a relatively high pressure than that used during boring or air through tremie pipe. The specific gravity of the mud suspension in the vicinity of the bottom of trench shall be determined by using a suitable slurry samples in first few panels and recorded. Concreting shall not be taken up when specific gravity of bottom slurry is more than 1.15 gms per cc.

Before concreting a diaphragm wall panel, the Contractor shall take measures to remove any heavily contaminated bentonite suspension which could impair the free flow of concrete from the tremie pipe. A sample of the bentonite suspension shall be taken from the base of the boring using an approved slurry sampling device and the specific gravity of the sample shall not exceed 1.15 as per standard practice and also as per IS:2911. Placing of concrete shall proceed only with due modification as per consent of the Engineer. Consistency of the mud suspension shall be controlled throughout the boring as well as concreting operations in order to keep the board panel stabilized as well as to avoid concrete getting mixed with the thicker mud suspension.

All reasonable steps shall be taken to prevent the spillage of bentonite suspension on the Site in areas outside the immediate vicinity of boring.

Diaphragm wall concrete shall be of M-30 grade.

Cement

Unless otherwise described in the contract, Ordinary Portland 53 grade cement shall be used.

General

Concrete shall comply with the general requirements. Structural concrete for permanent works shall have minimum cement content as specified shall be used. Where the concrete is being placed by tremie methods, in accordance with IS: 456-2000. Minimum slump of the concrete shall be 150mm and the mix shall flow easily within the tremie pipe and be designed to produce a dense impervious concrete. Concrete mix shall be suitably designed for required slump. Such structural concrete shall have minimum compressive cube strength of 30N/mm² at 28 days and the water: cement ratio of the mix shall not exceed 0.50 or as required by the design.

Lean mix concrete as per IS:456-2000 clauses 5 to 8 shall be employed as backfill above any cut-off level for structural concrete and be taken to the top level of the guide walls.

Stacking and Mixing

The various raw materials for making concrete shall be stacked in separate compartment near batching and mixing plant. The stack piles shall be large enough to last at least for a days' work.

All ingredient viz. Cement, sand, aggregates, bentonite, slurry, admixture etc. shall be mixed in motor driven large size mixture mounted on elevated masonry or concrete platform sufficiently high to suit the site condition. Necessary arrangement for continuous supply of raw materials and delivery of concrete shall be made by the contractor at his own cost.

- The specification for materials shall be as per relevant IS.
- For Mixing ingredient shall be used as per approved mix design.
- Prior approval of the Engineer shall be taken for the concrete mix design seven days before concreting of diaphragm wall is resumed.
- All the ingredients shall be batched as per mix design.

Concrete batching plant, shall be of requisite capacity to maintain the required progress of work. The equipment shall be capable of determining accurately by direct weighing, prescribed amount of the various ingredients viz. Cement, sand, aggregates, admixture, bentonite clay slurry combination of material in the mixer shall give a uniform mix within the prescribed time and discharging the mix without segregation equipment and its operations shall be all times to subject to approval of the Engineer.

The contractor shall provide all the equipments and any other ancillary Equipment, required for checking the performance of measuring and mixing device and shall make tests as and when ordered by the Engineer to his satisfaction. The contractor shall make such adjustment, replace or replacement as may be necessary to meet the requirement of accuracy to the satisfaction of the Engineer.

Conveying

Concrete shall be conveyed from mixing plant to the placing site as rapidly as Practicable by method which prevent segregation and or loss of aggregate normally concrete is conveyed by transit mixer of suitable capacities. Concrete shall be deposited in final position as early as possible, but preferably within 30 minutes of leaving the batching plant. In cases where after mixing when initial set taken place or segregation and or loss ingredient has taken place before placing in final position, such concrete mix shall be rejected and not used in the works.

Concreting

Concreting shall be done by the method known as tremmie method as specified in the relevant Indian Standard Specification. The tremmie shall be lowered up to the bottom of the trench through the slurry column. The pouring of concrete shall be continued till it accumulates in vertical tremmie pipe up to top of

funnel. The tremmie pipe shall be then be raised so as to release the concrete in a single continuous flow. Care shall be taken so that bottom end of tremmie pipe remains immersed at least 1.5m below in concrete during casting.

Prior to placing concrete of any panel the contractor shall ensure that heavily contaminated bentonite slurry which should impair the free flow of concrete from tremmie pipe has not accumulated in the bottom of trench. The contamination of bentonite slurry shall be identified by making sample of slurry as mentioned earlier. Density of sample shall be as per the IS specifications.

The time gap between the first pour successive pour should be so adjusted that there is no setting of concrete in and around the tremie pipe. The tremmie pipe is to be raised intermittently with the help of crane or any other suitable equipment, so that its bottom remains invariably enveloped / embedded in fresh concrete. The concreting shall then be continued till the overflow concrete reaches at least 0.75m over the cut off level of the diaphragm wall, as shown on the drawings.

Once concreting is started it shall be continued without break. The permissible time gap between consecutive shall be so adjusted that no initial setting of concrete takes place before it reaches its final position. During concreting, continuous raising up and removal of pieces of tremie pipes shall be ensured. Any incident of choking of tremmie pipe or any jamming of tremmie pipe should be immediately reported to the Engineer and further actions shall be taken according to the Engineer's instructions

A primary panel shall be excavated and concreted first. The panel ends of primary panel shall be chipped of up and made sufficient rough with the help of semicircular cutter prior to concreting of secondary panel. The contractor shall achieve a perfect joint between two adjacent panels.

Test Cubes

Samples from fresh concrete shall be taken as per IS-1199. The frequency of sampling shall be in accordance with IS 456. One sample consisting of six cubes 15 cm x 15 cm x 15 cm shall be taken.

Test cubes shall be made and tested for each panel constructed. Cubes shall be marked with the wall panel numbers and shall be sub-marked within each panel set to indicate a location within the panel.

The concrete of the panels shall be accepted or rejected in accordance with the criteria given in IS 456 for this purpose based on test results. In case the concrete does not satisfy the criteria for acceptance, the Engineer shall decide as to what further remedial actions are to be taken and the Contractor shall carry out such actions at no extra costs.

Specifications for Bentonite

Bentonite to be used for the work shall conform to the relevant Indian Standard Specifications. It should not have adverse chemical reactions with cement.

Sodium based Bentonite shall be used in preparing Bentonite slurry. The concentrated slurry used shall conform to the requirements. For saline and chemically contaminated ground water condition, the slurry may be suitably processed with chemicals.

Retaining agents and expansive additives may be added in the cement claygrout if required.

Following tests are normally carried out on freshly prepared Bentonite slurry to be used in diaphragm walls:

Type of Test	Method of Test	Permissible Value at 20°C
Density	Mud balance or hydrometer	1.04to1.10g/ml
pH value	PH indicator paper strips	9.5to12
Viscosity	Marsh cone method	30to90seconds
10-minutegelstrength	Shearometeror vane shear apparatus	1.4mto10N/m ²

The relationship between concentration C of Bentonite slurry expressed as percentage by mass and the density γ is given below:

$$\gamma = 1.0 + 0.006C.$$

Note: The above relation is valid for Indian Bentonite and represents an average sample. There may be some variation of bentonite. Laboratory calibration may be prepared for the bentonite samples actually used.

Tests to determine density, viscosity, shear strength and pH value shall be carried out until a consistent working pattern is established, taking into account the mixing process, blending of freshly mixed bentonite slurry with previously used slurry and any process which may be employed to remove impurities from previously used Bentonite slurry.

When results show consistent behaviour the tests for shear strength and pH value may be discontinued and tests required determining density and viscosity need be carried out.

The frequency of testing shall be on panel to panel basis where Bentonite slurry becomes heavily contaminated with fine sand during its first use, and may be on a daily basis where contamination may be slight. In cases where a mechanical process is employed to remove contaminating solids from the slurry, the frequency of slurry testing shall depend on equipment employed.

Prior to placing of concrete in any panel a Bentonite slurry sample shall be taken (that is, about 0.2 m from the trench bottom) and the same shall be tested for density. The density thus determined shall not be greater than 1.15 g/ml to ensure satisfactory placing of concrete. If the slurry is found to have

higher density, the same shall be thinned by feeding in fresh bentonite till the required density is achieved.

Suitable slurry pumps, submersible pumps or air lift shall be used in replacing the contaminated slurry at the bottom of trench by fresh Bentonite slurry.

Bentonite Slurry and Additives

Sodium bentonite powder shall be mixed thoroughly with potable water to form fully dispersed lump-free homogenous slurry. Suitable slurry tanks shall be used for this operation. The use of a slurry pump with special nozzle is suggested for preparing bentonite slurry. Use of paddle stirrer or other mechanical devices such as colloidal grout mixer, may also be made for proper mixing of slurry. The temperature of water used and of the slurry used shall not be less than 50 C.

Where saline or chemically contaminated ground water is present, special additives as listed below may be used to render bentonite slurry fit for use. These additives are used in very small amount of 0.1 to 0.5 % by mass of the slurry.

Sodium Carbox Methyl Cellulose (SCMC) is yet another additive sometimes used. It protects slurry against effects of electrolytes, accelerates filter cake formation, and reduces fluid loss by increasing the viscosity of slurry.

Cement contamination may be counteracted by phosphates. The calcium gets remove and clay solids dispersed. Phosphates decrease pH value thereby lowering viscosity and yield value of slurry.

Carboxyl methyl cellulose, gums or pre sheared asbesties may be used to increase viscosity and reduce filter loss.

To remove fine silty solids and clay solids from the slurry, flocculants may be used. Vinyl acetate malice anhydride co-polymer or polycrylamides may be used. Guar gum can flocculate clays, carbonates, etc.

Pre gelatinised starch may be employed as a fluid loss control. It may also be used as a protective colloid against the effect of electrolytes.

Storage of Bentonite

Bentonite shall be stored in dry cool conditions. Particular care shall be taken with bulk storage to prevent balling together of bentonite powder due to damp, or deterioration of properties due to damp and heat. A suitable design of hopper cone and bentonite feeding device shall be adopted. IS: 4082 -1996 shall be used for guidance regarding stacking and storage of construction materials and components at site.

Placing Concrete by Tremie

Tremie pipes shall be clean, watertight and with a minimum internal diameter of 250mm. The tremie tube shall extend to the bottom of the trench excavation prior to concreting and care shall be taken to ensure that all bentonite slurry is expelled from the pipe during the initial charging operation. The tremie pipe

shall be maintained with a minimum embedment of 1.5m into the concrete to prevent the re-entry of slurry into the pipe. The Contractor shall ensure that an adequate supply of concrete to the tremie is available at all times so that placement is continuous until completion of the panel. The number of tremie pipes per panel shall be in accordance with the method statement. Where more than one tremie pipe is employed during concrete pouring to any one panel, the charging of concrete into the pipes shall be arranged so that it is evenly distributed between the pipes and so that no differential head exists at the concrete/slurry interface over the length of the panel. This level shall be confirmed by soundings taken during the concrete pour.

Stop Ends

Stop ends, inserted before placement of concrete in the panel, shall be clean and have a smooth regular surface. Any shutter release agent shall have no detrimental effect on the finished works. Where stop ends are inserted in sections, adequate joint connections must be provided to ensure verticality of the complete tube. The stop ends arrangement shall be got approved from the client prior to starting of work. Effective shear transfer will be the essence of the construction of the diaphragm wall.

The extraction of stop ends shall be carried out at such a time and in such a manner that no damage is caused to the concrete placed against them, or to the adjacent soil and structures

Inserts

Inserts shall be formed at the locations shown in the Contractor's drawings and in accordance with his method statements and procedures.

Checking and Monitoring

The Contractor shall provide all necessary monitoring instrumentation necessary for the close and continuous checking of the movements of adjacent structures, services and underground constructions.

Safety and Emergency Procedures

The Contractor shall take all necessary precautions to ensure stability of his excavations and guide walls and shall take all necessary precautions and be responsible for the safety of personnel in the area of operation. He shall maintain, available for immediate use, a sufficient quantity of slurry to allow for any sudden loss.

Should the loss continue despite the addition of the slurry and the stability of the trench be placed at risk, the Contractor shall backfill with lean mix concrete to preserve the stability of the trench and ensure the safety of neighboring structures and utility services.

Site Cleanliness

The Contractor shall ensure that the Site is cleared of slurry and that surplus or displaced slurry is disposed of safely and without nuisance. All operations

shall be conducted in such a manner as to minimise any spillage of slurry over the Site, or accesses thereto.

Joints

The joints of permanent work shall be water tight. Where concrete is cast against previously completed wall panels, the previously formed concrete shall be cleaned so that solid substances are removed before the joint is formed. When the joint is exposed upon subsequent excavation, the Contractor shall immediately repair any joints that permit jetting or spraying of water or within which solid foreign substances greater than 3mm separate the concrete in adjacent panels. The walls formed shall be substantially watertight, that is, free from running or percolating water.

Records

The following records shall be maintained and kept for each wall panel and such records shall be available for inspection by the Engineer.

- i) Name of work
- ii) Panel No and reference drawing no
- iii) Date and time of start and finish of panel excavation;
- iv) Details of any obstructions encountered; time spent and construction method adopted in overcoming such obstructions.
- v) Date and time of completion of cage placement;
- vi) Date and time of start and completion of panel concreting;
- vii) Length of panel and width and depth of panel from top of guide wall level;
- viii) Top of guide wall level and densities;
- ix) Top level of wall as cast, in relation to top of guide wall at the edges and at the centre.
- x) A log of soil type encountered from start to finish of excavation, and of slurry levels and densities;
- xi) Volume of concrete used and time of any interruptions in concrete supply where these exceed 15 minutes. Volumes of normal and lean mix concrete;
- xii) Cut-off level of concrete below top of guide wall level;
- xiii) Date, place and time of slurry control tests and results recorded;
- xiv) Concrete test cubes, w/c ratio, slump markings, date and results obtained on testing;
- xv) Details of reinforcement and cage type;
- xvi) Quantity of slurry removed from Site and spoil removed from Site recorded by date;
- xvii) A graph of theoretical and placed concrete volumes with depth.

Stages of diaphragm wall construction

Generally cast-in-situ structural RCC diaphragm wall shall be constructed by resorting to alternate panel method. In alternate panel method, primary panels

shall be cast, first leaving suitable gaps in between. Secondary panels shall then be cast, resulting in a continuous diaphragm. However contractor may adopt other two alternative methods as mentioned below with prior approval of the Engineer.

Alternate Panel Method

In this method primary panels shall be cast first leaving suitable gaps in between. Secondary panels shall then be cast in these gaps. Two stop end tubes are used at the ends of the primary panels to support concrete and to form suitable joints with the secondary panels.

The excavated length of trench for secondary panel may be smaller than that of primary panel.

The shape of the secondary panel end shall be such as to form a good joint with primary panels.

Excavation of each trench panel shall be done with the help of suitable machinery. The trench panel shall be kept filled with bentonite slurry of suitable consistency and viscosity as during the excavation period.

A stop end tube with a smooth surface or a structural section shall be inserted in the trench at the end of panel to support concrete and to form a suitable joint with next panel.

Reinforcement cage shall then be lowered in the trench panel and suitably supported. The complete cover for the reinforcement shall be maintained by the use of spacers. Boxes or inserts for formation of recesses or for ground anchors shall be lowered along with the cage to correct position and levels.

Before placing concrete in the panel the trench shall be flushed properly to clean bottom and to remove thicker suspension from the lower level. The density of the slurry shall be checked by taking a sample about 0.2 m from the bottom. If the density of the sample is found to exceed 1.25 g/ml. The flushing shall be carried out with fresh bentonite slurry, concreting in the trench panel shall be done through one or more tremmie pipe with suitable funnels.

The end tube shall be taken out gradually after initial set of concrete. This may be done carefully with the help of a suitable crane or any other lifting device. Withdrawal of end tube should not cause any cracks in concrete at the panel end.

Direct Circulation Method

This method is used with rotary percussion type rigs where drilling fluid (bentonite slurry) is pumped through the drilling rods. It can be used alternate panel construction. Simple trenching rigs for excavation may be used. Special cutters (for cutting and jointing) and elliptical concreting tremmie pipes for backfilling the trench panel may be used.

The trench panel may be excavated in the ground by making overlapping bore holes with bentonite slurry-jet in combination with percussion and to and fro rotary motion of jetting pipe having a suitable cutter at the tip.

A special semicircular cutter shall be used for providing appropriate shape at each panel end to form a suitable joint.

The elliptical or oblong tremmie pipe shall be used for concrete having aggregate of 20mm and smaller. This shall be used for walls of 20 to 30 cm thickness. For walls of greater thickness, a circular tremmie pipe may be used. The operation of filling bentonite slurry in the trench and lowering of reinforcement cage into the trench panel.

For thicker walls, that is, 40 cm and more, suitable modified semicircular jointing cutter may be used.

This method is suitable for shallow depths and bringing up lighter cuttings.

Reverse Circulation Method

The reverse circulation method within percussion shall be used to make trench panel in the ground.

Forward and backward movement of the rig from one end of the panel to the other end shall increase the depth of the panel in zigzag manner.

High capacity pumps shall be used to suck the loosened soil in the slurry filled trench, Separators or sedimentation tanks shall be used to retain the soil cutting and to pass the slurry for circulation and reuse.

This method is suitable for greater depths and to bring up heavier cuttings.

Guide Walls

The RCC guide walls shall be constructed as per the dimensions and with reinforcement as shown in the drawing. The grade of guide wall concrete shall be approved by the Engineer.

Guide walls shall be constructed prior to main slurry trenching operation.

Guide walls shall be 100 mm thick and of appropriate depth and made of lightly reinforced concrete, and shall represent the reference lines.

The clearance between finished diaphragm wall and guide may be 50mm minimum for straight panels. The clearance shall be suitably increased when the panels are curved.

The finished faces of the guide walls towards the trench shall be vertical.

Guide walls after construction should be suitably propped to maintain specified tolerance. Mesh or cage reinforcement is proposed in guide walls.

The level of bentonite slurry in the trench shall be 1 m.

Guide walls get support form adjoining panels and therefore, their construction should be done continuously.

Measurements and Rates for Payment

1. The diaphragm wall excavation shall be measured on square metre basis and drawing dimensions shall be adopted for measurement purposes.

2. the concreting work for Diaphragm wall shall be measured in cum. Any excess concrete consumed due to pockets, side collapse, excess overflow etc. shall not be payable. Height up to the designed cut off level shall be taken for arriving at the payable volumes.
3. If the trench excavation is done deeper than the designed or specified depth, the diaphragm wall shall be done to such depths but payment for diaphragm wall and reinforcement shall be made restricting to the specified depth only and corresponding steel reinforcement. It shall be ensured that before lowering the reinforcement cage the excavation is done to the required depth so that there is no shortfall in the penetration of diaphragm wall below designed level of excavation.
4. The concreting of the diaphragm wall shall continue up to a height of more than 0.75 metre over designed cut off level. Concrete above cut off level shall not be payable.
5. The rates quoted by the contractor shall include the cost of all inputs of materials, labour, machineries, tools and plants involved in the operations including cost of providing guide walls and reinforcement for guide wall, boring, bentonite slurry, dewatering costs at any stage of the work, concreting etc.

Item No 10:

Providing and laying M-15 plain ordinary Portland cement concrete of various grade with cement, sand, and coarse aggregates including centering, shuttering, batching, mixing, transporting, placing, vibrating, smooth finishing, curing complete including Dewatering and MORT&H Specification no. 1700

The relevant specifications for machine mixed Plain Cement Concrete M15 is as per MORT&H specification no-1500 & 1700 for plain cement concrete shall apply to this item.

The measurement shall be in Cum.

The rate includes tamping, vibrating, leveling and curing complete with all formwork, dewatering wherever required including all materials, labours, plants, machineries & tools, all leads and lifts, etc. complete as per specification.

Item No 11:

Providing and laying of cement concrete of R.C.C. M30 grade as per the specifications for RCC retaining wall as per drawing and MORT&H Specification no.1500, 1700, 2300 as directed by the Engineer. Rate shall include cost of form work but exclude cost of reinforcement

The relevant specifications given for machine mixed Reinforced cement concrete for M30 grade as per Section -1500, 1700 & 2300 of MORT&H fifth revision specification shall be used.

The measurement shall be per Cum basis.

The rate includes tamping, vibrating, leveling and curing complete with all formwork, dewatering wherever required including all materials, labours, plants, machineries & tools, all leads and lifts, etc. complete as per specification.

Item No 12:

Providing and placing in position FE 500 TMT CRS Bar Reinforcement as per I.S. Standard for R.C.C Raft, Piers, Abutments, Retaining wall, Top Slab, Kerb, Approach Slab, Cutoff, Foot path including cutting bending hooking and tying complete as per detailed drawing and MORT&H Specification no. 1600

The relevant specifications as per Section-1600 of MORT&H fifth revision specification shall apply to this item.

The rates includes for supply, loading, unloading, transporting to site, cutting, bending, hooking, placing, tying in position with contractor's own 18 swg GI binding wire, welding, forming the cage and lowering it in position etc. Welding and supporting in position to ensure lines and levels during concreting, maintaining proper cover/ spacing, all leads & lifts, etc. including contractor's own equipment, labour, supervisor, taxes, machineries, etc. complete as per drawings and specification.

Item No. 13

Empty boring to the required depth (measured from bottom of pile cap to founding level) by means of hydraulic pilling rig through all strata like soil, sand, clay, murrum, gravel, pebble, boulder, cobble, soft rock, etc. for pile of diameter as below, supported with the help of bentonite slurry including all required plant & machineries, disposal of excavated material with all leads & lifts, mobilization demobilization, remobilization if required, transportation of required plant and machineries, etc. Method of boring shall be as per IS 2911-Part 1 - Section -II.

- 1) Length of pile shall be measured from bottom of pile cap and up to the founding level.
- 2) Rate is inclusive of empty boring through overburden (i.e. temporary working platform, etc.)

1. MORT&H fifth revision specifications as in section 1100 shall be followed in connection with this item. All relevant provisions as have been included in the respective IRC and IS specifications are also applicable.

2. Measurement shall be in running meter.

3. The rate shall include all required plant & machineries, disposal of excavated material with all leads & lifts, mobilization demobilization, remobilization if required, transportation of required plant and machineries, etc. Method of boring shall be as per IS 2911-Part 1 - Section -II.

ITEM NO: 14

Supplying, fabricating and placing in position MS liner made of 6 mm thick MS plate for initial length of cast-in-situ concrete piles including all operation such as straightening, cutting, bending to shape, welding, fabricating, driving, placing in position, applying 2 coats of primer and 2 coats of anticorrosive paint etc. complete as per specification excluding temporary liner if provided. Depth of liner shall be decided by Engineer-in-charge as per site condition.

1. The relevant specifications as per RDSO Specification & as per relevant MORT&H Section 1100 fifth revision specification shall apply to this item.

2. The measurement shall be in MT basis.

3. The rate includes all operation such as straightening, cutting, bending to shape, welding, fabricating, driving, placing in position, applying protective coating, etc. complete as per specification excluding temporary liner if

provided. Depth of liner shall be decided by Engineer-in-charge as per site condition.

ITEM NO: 15

Providing and placing with tremie reinforced cement concrete M35 grade in Pile using 6 mm to 20 mm machine crushed well graded stone aggregate, natural or crushed sand of approved quality, OPC 43/53 grade cement with contractor's own concrete mix design as approved by EIC, including necessary , mixing in fully automatic batch mix plant, transport, curing, casting of pile minimum 1 x dia. of pile above cut off level with all leads & lifts, etc. complete as per execution drawing & specification & as directed by engineer In charge. Including mobilization, demobilization, remobilization, transportation of required plant and machineries if required.

1) Excluding reinforcement, initial pile load test, routine load test and M.S. Liners but including temporary liners if required.

2) Rate is inclusive of 10% additional cement to be added over & above the quantity of cement required for design mix M-35 concrete for pile concreting in water.

1. The relevant MORTH fifth revision specifications shall be followed.
2. The measurement shall be in cum basis.
3. The rate includes necessary , mixing in fully automatic batch mix plant, transport, curing, casting of pile minimum 1 x dia. of pile above cut off level with all leads & lifts, etc. complete as per execution drawing & specification & as directed by engineer in charge. Including mobilization, demobilization, remobilization, transportation of required plant and machineries if required.
4. The rate is Excluding reinforcement, initial pile load test, routine load test and M.S. Liners but including temporary liners if required.
5. The Rate is inclusive of 10% additional cement to be added over & above the quantity of cement required for design mix M-35 concrete for pile concreting in water.

ITEM NO: 16

Chipping and dressing of the RCC piles up to cut off level (Mini. 1 x dia.) including cleaning of reinforcement and removal of dismantled materials etc. for providing pile caps as directed by Engineer and as per specifications.

1. The relevant specification for chipping and dressing of the RCC piles up to cut off level is as per IS 2911 Part-I section-II for all diameters of pile.
2. The measurement shall be in Rmt. basis.
3. The rate includes cleaning of reinforcement and removal of dismantled materials etc. for providing pile caps as directed by Engineer and as per specifications.

ITEM NO: 17

Providing and placing the reinforcement in designed position, fixing, lowering in position TMT bars Fe 500 D grade conforming to IS 1786 for Pile of all categories & depth, at all levels. The rates includes for supply, loading, unloading, transporting to site, cutting, bending, hooking, placing, tying in position with contractor's own black annealed binding

wire, welding, forming the cage and lowering it in position in pile bore etc. Welding and supporting in position to ensure lines and levels during concreting, maintaining proper cover / spacing, all leads & lifts, etc. including contractor's own equipment, labour, supervisor, taxes, machineries, etc. complete as per drawings and specification.

- 1) The waste cut pieces shall not be included in the paying quantity.
- 2) Black annealed binding wire shall not be included in the paying quantity.
- 3) The work shall be done as per execution drawing.

19.

1. The relevant specification 1600 of MORT&H fifth revision shall apply to this item.
2. The measurement shall be in Qtl basis.
3. The rate includes for supply, loading, unloading, transporting to site, cutting, bending, hooking, placing, tying in position with contractor's own black annealed binding wire, welding, forming the cage and lowering it in position in pile bore etc. Welding and supporting in position to ensure lines and levels during concreting, maintaining proper cover / spacing, all leads & lifts, etc. including contractor's own equipment, labour, supervisor, taxes, machineries, etc. Complete as per drawings and specification.

ITEM NO: 18

Pile Load test

a) Carrying out load test as per standard procedure laid down in the IS 2911 specification and maintaining complete records of load v/s settlement on test pile constructed for the purpose including erection and removal of loading platform with all contractor's materials, labour, tools & plants, etc. complete with all necessary instrumentation, high capacity hydraulic jacks, etc. complete as per specification and for the test load as directed by Engineer-in-charge. 1) Load test shall be continued till test load or soil failure whichever is earlier. 2) Testing shall be carried out with loading frame with ground anchors/anchor piles/kentledge with platform including all necessary arrangement required for the test, as approved by Engineer-in-charge. 3) Boring, concreting & reinforcement of test pile shall be measured separately in respective items subject to successful completion of test. 4) If load test of pile is not completed successfully, payment shall not be made for this test item as well as boring, concreting and reinforcement of test pile for which test carried out and another test pile shall be constructed.

a) Initial Pile Load Test on piles in non-working area in the vicinity of the bridge site excluding cost of test pile.

b) Routine Pile Load Test on piles on working pile.

20.

1. The relevant specifications given in IS-2911 for carrying out load test as per mentioned in this item shall apply to this item.
2. The measurement shall be Nos. of tested piles.
3. The rate includes erection and removal of loading platform with all contractor's materials, labour, tools & plants, etc. complete with all necessary instrumentation, high capacity hydraulic jacks, etc. complete as per specification and for the test load as directed by Engineer-in-charge.

ITEM NO: 19

Performing Integrity Test (low strain) on all vertical pile. The item shall include chipping of weak concrete at the top of pile, leveling, bending of reinforcing bars, preparation of pile head including testing with pile driving analyser or approved equivalent. To be carried out at least 15 days after concreting of piles. A specialist approved Agency shall be employed by the Contractor for the test. The test shall be carried out as per relevant ASTM code. The item is including complete testing with approved apparatus, analysis of results and conclusions including submission of test reports in three hard copies with soft copy in CD.

21.

1. The relevant specifications for pile testing as given for piling work shall apply to this.
2. Low strain pile integrity testing on RC bored foundation piles using pile integrity tester equipment manufactured by pile dynamics inc. of USA or TNO of Netherland or equivalent that confirms to ASTM D5882 shall be conducted
3. Test shall be conducted by experienced independent test agency.
4. The measurement shall be per number of load test on piles.
5. The rate includes cost of materials, labour, plants and equipment's etc. required for carrying each load test.

Item No 20

Providing and fixing in position 100mm dia PVC pipe weep holes in abutment, wing wall, and laying trimming etc complete

Specification shall be followed as per Morth 5th revision.

Weep holes shall be provided in solid plain concrete/ reinforced concrete abutment, wing wall and return walls etc as shown on the drawing or directed by the Engineer to drive moisture from the back filling. Weep holes shall be provided with 100 mm dia PVC pipe for structures in plain/reinforced concrete or brick masonry. Weep holes shall extend through the full width of concrete/ masonry with slope of about 1 vertical: 20 horizontal towards the draining face. The spacing of weep holes shall generally be 1m in either direction or as shown in the drawing with the lowest at about 150 mm above the low water level or ground level whichever is higher or as directed by the Engineer. Weep hole shall be filled with no fine concrete as per specifications.

The measurement of the item shall be in running meter.

Item No 21:

Providing and fixing in position PVC water stop with expansion joint as shown in drawing including filling the joints with asphalt pad or cork board of approved make and quality as per technical specification and engineer in charge (225 mm wide PVC water stop)

General

(a) Polyvinyl chloride (PVC) water stops shall normally have a centre bulb of 12.5 mm inside diameter and 25 mm outside diameter. It shall be 225 mm in width and shall have minimum of two or three longitudinal ribs on each side of the bulb evenly distributed between the bulb and the edge of the water stops. Each rib shall be 6.33 mm high and the rib adjacent to the centre bulb shall have web thickness 12.5 mm and the rib adjacent to the edge shall have a web thickness of 10 mm. For this purpose, the contractor shall submit to the Engineer-in charge, for approval, four sets of drawings showing details of the water stops, including dimensions, shapes and details of intersections and splices between water stops of the same size and of different sizes. Fabrication and procurement of materials shall be made only after the approval of the drawings by the Engineer -in-charge. Any fabrication or procurement of materials performed prior to approval of the drawings shall be at the Contractor's risk.

The Engineer-in-charge shall have the right to ask the contractor to make any changes in the

drawings, which may be necessary to make the finished installation conforming to the requirements and intent of these specifications without additional cost to the Corporation. Approval by the Engineer -in charge to the Contractor's drawings shall not re leave the contractor of his obligation to meet all the requirements at these specifications or of the responsibility for the correctness of the Contractor's drawings.

(b) One set of the above drawings will be returned to the Contractor either approved, disapproved, or conditionally approved and these shall be resubmitted for approval, if so directed.

(c) The water stops shall be dense, homogeneous and free from holes and other imperfections. The water stops shall meet the material and test requirements given hereinafter. The cross section of the water stops shall be uniform along its length and the thickness shall be symmetrical transversely. Tolerance for the dimensions given above shall be plus 5 mm in width, plus 2 mm in thickness and plus 1 mm for other dimensions.

(d) Certified copies of the laboratory test reports on the physical properties of the PVC water stops and a certificate stating that PVC water stops as furnished meeting with all other requirements of those specifications, be obtained by the Contractor from the manufacturer of the PVC water stops shall submit to the Engineer-in-charge with the test report of the PVC water stop carried out by the Contractor. Three samples of PVC water stops of 25 to 30 cm length shall be obtained by the Contractor from the supplier and shall be submitted to the Engineer-in-charge. These samples shall be furnished at least 60 days prior to embedment of any water stops in the structure.

MODE OF MEASUREMENT AND PAYMENT:

The item shall be measured and paid on running meter basis as laid.

Item No 22:

Providing, laying and fixing compressible fibre board sill flextype (Supreme industries or Equivalent make) 25mm thick in expansion joint as per technical specification and engineer in charge

Joint filler material of sill flex (supreme industries make) is only permitted. It shall be 25 mm less in depth than the thickness of the slab within a tolerance of 63 mm and provided to the full width between the side forms. It shall be in suitable lengths which shall not be less than one lane width. Holes to accommodate dowel bars shall be accurately bored or punched out to give a sliding fit in the dowel bars.

MODE OF MEASUREMENT AND PAYMENT:

The item shall be measured and paid on Square meter basis as laid.

Item No 23:

Strip Seal Expansion Joint

Providing and laying of a strip seal expansion joint catering to maximum horizontal movement up to 75 mm, complete as per approved drawings and standard specifications to be installed by the manufacturer / supplier or their authorized representative ensuring compliance to the manufacturer's instructions for installation.

The relevant specifications for providing and fixing in position Strip Seal Type Expansion Joint (of approved make) is as per Clause- 2600, 2607 of MORT&H shall apply to this item.

The measurement shall be in Rmt basis.

The rate is inclusive of supplying, fixing with contractor's own materials, equipments, machineries, labour, transport, testing, bolts, socket tubes, neoprene sheet/cap etc. complete. The rate is finished item complete and will be paid after fixing in all respect.

Item No. 24

Providing and fixing 100 mm dia. G.I. Drainage spouts, a including grating with suitable clean out fixtures including all leads and lifts etc. complete as per specification, design & drawings and as directed by Engineer.

(A) Galvanized Iron

MORT&H Specification no 2705 shall apply to these and Material for the water spout shall be as mentioned in the item and shall be got approved from the Engineer-in-charge.

Water spout shall be 100 mm internal dia G.I. rating shall be provided at the entry and shall be fixed in the recess so as to be flush with the road surface. The quality and size of the grating shall be got approved for the Engineer-in-charge. The water spouts shall project at-least 10 cm. outside the concrete and shall be rigidly fixed in it. The grating and C.I. pipes shall be painted with two coats of anticorrosive black bitumen paint.

Measurement shall be per number of water spout fixed.

Unit rate includes cost of all materials, labour and tools to complete the work.

Item No 25:

Providing & applying Coal Tar Epoxy of approved make like Dr. Fixit (Pidilite), Fosroc, clean coats, Sika, two component epoxy coating in two coats as per the mixing and application procedure suggested by manufacturer on the concrete surfaces. Coverage recommended is 3.0 – 4.0 m² per ltr for two coat application at the coverage rate of approx. 250 - 300 micron DFT.

1. GENERAL

INTENT

This Section covers the Work of chemically resistant coating to the surfaces of the RCC retaining wall / Diaphragm wall.

APPLICATOR

Ensure that all Work is done by a competent applicator licensed and/or approved by the chemically resistant coating material manufacturer. Submit the manufacturer's certification of this approval.

GUARANTEE

Furnish a written guarantee covering the materials and workmanship for a period of 5 years from the date of acceptance of the Work, and be responsible for making good, at your expense, any and all defects due to the failure of the coating materials or workmanship.

Provide completely corrosion resistant work with no leakage through or around the coating.

SUBMITTALS

Submit the proposed materials, schedule of applications and the manufacturer's literature for the materials and the recommended methods of application.

Submit sketches showing standard and special details for the corrosion protection. Submit the manufacturer's approval of the applicator.

Immediately prior to commencing Work in each Area, submit a letter of acceptance for the wall surfaces to be coated, signed by the applicator's authorized representative. Upon acceptance, submit a written guarantee.

2. PRODUCTS

Coating for Application on RCC Retaining wall/ peir surface

System Design – Epoxy Tar Based Coating

The coating shall be corrosion resistant coal tar epoxy coating with minimum of 50% solids content. The dry film thickness shall not be less than 300microns per coat and should be applied in minimum two (2) coats. The cured film shall be tough and abrasion resistant.

The Contractor must follow the manufacturer's guidelines for the preparation of surfaces, for mixing and application of coating.

3. EXECUTION

a. General

Deliver materials to job site in factory sealed containers with manufacturer's identification on each package.

The Contractor shall store the materials to protect them from damage.

b. Surface Preparation and Inspection

Clean surfaces of deleterious material in accordance with the manufacturer's recommended practice.

Prepare surfaces to be coated in accordance with manufacturer's instructions.

Verify the surfaces are dry. (ASTM D4263)

Have the coating manufacturer's authorized agent inspect surfaces to be coated and certify in writing to the Engineer-in-Charge that the surfaces are acceptable for the application of the coating. Do not apply the coating until written certification is received by the Engineer-in-Charge.

c. Concrete Repairs

Chip out damaged concrete to sound concrete.

Repair rebar if damaged.

Clean concrete surfaces, dampen and hand place patching concrete in accordance with the pipe manufacturer's recommended practice. Wet cure immediately and as recommended by the manufacturer.

d. Application of Coating

Confirm to the coating manufacturer's instructions for application.

Schedule the Work to allow application to be performed in a manner that it conforms to the Manufacturer's recommendations.

Apply coating only when atmospheric conditions are suitable and as recommended by the Manufacturer.

e. Protection of coating

Protect the coating from damage.

Allow to cure before further work or putting the coating into service.

f. Clean-up

Promptly, as the Work proceeds and upon completion, clean up and remove from the site, rubbish and surplus material resulting from the Work of this Section.

4. RATE

The measurement shall **in sq.mt basis**.

The rate includes labour, material, equipment as per specification and as directed by the engineer including all lead and lifts etc. complete.

Item No 26:

Earthwork in embankment using selected soil, soft and hard murrum excavated from approved borrow area/village tanks etc. including breaking clods, dressing to the design section including loading and unloading and all lift and Compaction of Earthwork in embankment in layers 15 to 20Cms at requisite moisture content to required dry density not less than 85% of corresponding proctor maximum dry density including watering, rolling with suitable type of roller etc. complete. MORT&H Specification no.300 and Excavated stuff to be dumped or used from the lead up to 500mts.

The relevant MORT&H specification No 305 for shall apply for this item

General

(a) Bushes, roots, sods or other perishable or unsuitable materials shall not be placed in the embankment. The suitability of each part of the foundation for placing embankment (bank seat) materials there on and of all materials for use in embankment construction will be determined by the Engineer-In-Charge on the basis of field laboratory tests. The difference in elevation of the earthen bund embankment within each working length of not less than 50 m shall not exceed 1.2 m anywhere in cross section unless specifically permitted by the Engineer-In-Charge. Placing of the layers for the embankment portion programmed for construction in the season shall be continuous and approximately horizontal.

- (b) Embankment materials shall be spread in successive horizontal layers of 15 cm to 23 cm thickness extending to the full width of the embankment including slopes at the level of the particular layer. Construction of embankments shall begin at the toe of the fill and in no case shall embankments be widened by material dumped from the top. Adequate extra width that is proud section not less than 20 cm in thickness as measured perpendicular to the slope from line representing the bottom of filter media shall be provided so that when compacted, lines of the finished Earthen Bund slopes shall have not less than 85 percent of Proctor density at OMC. Such proud earthwork shall be removed subsequently. On the waterside, removal of proud section shall precede the filter media as stipulated. On outer side removal of proud section shall be done along with dressing of the slope as stipulated. No payment shall be made for providing or removal of the proud on waterside and outer side slopes.
- (c) Thickness of layers shall be adjusted by the Engineer-In-Charge, if the Contractor satisfies the S.M.C that the particular type of compactors used by him give the required density by carrying out trial compaction and requisite test. For compaction vibratory rollers having adequate capacity shall only be used. For back filling near and around structures pneumatic compactors or plate compactors shall be used.
- (d) No fresh layer shall be laid until the previous layer is properly watered and compacted as per requirement. The work of spreading and compaction shall be so adjusted as not to interfere with each other and in such a way that neither of the operations is held-up because of non-completion of the rolling and watering. If the work is held-up due to failure of machinery, no claim whatsoever shall be entertained. The surface of the banking shall at all time of construction be maintained true to required cross section.
- (e) Before starting of the embankment work, the Contractor shall provide all necessary facilities without any extra cost for the collections of soil samples along the embankment & borrow area up to the required depth as directed by the Engineer-In-Charge. The soil samples will be tested for its physical properties for ensuring the suitability of different types of soil for the embankment as per the drawing. The Contractor shall use there suitable types of soil for construction of embankment along the embankment reaches as directed by Engineer-In-Charge.
- (f) For proper bond of the embankment done in the previous season with the new embankment, the work shall be carried out and finished as under:
- (i) In case of the old bank to be extended horizontally it shall be cut to a slope not steeper than 1 in 3 and the surface so prepared shall be scarified and made loose at least for a depth of 15 cm. Necessary watering shall be done and the earth surface shall be thus prepared to receive the new embankments. The bank material shall be laid in layers and compacted to the 85% of Proctor Maximum Dry Density at OMC to have a proper bond with the old one.
- (ii) If the old bank is to be raised vertically. Vegetation shall be cleared followed by scarifying, watering and placing of the new earth layer and compacted to the 85% of Proctor Maximum Dry Density as specified above. No extra payment shall be made in this regard.
- (iii) The surfaces which are damaged due to rain shall be made good by filling with proper soil duly compacted by tampers, pneumatic compactors or plate compactors. A cross slope away from the centre of embankment of about 1 in 80 shall be maintained throughout the rainy season to ensure proper drainage in the event of occasional rainfall.

Preparation of Seat under Embankment

- (a) No materials shall be placed in any section of the earth fill portion of the embankment until the embankment seat for that section has been dewatered suitably prepared and approved by the Engineer-In-Charge. All portions of excavation made for test pits or other subsurface investigations and all other existing cavities found within the area to be covered and which extend below the established lines of excavation for embankment seat shall be filled with earth of the corresponding zone of the embankment and suitably compacted up to required density for embankment.

(b) Pools of water shall not be permitted in the foundation for embankment and such water shall be drained and cleared prior to placing the first layer of embankment materials.

(c) Soil Foundation

Soil foundation under the seat of embankment shall be scarified and loosened by means of a plough, ripper or other means to a depth of about 15 cm to 20 cm to the satisfaction of the Engineer-In-Charge. Roots or other debris turned up during scarifying shall be removed from the entire foundation area for the fill. It shall then be moistened to slightly above the optimum moisture content and compacted by required number of passes of the compaction equipment to the same percentage of compaction as that of the embankment. The purpose of using higher moisture than optimum is to ensure forcing of the soil into any unseen soft zones just below the surface. The first few layers of fill for the embankment shall be of depth of 10 cm to 15 cm and shall be carefully placed, ensuring uniform compaction and a satisfactory intimate bond between the foundation soil and fill material. Sheep foot roller shall be used for compaction of impervious soil and vibratory type rollers shall be used for compaction of all other soils. Separate payment shall not be made for preparation of foundation as above and it shall be deemed to have been included in the unit rate quoted for respective item of embankment.

Construction

Earth fill

a) General

(i) Embankment shall be constructed as shown on the drawings. Suitable excavated material available from the Excavation of structures, proud cutting and removal of ramps shall be used for construction of banks. Material should be free from the organic matter and any deleterious material.

(ii) The useful material available from excavation of proud and excavation of structures shall be transported over the required leads, as indicated in the respective items of Schedule-B and placed in the specified layers for embankment.

(iii) In areas, where suitable and adequate material for constructing embankment is not available from excavation of structures, the material shall be obtained from the borrow areas fixed for the purpose. The borrow areas shall be excavated to the dimensions and depths actually required and as per the instructions of the Engineer-In-Charge.

(iv) The Contractor shall utilize all suitable excavated material from the structure excavation & other excavation to construct embankment by conveying in varying leads not exceeding as indicated in Item. The Contractor shall make his own best plan to use the available excavated material from structure excavation & other excavation and also that to be obtained from borrow area for the embankment. The payment will be regulated under relevant items of excavation and embankment. The soils and murrum excavated from the structure excavation & other excavations which are useful for construction of the embankment will be decided by the Engineer-In-Charge as regards their suitability. The Contractor has to utilize all the usable and suitable excavated material within the lead as specified by the Engineer-In-Charge. The Contractor shall not be allowed to spoil any usable and suitable material from structure excavation & other excavation. The Contractor shall only be allowed to use the borrow area after utilizing the suitable material for the entire reach. The balance quantities of soils and murrum can be obtained from the borrow area approved by the Engineer-In-Charge. Operation of borrow area will be permitted only after full utilization of usable soil available from structure excavation & other excavation. If the Contractor fails to utilize all suitable excavated material from the structure excavation & other excavation within the lead as mentioned in Item. and obtains excess quantity of soils from the borrow area, payment for obtaining the soils from the borrow area shall be limited to the quantities required to be borrowed, in excess of the above mentioned suitable material and the excess quantities shall be paid under the respective item of Schedule-B. The decision about the usable soils available from the excavation taken by the Engineer-In-Charge shall be final and binding upon the Contractor. Wherever the excavated useful material comes

from excavation as well as from the borrow areas / village tanks simultaneously for embankment, of Schedule-B, shall be arrived on the basis of total quantity of embankment worked out from initial & final cross sections less all the usable excavated material from canal excavation structure excavation and gutter excavation whether utilized or not on the basis of the following.

- (v) The compaction shall be done at Optimum Moisture Content by suitable compacting equipment. The materials shall be compacted to a density as specified on the drawings but not less than 85% of their Standard Proctor Density. The suitability of compacting equipment shall be decided by the Engineer-In-Charge and his decision shall be final and binding to the Contractor.
- (vi) If silty sand material is used in compaction shall be done by using proper machinery utilizing the principle of vibro compaction. The distribution of material shall be such that the compacted material shall be uniform, free from cracks, pockets or other imperfections. The excavating and placing operation shall be such that the material when completed shall be bonded sufficiently to secure the best practicable degree of compaction, impermeability and stability. The material shall be compacted to a density as specified on the drawings but not less than 85% of Standard Proctor Density.

(b) Moisture Control

- (i) Prior to and during compacting operations the material in each layer of embankment shall have optimum moisture content up to about 2% less than the optimum moisture content in the cohesion less soil and up to about 2% more than the optimum in the cohesive soil may be permissible.
- (ii) As far as possible, the material excavated from the borrow area shall have adequate moisture content. If additional moisture is required, it shall be added preferably at the borrow area in advance and only to a limited extent, if required, on the embankment by sprinkling water before starting the rolling. If moisture content is more than that required, the material shall be allowed to dry before starting compaction. The moisture content shall be uniform throughout the layer of material for which plugging, disc harrowing or other methods of mixing shall be applied. If the moisture content as specified above or if it is not uniformly distributed throughout the layer, rolling shall be stopped and shall be started again only when the above conditions are satisfied.

(c) Compaction of Cohesive Materials

- (i) When each layer of material has been prepared so as to have the proper moisture content uniformly distributed throughout the material, it shall be compacted by rolling with the suitable roller. The layer shall be compacted in strips overlapping not less than 0.30 meter. The rollers shall travel in a direction parallel to the axis of the Embankment. Turns shall be made carefully to ensure uniform compaction. Density tests shall be made after rolling and dry density attained shall be at least 85 percent of the maximum dry density (Standard Proctor) obtained in the laboratory for the type of material used. The density achieved shall not normally be less than the designed density, unless the design is reviewed.
- (ii) Standard Proctor Density test shall be carried out at regular intervals to account for variations in the borrow area material as well as that in situ excavated material. Not less than three tests shall be carried out to indicate variations in the Standard Proctor Density attained in the laboratory.
- (iii) S.M.C might review the design if necessary on examination of density test results and the Contractor shall have no claim arising out of such a review and consequent change, if any, in the design.
- (iv) In case embankment covers the any other structures, first 45 cm of the embankment shall not be compacted with roller but it shall be compacted with pneumatic tampers in thin layers. The compaction above these layers of total 45 cm, shall be done by using suitable light rollers to avoid damage to the structure, by adjusting the thickness of layers until sufficient height is achieved to permit compaction by heavy rollers. Density tests shall be conducted from time to

time on site to ascertain whether the compaction is attained as specified above. For every 1500 cubic meter of compacted earthwork at least two field density tests shall be taken. Minimum two density tests shall be taken per day irrespective of the quantity of earthwork specified above. In case the test shows that the specified densities are not attained, suitable measures shall be taken by the Contractor either by moisture correction or by entire removal and relaying of layer or by additional rolling so as to obtain the specified density without any extra cost which shall be checked again by taking fresh tests at the same locations. Necessary labour required for carrying out such density tests shall be provided by the Contractor

(v) Compaction shall be done by mechanical compactors like vibratory rollers and standard sheep foot rollers.

(vi) The dimensions and weight of the rollers should be such as to exert a ground pressure of not less than 12kg/cm^2 of tamping when it is empty and 25 kg/cm^2 when ballasted. The number of passes required for each layer to obtain the specified density shall be determined by actual field tests.

(d) Compaction of Cohesion less Materials

(i) Where compaction of cohesion less free-draining materials such as sand and gravel or metal is required, the materials shall be deposited in horizontal layers and compacted to the required relative density. The excavating and placing operations shall be such that the material, when compacted, shall be bonded sufficiently to secure the highest practicable unit weight and best stability. Water shall be added to the materials as may be required to obtain the specified density by method of compaction being used.

(ii) The thickness of the horizontal layers after compaction shall not be more than 10 cm if compaction is performed by tampers, pneumatic or plate compactors and not more than 15 cm if by rollers and not more than 30 cm if compaction is performed by vibratory or pneumatic rollers or similar equipment. The relative density of the compacted materials shall not be less than 65 percent as determined by laboratory tests.

(d) LOW-GRADE BENTONITE SLURRY SPRAY:-

Low grade bentonite with L.L 40 to 50 and free swelling lesser than 50% shall be used in slurry form to stabilize the slope in non-cohesive soil so as to facilitate the construction. Approximately 5% by weight bentonite shall be mixed with water to be sprayed for bringing the soil layer to O.M.C. The 1mtr Outer and 1mtr. Inner edges of each layer of banking shall be treated with this as shown in the drawings. The bentonite slurry shall be prepared in a sump and shall be sprayed by tankers with agitation arrangement in such a way that it remains in colloidal form at the time of spraying. The percentage of bentonite may be adjusted based on field tests so that desired cohesion is arrived in the earthen slope good enough for construction activities and approved by Engineer-in-charge.

Measurement and Payment

(i) The embankments for bund, and diverted Drains etc are to be constructed from the usable material available from excavation of embankment, structures, and diverted Kotars and borrow areas. Payment for this material used will be made on cubic meter basis under the respective items in Schedule-B and shall include all labour, equipments and other incidental operations involved in the work.

(ii) Final measurements shall be taken on cross sectional measurements of the completed banks after the slopes are dressed to ensure that the work is completed as per pay lines shown on the drawings. Measurement shall exclude the proud section. The quantity of the compaction of earthwork shall be worked out on the basis of cross sectional areas excluding the proud section and the c/c distance between the cross sections.

BORROW AREA:-

General

(a) All materials required for the construction of embankment and around the structures which are not available from structure and other excavation for structure or from excavation of other

ancillary works shall be obtained from the designated borrow areas as designated by the Engineer-In-Charge. The depth of cut in all borrow areas shall be designated by the Engineer-In-Charge and the cuts shall be made to such designated depths only. Shallow cut will be permitted in the borrow areas if unstratified materials with uniform moisture contents are encountered. Each designated borrow area shall be fully exploited before switching over to the next designated borrow area. Haphazard exploitation shall not be permitted. The type of equipment used and the operations in the excavation of materials in borrow areas shall be such as to produce the required uniformity of the mixture of materials for the embankment.

(b) Borrow pits shall be operated so as not to impair the usefulness of spoil, the appearance of any part of the work or any other property. The surfaces of wasted materials shall be left in a reasonably level and even condition.

Stripping of Borrow Areas

a) The Contractor shall clear the entire borrow area land width required for setting out, of all tree stumps, roots, bushes, brushwood, rubbish of all kinds, loose stones and all other objectionable materials. Cutting of all trees shall be covered in this item. The ownership of all the useful materials so removed from clearing site and / or excavation shall rest with the S.M.C. The Contractor shall have to remove all the stumps and roots of trees for which no additional payment shall be made. The roots of trees shall be grubbed to an adequate depth below the ground to remove the entire roots. The Contractor shall dispose off all such materials as directed by the Engineer-In-Charge.

b) No separate payment shall be made to the Contractor for complying the requirements of paragraph (a) as above and all costs shall be deemed to have been included in the rates quoted in Schedule B for the items of excavation.

(c) Borrow areas shall be stripped of top soil and any other objectionable materials to the required depth. Stripping operations shall be limited only to designated borrow areas. Materials from stripping shall be disposed off in exhausted borrow areas or in the approved adjacent areas.

Borrow Area Watering

(a) Borrow area watering shall be done by the Contractor wherever necessary and in the manner specified by the Engineer-In-Charge.

(b) The initial moisture content of the material in the borrow areas shall be estimated with the help of field laboratory tests by S.M.C and necessary labour shall be provided by the Contractor without any extra cost. The optimum moisture content required for the material in any particular borrows areas shall be obtained from the field laboratory. The additional moisture requirements as determined by the laboratory tests shall be introduced into the borrow areas by watering well in advance of the excavation to ensure uniformity of moisture content. All care shall be taken to reduce excessive moisture in any of the locations of a borrow area before or during excavation to secure the materials with moisture content close to the optimum. To avoid the formation of pools in the borrow areas during excavation operation, drainage ditches from borrow areas to suitable outlets shall be excavated, wherever necessary. Upon exhausting of all materials or abandoning the borrow areas, the pits shall be fully drained to ensure that no ponding of water takes place.

Measurement and Payment

(a) The material required for the construction of embankment but in deficit shall be brought from approved borrow area and that too after all the available usable material from excavation is fully utilized. For purpose of measurement of the material conveyed from borrow area for the bank construction, the initial levels before placing the borrow area materials and level shall be taken after properly compacted borrow area material in embankment portion and after dressing the slope as per design section requirement and the quantity thereof shall be arrived at by cross sectional measurement for running / final payment. The quantities of borrow area material shall be calculated for the purpose of payment as per actual cross sectional measurement by taking final levels of completed banks after the slopes are dressed to ensure that the work is completed as per paylines shown on the drawing and considering initial levels before placement of borrow

area material. The rate includes conveyance of the excavated material from the borrow area for varying up to 50.0 km. Measured as shortest possible distance from the centre of borrow area to the centre of each bund reach. The payment shall be made on cubic meter basis under relevant item of Schedule-B.

(b) Whenever the excavated material from structure excavation and borrow areas / village tanks comes simultaneously and utilized for embankment, the quantity of embankment from borrow area of Item shall be worked out as per conversion table and as specified under Construction (i) Earth fill (a) General. The quantity for the payment of borrow area banking shall be governed and paid by the following formula.

$$QBB = Q B - 0.90 (QG + QSG)$$

QBB = Quantity of borrow area banking of payment purpose

QB = Total quantity of banking as defined here in forgoing Para.

QG = Quantity of usable excavated stuff available from structure excavation, other excavation & road excavation.

QSG = Quantity of usable excavated stuff available from side gutter, regrading of nalla etc.

(c) Intermediate payment will be made at 98% of the full rate. The remaining 2% shall be paid when the work is fully completed.

The estimated rate work out by Rate analysis by adopting rates of S.O.R item as per different leads, The S.O.R. rate adopted in rate analysis for the respective lead are as under.

(i) Basic rate up to 500 m Rs.130.00/- per C.M.

(ii) Extra lead up to 5.0 KM. Rs.175.46/- per C.M.

Rate per extra KM Rs.8.17 Rs per KM

Hence, $45 \times 8.17 = \text{Rs. } 367.65$ Rs.367.65/- C.M.

Estimated Rate put to tender

Total – Rs. 673.11/- per C.M.

At the time of payment of Running Bill & final, the proportionate rate of estimate shall be work out as per actual average lead of work by adopting the different rates of leads as stated above. The quoted rate shall be proportionately decrease or increase as per actual average lead of work by comparing the estimated rate put to tender & quoted rate. The payment shall be made per C.M., as per actual average lead of completed work. No extra payment shall be made if the borrow area beyond 50.0 Km. In this case the payment shall be made up to 50.0 Km lead only on the basis of Cubic Meter.

Item No 27:

Providing and laying 25mm to 100mm thick compacted BITUMINOUS CONCRETE using aggregates as per gradation and percentage of asphalt for mixing shall be as arrived from mix design, provided in no case asphalt percentage shall be less than 5.5 % by Wt. of total mix as binder by drum mix type hot mix plant and laying by sensor paver finisher including consolidation by vibrator roller including providing and operating plant, sensor paver and machinery, cost of fuel, oil, lubricant and labour charges including cost of asphalt, aggregate and filler (if found required as per mix design) etc complete (But excluding cost of providing & applying tack coat.)

1. The relevant specifications for Bituminous Concrete are as per MORT&H fifth revision Clause 500 applicable to this item.
2. The measurement shall be in MT basis.
3. The rate includes labour, material, equipment etc. complete as per direction of engineer in charge.

The mode of payment shall be in per M.T. basis.

Item No 28:

Providing and applying Prime Coat with bitumen emulsion (Medium Grade)on prepared surface of granular Base including clearing of road surface and spraying primer at the rate of 0.60 kg/sqm using mechanical means and conforming to MORT&H Specification clause 502

1.1 Scope

This work shall consist of the application of a single coat of low viscosity liquid bituminous material to a porous granular surface preparatory to the superimposition of bituminous treatment mix. The work shall be carried out on a previously prepared granular/ stabilized surface to MORT&H Specification Clause 501.8.

1.2 Materials

1.2.1 The primer shall be cationic bitumen emulsion SS1 grade conforming to IS: 8887 or medium curing cutback bitumen conforming to IS: 217 or as specified in the Contract.

1.2.2 Quantity of SS1 grade bitumen emulsion for various types of granular surface shall be as given in MORT&H Specification Table 500-3.

Table 500-3 : Quantity of Bitumen Emulsion for Various Types of Granular Surfaces

Type of Surface	Rate of Spray (kg/sq.m)
WMM/ WBM	0.7-1.0
Stabilized soil bases/Crusher Run Macadam	0.9-1.2

Cutback for primer shall not be prepared at the site. Type and quantity of cutback bitumen for various types of granular surface shall be as given in MORT&H Specification Table 500-4.

Table 500-4: Type and Quantity of Cutback Bitumen for Various Types of Granular Surface

Type of Surface	Type of Cutback	Rate of Spray (kg/sq.m)
WMM/ WBM	MC30	0.6-0.9
Stabilized soil bases/Crusher Run Macadam	MC70	0.9-1.2

The correct quantity of primer shall be decided by the Engineer and shall be such that it can be absorbed by the surface without causing run-off of excessive primer and to achieve desired penetration of about 8-10 mm.

Weather and Seasonal Limitations

Primer shall not be applied during a dust storm or when the weather is foggy, rainy or windy or when the temperature in the shade is less than 10°C. Cutback bitumen as primer shall not be applied to a wet surface. Surfaces which are to receive emulsion primer should be damp, but no free or standing water shall be present. Surface can be just wet by very light sprinkling of water.

Construction

Equipment

The primer shall be applied by a self-propelled or towed bitumen pressure sprayer equipped for spraying the material uniformly at specified rates and temperatures. Hand spraying shall not be allowed except in small areas, inaccessible to the distributor, or in narrow strips where primer shall be sprayed with a pressure hand sprayer, or as directed by the Engineer.

Preparation of Road Surface

The granular surface to be primed shall be swept clean by power brooms or mechanical sweepers and made free from dust. All loose material and other foreign material shall be removed

completely. If soil/ murrum binder has been used in the WBM surface, part of this should be brushed and removed to a depth of about 2 mm so as to achieve good penetration.

Application of Bituminous Primer

After preparation of the road surface, the primer shall be sprayed uniformly at the specified rate.

The method for application of the primer will depend on the type of equipment to be used, size of nozzles, pressure at the spray bar and speed of forward movement. The Contractor shall demonstrate at a spraying trial, that the equipment and method to be used is capable of producing a uniform spray, within the tolerances specified.

No heating or dilution of SS1 bitumen emulsion and shall be permitted at site. Temperature of cutback bitumen shall be high enough to permit the primer to be sprayed effectively through the jets of the spray and to cover the surface uniformly.

Curing of Primer and Opening to Traffic

A primed surface shall be allowed to cure for at least 24 hours or such other higher period as is found to be necessary to allow all the moisture/volatiles to evaporate before any subsequent surface treatment or mix is laid. Any unabsorbed primer shall first be blotted with a light application of sand, using the minimum quantity possible. A primed surface shall not be opened to traffic other than that necessary to lay the next course.

Quality Control of Work

For control of the quality of materials and the works carried out, the relevant provisions of Section 900 shall apply.

Arrangements for Traffic

During construction operations, arrangements for traffic shall be made in accordance with the provisions of Clause 112.

Measurement for Payment

Prime coat shall be measured in terms of surface area of application in square meters.

Rate

The contract unit rate for prime coat shall be payment in full for carrying out the required operations including full compensation for all components listed in Clause 1.7 (i) to (v) and as applicable to the work specified in these Specifications. Payment shall be made on the basis of the provision of prime coat at an application rate of quantity at 0.6 kg per square metre or at the rate specified in the Contract, with adjustment, plus or minus, for the variation between this quantify and the actual quantity approved by the Engineer.

The Measurement of the item shall be in Sq mt basis.

Item No 29:

Providing and applying Tack coat with bitumen emulsion (Medium Grade) using emulsion pressure distributor at the rate of 0.20 kg per sqm on the prepared bituminous/granular surface cleaned with mechanical broom and conforming to MORT&H Specification clause 503

The Measurement of the item shall be in Sq mt basis.

The relevant specifications as per MORT&H fifth revision shall be applicable to this item

Item No 30:

Providing and laying of cement concrete of R.C.C. M35 grade as per the specifications for RCC retaining wall stem as per drawing and MORT&H Specification no.1500,1700,2300 as directed by the Engineer. Rate shall include cost of form work but exclude cost of reinforcement

The Measurement of the item shall be in cum basis.

The relevant specifications as per MORT&H fifth revision shall be applicable to this item

Item No 31:

Providing and placing in position FE 500 TMT CRS Bar Reinforcement as per I.S. Standard for R.C.C Raft, Piers, Abutments, Retaining wall, Top Slab, Kerb, Approach Slab, Cutoff, Foot path including cutting bending hooking and tying complete as per detailed drawing and MORT&H Specification no. 1600

The relevant specifications as per MORT&H fifth revision shall be applicable to this item

Item No 32:

Road marking with Hot applied Thermo Plastic compound with Reflectorising glass bend on Bituminous Surface. Providing and laying of hot applied thermo plastic compound 2.5mm thick including refelectorising glass beads @ 250gms per sq mt .The finished surface to be level ,uniform and free from streaks and holes.

The color width and layout of road makings shall be in accordance with the Code of Practice for Road Markings with thermoplastic paints and as specified in the drawings or as directed by the Engineer-in- Charge.

The relevant specifications given in Section – 803 of MORT&H fifth revision specification shall apply to this item.

1.0 Materials

Road markings shall be of ordinary road marking paint (retro-reflective), hot applied thermoplastic compound as specified in the item.

2.0 Hot Applied Thermoplastic Road Marking:

General

- (i) The thermoplastic material shall be homogenously composed of aggregate, pigment, resins and glass reflectorizing beads.
- (ii) The thermoplastic compound shall be screeded/extruded on to the pavement surface in amolten state by suitable machine capable of controlled preparation and laying with surface application of glass beads at a specific rate. Upon cooling to ambient pavement temperature, it shall produce an adherent pavement marking of specified thickness and width and capable of resisting deformation by traffic.
- (iii) The thermoplastic material shall conform to ASTM D36/BS-3262-(Part I).
- (iv) The material shall meet the requirements of these specifications for a period of one year.

The thermoplastic material must also melt uniformly with no evidence of skins or unmelted particles for the one year storage period. Any material not meeting the above requirements shall be replaced by the manufacturer / supplier / Contractor.

(v) Marking:

Each container of the thermoplastic material shall be clearly and indelibly marked with the following information:

1. The name, trade mark or other means of identification of manufacturer.
2. Batch number
3. Date of manufacture
4. Colour (White or yellow)
5. Maximum application temperature and maximum safe heating temperature.

(vi) Sampling and Testing:

The thermoplastic material shall be sampled and tested in accordance with the appropriate ASTM/BS method. The Contractor shall furnish to the Engineer-in-Charge a copy of certified test reports from the manufacturers of the thermo plastic material showing results of all tests specified herein and shall certify that the material meets all requirements of this Specification.

3.0 Preparation

- (i) The material shall be melted in accordance with the manufacturer’s instructions in a heater fitted with a mechanical stirrer to give a smooth consistency to the thermoplastic material to avoid local overheating. The temperature of the mass shall be within the range specified by the manufacturer, and shall on no account be allowed to exceed the maximum temperature stated by

the manufacturer. The molten material should be used as expeditiously as possible and for thermoplastic material which has natural binders or is otherwise sensitive to prolonged heating, the material shall not be maintained in a molten condition for more than 4 hours.

(ii) After transfer to the laying equipment, the material shall be maintained within the temperature range specified by the manufacturer for achieving the desired consistency for laying.

4.0 Properties of Finished Road Marking

(a) The stripe shall not be slippery when wet.

(b) The marking shall not lift from the pavement in freezing weather.

(c) After application and proper drying, the stripe shall show no appreciable deformation or discoloration under traffic and under road temperatures upto 60oC.

(d) The marking shall not deteriorate by contact with sodium chloride, calcium chloride or oil drippings from traffic.

(e) The stripe or marking shall maintain its original dimensions and position. Cold ductility of the material shall be such as to permit normal movement with the road surface without chopping or cracking.

(f) The colour of yellow marking shall conform to IS Colour No. 356 as given in IS 164.

5.0 Application

Marking shall be done by fully /semi automatic paint applicator machine fitted with profile shoe, glass beads dispenser, propane tank heater and profile shoe heater, driven by experienced operator as specified in item. For locations where painting cannot be done by machine, approved manual methods shall be used with prior approval of the Engineer-in-charge. The Contractor shall maintain control over traffic while painting operations are in progress so as to cause minimum inconvenience to traffic compatible with protecting the workmen.

The thermoplastic material shall be applied hot either by screeding or extrusion process. After transfer to the laying apparatus, the material shall be laid at a temperature within the range specified by the manufacturer or otherwise directed by the Engineer-in-Charge for the particular method of laying being used. The paint shall be applied using a screed or extrusion machine.

The pavement temperature shall not be less than 10°C during application. All surfaces to be marked shall be thoroughly cleaned of all dust, dirt, grease, oil and all other foreign matter before application of the paint.

Thermoplastic paint shall be applied in intermittent or continuous lines of uniform thickness of at least 2.5 mm unless specified otherwise. Where arrows or letters are to be provided, thermoplastic compound may be hand-sprayed.

The minimum thickness specified is exclusive of surface applied glass beads.

The finished lines shall be free from ruggedness on sides and ends and be parallel to the general alignment of the carriageway. The upper surface of the lines shall be level, uniform and free from streaks.

6.0 Measurements for Payment:

The painted markings shall be measured in sq. metres of actual area marked (excluding the gaps, if any) correct up to the two places of decimal.

7.0 The rate includes of reflectorising glass beads at 250 gm/smt area. Thickness of 2.5 mm is exclusive of surface applied glass beads as per IRC 35. The finished surface shall be level uniform free from streaks and holes and as per direction of engineer in charge.

Item No 33:

Supplying of Molded Shank Raised Pavement Markers made of polycarbonate and ABS molded body and reflective panels with micro prismatic lens capable of providing total internal reflection of the light entering the lens face and shall support a load of 16000 kg tested in accordance to ASTM D 4280 Type H and complying to Specifications of Category A of MORTH Circular No RW/NH/33023/10-97 – DO III Dt 11.06. 1997. The height, width

and length shall not exceed 50 mm, 100 mm and 100 mm and with minimum reflective area of 13 Sqcm on each side and the slope to the base shall be 35 +/- 5 degree. The strength of detachment of the integrated cylindrical shanks, (of diameter not less than 19 +/- 2 mm and height not less than 30 +/- 2 mm) from the body is to be a minimum value of 500 Kgf. Fixing will be by drilling holes on the road for the shanks to go inside, without nails and using epoxy resin based adhesive as per manufacturer's recommendation and complete as directed by the engineer. (3M or Equivalent Brand)

The relevant specifications as per MORT&H fifth revision shall be applicable to this item

The Measurement of the item shall be in Numbers basis.

Item No 34:

The work includes SETC & defect liability (guarantee) period of 12 months of entire streetlight system having all components GI streetlight pole, GI bracket, foundation of pole, cable, termination of cable, excavation & laying in DWC pipe of appropriate size, cable guard pipe, fitting wire, led streetlight outdoor luminaire, CCMS, pole number for identification etc.

The important design aspects are as under: -

I. Average illumination level = 15 lx

II. Overall maintenance factor= 0.7

III. Uniformity Factor= 0.4, Transverse uniformity ratio= 0.33

IV. Span (min.) = 30 m

V. Impact Resistance= IK 08 (min.)

VI. CCT= 4,000⁰ K

VII. CCMS system having remote control, monitoring, supervision, operation facility from remote location. It should have electrical data collection/ retrieving facility through GPRS/ GSM mobile.

VIII. GI octagonal streetlight pole (min. coating of 85 micron)

The Measurement of the item shall be in Numbers basis.

Item No 35:

Providing and fixing in position sign boards of size 0.45m x 0.30m with M.S.angle 40mmx40mmx6mm with 3mm thick iron plate fixed in 1:5:10 prop. Concrete block size 40cm x 40cm x 75cm including radium paint on both side etc complete

The Measurement of the item shall be in Numbers basis.

Item No 36:

Providing and fixing in position sign boards of size 0.60m x 0.45m with M.S.angle 40mmx40mmx6mm with 3mm thick iron plate fixed in 1:5:10 prop. Concrete block size 40cmx40cmx75cm including radium paint on both side etc complete

The Measurement of the item shall be in Numbers basis.

Item No 37:

Providing and fixing in position sign boards of size 1.20m x 0.90m with M.S.angle 40mmx40mmx6mm with 3mm thick iron plate fixed in 1:5:10 prop. Concrete block size 40cmx40cmx75cm including radium paint on both side etc complete

The Measurement of the item shall be in Numbers basis.

Item No 38:

Providing 100mm thick readymade c.c. kerb of strength M-20 (size 300mm x 380mm) purchased from SMC's approved paver block manufacturer & setting in line, level and in truly vertical position, including filling joints in C.M. 1:1 (1 part of cement: 1 part of stone dust) smooth pointing in C.M. 1:1 (1 part of cement : 1 part of coarse sand) including watering etc. complete and as directed by engineer in charge.

The Measurement of the item shall be in Running meter basis.

Item No 39:

Providing and laying cement concrete 1:5:10 (1 Part of cement: 5 Part of coarse sand: 10 Part of graded stone aggregate of 40 mm nominal size) in 75 mm thick and curing complete excluding cost of formwork etc. complete.

Materials:-

Water shall conform to M-1. Cement shall conform to M.3. Sand shall conform to M-6. Stone aggregate 40mm nominal size shall conform to M-12.

WORKMANSHIP:

General:-

Before starting concreting the bed of foundation trenches shall be cleared of all loose materials, levelled, Watered and rammed as directed.

Proportion of Mix:-

The proportion of cement, sand coarse aggregate shall be one part of cement, 5 parts of sand 5 parts of stone aggregate shall be measured by volume.

Mixing:-

The concrete shall be mixed in a mechanical mixer at the site of work. Hand mixing may however be allowed for smaller quantity of work if approved by Engineer-in-charge. When hand mixing is permitted by the Engineer-in-charge in case of breakdown of machineries and in the interest of the work, it shall be carried out on a water tight platform and care shall be taken to ensure that mixing is continued until the mass is uniform in colour and consistency. However in such case 10% more cement than otherwise required shall have to be used without any extra cost. The mixing in mechanical mixer shall be done for a period 1 1/2 to 2 minutes. The quantity of water shall be just sufficient to produce dense concrete of required workability for the purpose.

Transporting and placing the concrete:-

The concrete shall be handed from the place of mixing to the final position in not more than 15 minutes by the method as directed and shall be placed into its final position, compacted and finished within 30 minutes of mixing with water i.e. before the setting commences.

The concrete shall be laid in layers of 15 cms to 20 cms.

Compacting:-The concrete shall be rammed with heavy iron rammer and rapidly to get the required compaction and to allow the interstices to be filled with mortar.

Curing:-

After the final set, the concrete shall be kept continuously wet, if required by ponding for a period of not less than 7 days from the date of placement.

The relevant specifications as per MORT&H fifth revision shall be applicable to this item

Mode of measurements and payment:-

The concrete shall be measured for its length breadth and depth, limiting dimensions to those specified on plan or as directed. The rate shall be for a unit of one cubic meter.

Item No 40:

Supplying and filling fine sand (Pana) in 25/75 mm (Avg.) compacted thickness over the base including necessary compaction, watering etc. complete. Item includes leveling by using vibratory plates compacted machine and as directed by Engineer-in-charge.

1. MATERIALS:

Fine sand (Para) shall conform to specification of material M-5.

2. WORKMANSHIP:

Fine sand (Pana) shall be supplied to worksite and staked at suitable place. It shall be got approved by Engineer-in-charge. Fine sand (Pana) shall be filled in compacted thickness of 75 mm. It shall be compacted and watered thoroughly.

The Measurement of the item shall be in cum basis.

Item No 41:

Providing interlocking type Rubber moulded cement concrete paver block of approved shape, design & color having 60mm thickness (M-35) purchased from SMC's approved paver block manufacturer only & fixing of fine sand bedding. Item includes leveling by using vibratory plates compacted machine. Item also includes all materials, labour, equipments, tools, plants, watering, cleaning etc. complete.

RAW MATERIAL**CEMENT:-**

The cement used in the manufacture of high quality precast concrete paving block shall be conforming to IS 12269 (53 grade) ordinary Portland Cement or IS 8112 (43 grade ordinary Portland cement). The minimum cement content in concrete used for making paver blocks should be 310 kg/Cu.M. And the upper limit of cement shall not be more than 425kg/Cu.M.

AGGREGATES :-

The fine and coarse aggregates shall consist of naturally occurring crushed or uncrushed materials which, apart from the grading requirements comply with IS 383-1970. The fine aggregates used shall contain a minimum of 25% natural silicon sand. Lime stone aggregates shall not be used. Aggregates shall contain no more than 3% by weight of clay and shall be free from deleterious salts and contaminants.

WATER:-

The water shall be clean and free from any deleterious matter. It shall meet the requirements stipulated in IS:456-2000.

OTHER MATERIALS :-

Any other material/ingredients used in the concrete shall conform to latest IS specifications.

PAVER BLOCKS CHARACTERISTICS

The concrete pavers should have perpendicularities after release from the mould and the same should be retained until the laying.

The surface should be of anti-skid and anti-glare type. The paver should have uniform chamfers to facilitate easy drainage of surface run off.

The pavers should have uniform interlocking space of 2 mm to 3 mm to ensure compacted sand filling after vibration on the paver surface.

The concrete mix design should be followed for each batch of materials separately and automatic batching plant is to be used to achieve uniformity in strength and quality.

The pavers shall be manufactured in single layer only.

Skilled labour should be employed for laying blocks to ensure line and level for laying, desired shape of the surface and adequate compaction of the sand in the joints.

The pavers are to be skirted all round with kerbing using solid concrete blocks of size 100 mm x 200 mm x 400 mm or as directed by the Engineer. The kerbing should be embedded for 100 mm depth. The concrete used for kerbing shall be cured properly for 7 days minimum.

LAYING OF PAVER BLOCKS:-**PRIMING :-**

It will be responsibilities of the Contractors to ensure that the manhole/pipeline cable trenches / circular drainage system etc. raised to driveway level using the requisite materials as per instruction of Engg. The areas of potholes/deep depressions at the isolated locations also have to be filled up before laying the paver blocks. No extra payments will be made for this purpose.

It will be the responsibility of the Contractors to ensure that undulations on the paver blocks are eliminated after the traffic is allowed on it. Proper slope for drainage of water needs to be ensured by the Contractor. All necessary materials, tools, tackles are required to be arranged by the Contractor.

BEDDING SAND COURSE:-

The bedding sand shall consist of clean well graded sand passing through 4.75 mm sieve and suitable for concrete. The bedding should be from either a single source or blended to achieve the following grading.

In sieve size	%passed
9.52mm	100
4.75mm	95-100
2.36mm	80-100
1.18mm	60-100
600microns	25-60
300microns	10-30
150microns	5 - 15
75 microns	0 - 10

Contractor shall be responsible to ensure that single-sized, gap graded sands or sands containing an excessive amount of fines or plastic fines are not used. The sand particles should preferably be sharp not rounded as sharp sand possess higher strength and resist the migration of sand from under the block to less frequently areas even though sharp sands are relatively more difficult to compact than rounded sands, the use of sharp sands is preferred for the more heavily trafficked driveways. The sand use for bedding shall be free of any deleterious soluble salts or other contaminants likely to cause efflorescence.

The sand shall be of uniform moisture content and within 4%-8% when spread and shall be protected against rain when stock piled prior to spreading. Saturated sand shall not be used.

The bedding sand shall be spread loose in a uniform layer as per drawing. The compacted uniform thickness shall be of 45 mm and within +/- 5 mm. Thickness variation shall not be used to correct irregularities in the base course surface.

The spread sand shall be carefully maintained in a loose dry condition and protected against pre-compaction both prior to and following screeding. Any pre compacted sand or screeded sand left overnight shall be loosened before further laying of paving blocks take place.

Sand shall be slightly screeded in a loose condition to the predetermined depth only slightly ahead of the laying of paving unit.

Any depressions in the screeded sand exceeding 5 mm shall be loosened, raked and rescreeded before laying of paving blocks.

LAYING OF INTERLOCKING PAVER BLOCKS:-

Paver blocks shall be laid in herringbone laying pattern throughout the pavement. Once the laying pattern has been established, it shall continue without interruption over the entire pavement surface. Cutting of blocks, the use of infill concrete or discontinuities in laying pattern is not be permitted in other than approved locations.

Paver blocks shall be placed on the uncompact screeded sand bed to the nominated laying pattern, care being taken to maintain the specified bond throughout the job. The first row shall be located next to an edge restraint. Specially manufactured edge paving blocks are permitted or edge blocks may be cut using a power saw, a mechanical or hydraulic guillotine, bolster or other approved cutting machine.

Paver blocks shall be placed to achieve gaps nominally 2 to 3 mm wide between adjacent paving joints. No joint shall be less 1.5 mm not more than 4 mm. Frequent use of string lines shall be used to check alignment. In this regard the "laying face" shall be checked at least every two meters as the face proceeds. Should the face become out of alignment, it must be corrected prior to initial compaction and before further laying job is proceeded with.

In each row, all full blocked shall be laid first. Closure blocks shall be cut and fitted subsequently. Such closer blocks shall consist of not less than 25% of a full blocks.

To infill spaces between 25 mm and 50 mm wide concrete having screened sand, coarse aggregate mix shall be used. Within such mix the nominal aggregate size shall not exceed one

third the smallest dimension of the infill space. For smaller spaces dry packed mortar shall be used.

Except where it is necessary to correct any minor variations occurring in the laying bond, the paver blocks shall not be hammered into position. Where adjustment of paver blocks necessary care shall be taken to avoid premature compaction of the sand bedding.

INITIAL COMPACTION:-

After laying the paver blocks, they shall be compacted to achieve consolidation of the sand bedding and brought to design levels and profiles by not less than Two (2) passes of a suitable plate compactor.

The compactor shall be a high-frequency, low amplitude mechanical flat plate vibrator having plate area sufficient to cover a minimum of twelve paving blocks. Prior to compaction all debris shall be removed from the surface.

Compaction shall proceed as closely as possible following laying and prior to any traffic.

Compaction shall not, however, be attempted within one meter of the laying face.

Compaction shall continue until lipping has been eliminated between adjoining blocks. Joints shall then be filled and recompactd as described.

All work further than one meter from the laying face shall be left fully compacted at the completion of each day's laying. Any blocks that are structurally damaged prior to our during compaction shall be immediately removed and replaced. Sufficient plate compactors shall be maintained at the paving site for both bedding compaction and joint filling.

JOINT FILLING AND FINAL COMPACTION:-

As soon as possible after compaction and in any case prior to the termination of work on that day and prior to the acceptance of vehicular traffic, sand for joint filling shall be spread over the pavement.

Joint sand shall pass a 2.36 mm (No.8) sieve and shall be free of soluble salts or contaminants likely to cause efflorescence. The same shall comply with the following grading limits.

In sieve size	%passed
2.36mm	100
1.18mm	90-100
600microns	60-90
300microns	30-60
150microns	15-30
75 microns	10-20

The Contractor shall supply a sample of the jointing sand to be used in the contract prior to delivering any such materials to site for incorporation into the works. Certificates of test results issued by a recognized testing laboratory confirming that the samples conform to the requirements of these specifications shall accompany the sample.

The jointing sand shall be broomed to fill the joints. Excess sand shall then be removed from the pavement surface and the jointing sand shall be compacted with not less than one (1) Pass by the plate vibrator and joints refilled with sand to full depth.

This procedure shall be repeated until all joints are completed filled with sand. No traffic shall be permitted to use the pavement until all joints have been completely filled with sand and compacted. Both the sand and paver block shall be dry when sand is spread and broomed into the joints to prevent premature setting of sand. The difference in level (lipping) between adjacent blocks shall not exceed 3 mm with not more than 1% in any 3 m x 3 mm area exceeding 2 mm. Pavement which is deformed beyond above limits after final compaction shall be taken out and reconstructed to the satisfaction of the Engineer.

EDGE RESTRAINT:-

Edge restrains need to be sufficiently robust to withstand override by the anticipated traffic, to withstand thermal expansion and to prevent loss of the laying course material from beneath the

surface course. The edge restraint should present a vertical face down to the level of the underside of the laying course.

The surface course should not be vibrated until the edge restraint, together with any bedding or concrete haunching, has gained sufficient strength. It is essential that edge restraints are adequately secured.

SAMPLING AND TESTING PROCEDURES FOR PAVER BLOCKS:-

SAMPLE SIZE:-

Internal - Average of minimum 3 samples per 5000 blocks - for paver block manufacturers.

External - Minimum 2 blocks per 10000 blocks. Average of minimum 8 blocks per site – for captioned contractors.

SAMPLING FOR TESTING:-

Sampling for testing of paver blocks shall be done in accordance with Appendix-A.

COMPRESSIVE STRENGTH:-

Testing for 28 days compressive strength shall be undertaken in accordance with Appendix-B.

The average compressive strength of 60 mm thick paver blocks tested shall be 31.8 MPa.

Note:- 10% lower tolerance limit in compressive strength shall be allowed.

WATER ABSORPTION:-

Testing for water absorption shall be in accordance with IS 2185:1979:Part I (Specifications for concrete masonry blocks) Appendix C

APPENDIX -A

SAMPLING OF PAVER BLOCKS:-

Method of Sampling:

The paver blocks required for carrying out the tests, a sample of 20 block shall be taken from every consignment of 4000 blocks or part thereof of the same size, shape and thickness and the same batch of manufacture from these samples the blocks shall be taken at random for conducting the tests.

MARKING AND IDENTIFICATION:-

All samples shall be clearly marked at the time of sampling in such a way that the designated section of Part thereof and the consignment represented by the sample, are clearly defined.

The sample shall be dispatched to the approved test laboratory taking precaution to avoid damage to the paving in transit. Protect the paving from damage and contamination until they have been tested. The samples shall be stored in water at 20°C + 5°C for 24 hours prior to testing.

APPENDIX - B

PROCEDURE FOR TESTING OF COMPRESSIVE STRENGTH FOR PAVER BLOCK:

Reference: BS 6717 Part I (1993) Specification for Paver Blocks B-1 Testing Machine: The testing machines shall be of suitable capacity for the test and capable of applying the load at the rate specified. It shall comply, as regards repeatability and accuracy with the requirements of relevant IS specification.

B-2 Procedure - The sample specimens shall be tested in wet condition after being stored at least 24 hours, in water maintained at a temperature of 20°C + 5°C before the specimens are submerged in water, the necessary area shall be determined.

The plates of the testing machine shall be wiped clean and any loose grit or other material removed from the contact faces of the specimen. Plywood nominally 4 mm thick, shall be used as packing between the upper and lower faces of the specimen and the machine plates, and these boards shall be larger than the specimen by a margin of at least 5 mm at all points. Fresh packing shall be used for each specimen tested. The specimen shall be placed in the machine with the wearing surface in a horizontal plane and in such a way that the axes of the specimen are aligned with those of the machines plates. The load shall be applied without shock and increased

continuously at the rate of approximately 15 N/sqmm per minute until no greater load can be sustained. The maximum load applied to the specimen shall be recorded.

B-3 ALLCULATION OF CORRECTED STRENGTH:-

The compressive strength of each block specimen shall be calculated by dividing the maximum load by full cross section area and multiplying by an appropriate factors.

Thickness and Chamfer Correction Factors

For Compressive Strength

Work Size Thickness in mm	Correction Factors	
	Plain Block	Chamfered
60	1.00	1.06
80	1.12	1.18
100	1.18	1.24

B-4 COMPRESSIVE STRENGTH CALCULATION:-

The average corrected compressive strength for the designed block section shall be calculated.

APPENDIX -C

METHOD FOR THE DETERMINATION OF WATER ABSORPTION:-

The test specimens shall be completely immersed in water at room temperature for 24 hours. The specimens shall then be weighed, while suspended by a metal wire and completely submerged in water. They shall be removed from the water and allowed to drain for one minute. Visible surfaces water being removed with a damp cloth and immediately weighed. Subsequent to saturation, all specimens shall be dried in a ventilated oven at 100 to 115oC for not less than 24 hours and until two successive weightings at intervals of 2 hours show an increment of loss not greater, than 0.2 percent of the last previously determined mass of the specimen.

Calculate the absorption as follows:

Absorption, kg/m³

A-B

=----- X 10000

B-C

Absorption percent

A-B

Where -----X 100

B

A = wet mass of unit in kg

B = dry mass of unit in kg. And

C = suspended immersed mass of unit in kg.

Recommended Brand names:-

- Lakshmi Tiles, Surat.
- Vyara Tiles.
- Anjani Cement Article, Surat.
- Krishna Precast , Surat.

Bansal Building Material Pvt Ltd.

Item No 42:

Providing and fixing post and pipe railing as per detailed drawing including 3 coats of painting to steel works complete

The scope of item is to provide M.S. angle supported G.I. pipe railing of required section of structural section and C- class G.I. pipe.

For various parts of railing the following latest version of IS Specification should be followed, other applicable codes are also required to be observed.

1. (a) IS : 2062 – 1984 Structural steel (Standard quality)
1. (b) IS: 226-75 Structural steel (Standard quality)
2. IS: 808-64 Rolled steel beam, channel and angle sections
3. IS: 816-1969 Code of practice for metal arc welding for general construction in mild steel The metal work shall be assembled to ensure that all parts are properly fitted and that the dimensional and tolerance requirements shown on the drawings have been obtained. All holes for field connections of parts furnished under these specifications shall be drilled or reamed as noted on the drawings, with the anchorages so assembled.

Painting

General

All paints and painting materials required for painting shall be supplied by the Contractor and shall be included in the price bid. The paints proposed by the Contractor must be approved by the Engineer-in-Charge before acceptance. The analysis in respect of paint properties, paint composition and performance requirements of the paint shall be submitted by the Contractor for examination and approval.

Preparation of Surfaces

Surface preparation shall be made in accordance with the following procedure;

- (i) Weld spatters or any other surface irregularity shall be removed by any suitable means before cleaning;
- (ii) All oil, grease and dirt shall be removed from the surface by the use of clean mineral spirits, xylol or white gasoline (Lead free) and clean wiping materials; and
- (iii) Following the solvent cleaning, the surface to be painted shall be cleaned of all rust, mill scale, and other tightly adhering objectionable substances by sand blasting or grit blasting to uniform bright base metal. Any grit or dust remaining after the cleaning operation shall be completely removed from the surface by wire brushing, air blowing, suction or other effective means before the surface is painted.
- (iv) All surfaces of the embedded parts which are to come in contact with concrete shall be cleaned as mentioned above and given two coats of cement wash to prevent rusting during shipment and while awaiting installation. The item includes all cost of materials such as structural steel, G.I. pipes, paints and any other fixture to complete the item, including cost of labour for fixing in position duly painted.

Payment

Payment shall be made on Rmt. Basis of completed Item.

Item No 43:

providing and fixing in position (different diameter) IS NP3 class reinforced pipe with caulking the joints with cement mortar 1:1 proportion using jute string soaked in cement slurry, finishing joints, and laying pipes to the designed grade and levels, curing etc complete for all lead and lifts and as per MORT&H Specification no. 2900, technical specification and engineer in charge.

The relevant MORT&H specification No 2900 shall apply for this item

The work shall consist of furnishing and installing reinforced cement concrete pipe of the type diameter and length required at the location shown on the drawings or as ordered by the Engineer-in-charge. Reinforced concrete pipe shall be NP3 type conforming to the requirements of IS: 458 and shall be of diameter as specified in the item. Each consignment of cement concrete pipes shall be inspected, if necessary and approved by the Engineer-in-charge, either at the place of manufacture or at the site before their incorporation in the works. NP3, NP2, NP1 pipes are used for R. C. C. Pipes, where testing of pipes will not be feasible the contractors will have to

produce a certificate from the manufacturers on company's letter head the given hereinafter form.

Production of such certificate will not however relieve the contractor from his responsibility of supplying pipes of required standard and will have to bear the loss or damage caused to the work on account of defects found subsequently during the execution. It will also be necessary to purchase these pipes from manufacturer having standard equipments for carrying out various test as per IS : 458 at his factory.

FORM OF CERTIFICATE FOR NP3, NP2, NP1 PIPES

We _____ manufacturer of R.C.C. pipes produce B.C.C.

Pipes as per the requirement of IS: 458 and also carry out the required test at our place. We have acquired equipments for carrying out test and are prepared to carryout test at our factory sites.

We have experience of manufacturing of pipes of _____ years

The pipes supplied by us to M/s. _____ satisfy the requirement of IS: 458

Date: _ _____

Place: _____ Manufacturer's Sign _____

No pipe shall be placed in position until the foundations have been approved by the Engineer-in charge. Where two or more pipes are to be laid adjacent to each other, they shall be separated by a distance equal to at least half the diameter of the pipe subject to minimum of 450 mm. The laying of pipes on the prepared foundation shall start from the outlet and proceed towards the inlet and be completed to the specified lines and grades. The pipes shall be fitted and matched so that when laid in works they form a culvert with a smooth uniform invert. Any pipe found defective or damaged during laying shall be removed at the cost of Contractor. The pipes shall be jointed either by collar joint or by flush joint. In the former case, the collars shall be of R.C.C., 150 to 200 mm wide and having the same strength as the pipes to be jointed. Caulking, space shall be between 13 and 20 mm according to the diameter of the pipes, caulking material shall be slightly wet mix of cement and sand in the ratio of 1:2 rammed with caulking irons. Before caulking the collar shall be so placed that its centre coincides with that of pipe and an even annular space is left between the collar and the pipes. Flush joint may be shaped to form a self centering joint with a joining space 13 cm wide. The joining space shall be filled with cement mortar. 1 cement to 2 sand, mixed sufficiently dry to remain in position when forced with a trowel or rammer. Care shall be taken to fill all voids and excess mortar shall be removed. All joints shall be made with care so that their interior surface is smooth and consistent with the interior surface of the pipes. After finishing, the joint shall be kept covered and damp for at least four days. R. C. C. pipe shall be measured along their centre between their inlet and outlet ends in linear meter. The rate for the pipes shall include the cost of pipe including loading, unloading, handling storing laying in position and joining complete.

Item No 44:

providing and constructing sewer manholes, scraper manholes and unit house connection chamber, as per the type design in brick masonry in c.m.1:5 and inside and outside 15 mm thick plastering inc.m.1:3 necessary 100 mm coping with reinforcement in RCCM-200 fixing C.I. step sand fixing manhole frame and covers (excluding supply of Manhole Frame) over manholes (including Excavation) manhole type A circular type having inside diameter of 1200mm for depth up to 4m.

Sewer Manholes

Location

Manholes shall be constructed at places approved by the Employer's Representative. In case of manhole along the river or drain the top of Manhole shall be raised to safe height above the highest flood level of river /drain as directed by E.I.C.

MATERIALS

Water shall conform to M-1, Cement Conform to M-3, Stone coarse aggregate of 20 mm nominal size shall conform to M-12, Grit shall conform to M-8, Steel reinforcement shall conform to M-18-19. Fly ash brick shall conform to M-15A, Cement mortar of specified proportion shall conform to M-11. Manhole cover with frame of required size and weight shall be procured by the contractor.

Workmanship:

Excavation

The excavation for construction of manhole including dismantling of all types of roads surface guarding, barricading, lightening the trenches, dewatering if required, removing and replacing, shifting of telephone/electric cables, pipe line etc. and all other safety provisions like shoring and strutting etc. till refilling of trenches and completion of manhole construction, stacking of excavated stuff within the specified lead, back filling of selected excavated earth, watering and consolidation etc. complete shall be carried out as per relevant specification of Excavation.

Plain Cement Concrete

The water, sand, cement & stone aggregate of 40 mm nominal size shall be used of approved quality as per standard specification in I.S. 456. Detail specification of materials as given in General Technical Specification shall be observed.

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

Mixing:

The concrete shall be mixed in a mechanical mixer at the site of work. Hand mixing may however be allowed for smaller quality of work if approved by the Engineer-in-charge. When hand mixing is permitted by the Engineer-in-charge in case of breakdown of machineries and in the interest of the work, it shall be carried out on a water tight platform and shall be taken to ensure that mixing is continued until the mass is uniform in colour and consistency. However, in such cases 10% more cement than otherwise required shall have to be used without any extra cost. The mixing in mechanical mixer shall be done for a period of 1.5 to 2 minutes. The quantity of water shall be just sufficient to produce a dense concrete of required workability for the purpose.

Transporting and placing the concrete:

The concrete shall be handed from the place of mixing to the final position in not more than 15 minutes by the method as directed and shall be placed into the final position, compacted and finished within 30 minutes of mixing with water i.e. before the setting commences. The concrete shall be laid in layers of 15 cm. to 20 cm.

Compacting:

The concrete shall be rammed rapidly with heavy iron rammers to get the required compaction and to allow all the interstices to be filled with mortar.

Curing:

After the final set, concrete shall be kept continuously wet, if required by ponding for a period of not less than 7 days from the date of placement.

REINFORCEMENT:

All the reinforcement bars shall be accurately placed in exact position shown on the drawings and shall be securely held in position during placing of concrete by annealed No. 1 binding wire not less than 1 mm is size and by using stay block ornately chair spacers, metal hangers, supporting wires or other approved devices it sufficiently close intervals. Bars shall not be allowed to bag between supports nor displaced during concrete of any other operation of the work. 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.

Bars shall be bend cold to specified shape and dimensions or as directed, attain proper radius of bends, Bars shall not be bent or straightened in a manner that will injure the materials. Bars bend during transport or handling shall be straightened before being used on the work. Unless otherwise specified for mild steel a 'U' type hook at the end of each bar shall invariably be provided to main reinforcement.

In case 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 cold twisted steel bars shall be used with or without hooks at the ends. Deformed bars without hooks shall however, comply with relevant anchorage requirements.

Bars crossing each other where required shall be secured by binding wires (annealed) of size not less than 1 mm in such a manner that they do not slip over each other at the time of fixing and concreting.

As far as possible bars of full length shall be used. In case this not possible overlapping of bars shall be done as directed. The overlaps shall be staggered for different bars and located at points along the span where shear not bending moment is maximum.

When permitted or specified on the drawings joints of reinforcement bars shall be butt welded so as to transmit their full stresses. Welded joints shall preferably be located at points where steel will not be subject to more than 75 percent of the maximum permissible stresses and welds shall be staggered so that at any one section not more than 20 percent of the rods are welded. It shall be ensured that no voids are left in welding and when welding is done in two or three stages, previous surface shall be cleaned properly. Ends of the bars shall be cleaned of all loose scale, rust, grease, paint and other foreign matter before welding. Only competent welders shall be employed on the work.

Bricks for Sewer chamber:

Bricks used for construction of sewer man hole chamber shall conform to the IS 4883-1988. They shall be sound, hard, and homogeneous in texture, well burnt in kiln without being vitrified, table molded, deep red, cherry or copper colored, of regular shape and size and shall have sharp and square and parallel faces. The sewer bricks shall be free from pores, chips, flaws or humps of any kind. Bricks containing ungrounded particles and/or which absorb water more than 1/6th of their weight when soaked in water for twenty-four hours shall be rejected. Over burnt or under burnt bricks shall be liable to rejection. The bricks shall give a clear ringing sound when struck and shall have a minimum crushing strength of 50 kg/sq.cm. Unless otherwise noted in drawings. The class and quality requirements of bricks shall be as laid down in IS: 4883-1988.

The size of the brick shall be 23.0 x 11.5 x 7.5 cm. unless otherwise specified; but tolerance up to ± 3 mm in each direction shall be permitted. Only full size brick shall be used for masonry work. Brickbats shall be used only with the permission of Employer's Representative to make up required wall length or for bonding. Sample bricks shall be submitted to the Employer's Representative for approval and bricks supplied shall conform to approved samples. If required by the Employer's Representative, brick sample shall be tested as per IS: 3495 by Contractor. Bricks rejected by the Employer's Representative shall be removed from the Site within 24 hours.

Cement Mortar

Mortar for brick masonry shall be prepared as per IS: 2250. Manholes shall be constructed in

brick masonry with cement mortar (1:3) unless otherwise specified. Gauge boxes for sand shall be of such dimensions that one bag containing 50 kg. of cement forms one unit. The sand shall be free from clay, shale, loam, alkali and organic matter and shall be of sound, hard, clean and durable particles. Sand shall be as approved by the Employer's Representative. If required by the Employer's Representative Sand shall be thoroughly washed till it is free of any contamination. For preparing cement mortar, the ingredients shall first be mixed thoroughly in dry conditions. Water shall then be added and mixing continued to give a uniform mix of required consistency. Cement mortar shall be used within 25 minutes of mixing. Mortar left unused in the specified period shall be rejected.

The Contractor shall arrange for tests on mortar samples if so required by Employer's Representative. Re tempering of mortar shall not be permitted.

Brick Masonry

All bricks shall be thoroughly soaked in clean water for at least one hour immediately before being laid. The cement mortar for brick masonry work of manholes shall be in the proportion specified in drawing, and as per IS 2212-1962 Brick work 230 mm thick and over shall be laid in English Bond unless otherwise specified. 115 mm thick brick work shall be laid with stretchers. For laying bricks, a layer of mortar shall be spread over the full width of suitable length of the lower course. Each brick shall be pressed into the mortar and shoved into final position so as to embed the brick fully in mortar. Bricks shall be laid with frogs uppermost.

All brickwork shall be in plumb and square/ circular unless otherwise shown on drawing and true to dimensions shown. Vertical joints in alternate courses shall come directly one over the other and be in line. Horizontal courses shall be leveled. The thickness of brick courses shall be kept uniform. For walls of thickness greater than 230 mm both faces shall be kept in vertical planes unless otherwise specified. All interconnected brickwork shall be carried out at nearly one level (so that there is uniform distribution of pressure on the supporting structure) and no portion of the work shall be left more than one course lower than the adjacent work. Where this is not possible, the work shall be raked back according to bond (and not saw toothed) at an angle not exceeding 45 degrees. But in no case the level difference between adjoining walls shall exceed 1.25 M. Workmanship shall conform to IS: 2212.

Brick shall be so laid that all joints are well filled with mortar. The thickness of joints shall not be less than 6 mm and not more than 10 mm. The face joints shall be raked to a minimum depth of 12 mm by raking tools daily during the progress of work when the mortar is still green, so as to provide a proper key for the plastering to be done. When plastering is not required to be done, the joints shall be uniform in thickness and be struck flush and finished at the time of laying. The face of brickwork shall be cleaned daily and all mortar droppings removed. The surface of each course shall be thoroughly cleaned of all dirt before another course is laid on top. If mortar in the lower courses has begun to set, the joints shall be raked out to a depth of 12 mm before another course is laid.

Cement Plaster

All joints in masonry shall be raked to a depth of 12 mm with hooked tool made for the purpose when the mortar is still green and in any case within 48 hours of its laying. The surface to be rendered shall be washed with fresh clean water free from all dirt, loose material, grease etc. and thoroughly wetted for 6 hours before plastering work is commenced. Concrete surfaces to be rendered will however be kept dry. The wall should not be too wet but only damp at the time of plastering. The damping shall be uniform to get uniform bond between the plaster and the wall. The proportion of the cement mortar shall be as approved on relevant drawings. Cement shall be mixed thoroughly in dry condition and then just enough water added to obtain a workable consistency. The quality of water, sand and cement shall be as per relevant IS 383. SRC Cement to be used for internal plastering. The mortar thus mixed shall be used immediately and in no case shall the mortar be allowed to remain for more than 25 minutes after mixing with water.

Curing of plaster shall be started as soon as the applied plaster has hardened enough so as not to

be damaged. Curing shall be done by continuously applying water in a fine spray and shall be carried out for at least 7 days.

Plastering with water proofing shall be done on inner face of brick masonry in cement mortar (1:3) and 20 mm thick unless otherwise specified, as per IS only and cement should be used SRC for inside plastering.

12 mm thick plastering in C.M. 1:3 shall be done outer face of brick masonry of chambers in C.M. 1:3, as per IS only.

Plastering work inside of M H Chamber shall be carried out in two layers, water Proof, to the inner face, the first layer being 14 mm thick and the second layer being 6 mm thick by using water proof compound as per I S standard. The first layer shall be dashed against the prepared surface with a trowel to obtain an even surface. The second layer shall then be applied and finished leaving an even and uniform surface, trowel finished unless otherwise approved by the Employer's Representative.

Cement Concrete Channel

The channel for the manhole shall be constructed in cement concrete of M 20 grade. Both sides of the channel shall be taken up to the level of the crown of the outgoing sewer. They shall be benched up in concrete and rendered in cement mortar (1:1) of 20 mm thickness and formed to a slope of 1 in 12 towards the channel.

Pipe Entering or Leaving Manhole

Whenever a pipe enters or leaves a manhole, bricks on edge must be cut to a proper form and laid around the upper end of the pipe so as to form an arch. All around the pipes, there shall be a joint of cement mortar (1:2) 13 mm thick between it and the bricks.

Scaffolding

For brick work in M.H., single scaffolding shall be permitted. In such cases, the inner end of the horizontal scaffolding pole shall rest in a hole provided only in the header course for the purpose. Only one header for each pole shall be left out. Such holes for scaffolding shall, however, not be allowed in pillars/columns less than one meter in width, or immediately near the skew backs of arches. The holes left in masonry works for scaffolding purpose shall be filled and made good before plastering.

Precast Manhole Frame & cover shall be fixed on manhole in RCC M 20 as per technical drawing.

Deformed / TMT bars conforming to relevant IS of grade Fe 415 shall be used with RCC work for fixing M.H. frame & cover on M.H.

C.I. Steps:

The steps as per detail specification shall be fixed in the fashion narrated in drawing.

Cast iron steps shall be as per IS: 5455-1969. The steps shall be of grey cast iron of grade 15 as per IS: 210. The steps shall be clean, well cast and they shall be free from air and sand holes, cold shuts and wrappings. The portion of the step which projects from the wall of the manhole shall have a raised checkered design to provide an adequate non-slip grip. C.I. steps shall weigh not less than 5.30 kg each and shall be of 165 mm x 385 mm overall dimensions. These steps shall be coated with a black bituminous composition. The coating shall be smooth and tenacious. It shall not flow when exposed to a temperature of 63°C and shall not be brittle as to chip off at temperature of 0 °C.

Where the depth of invert of manhole exceeds 800 mm, steps of approved pattern shall be fixed in the brickwork at the interval of 300 mm vertically and staggered at 380 mm horizontally centre to centre. Providing and fixing safety chain wherever necessary as per the stipulations in the type design etc complete.

75 mm all round vata in C.M. 1:3 shall be provided at bottom of outer periphery of masonry work over foundation concrete as per drawing.

Curing:

All PCC, R.C.C., Brick masonry, plaster, etc. work shall be kept wet for seven days. During this period it shall be suitably protected from all damages.

Mode of Measurement & payment:

The measurement of M.H. will be taken on Number basis as per type design.

Item No 45:

Removing, cleaning and refixing of R.C.C. pipes of canal structure and U.G.P.L. including fixing collars for pipe joints in cement and sand including filling and chaulking joints with cement mortar of 1:1 proportion curing etc complete for all lead and lift

The Measurement of the item shall be in Rmt basis.

Item No 46:

Providing and filling rubbles including hand packing and filling interstices with quarry spalls behind abutments and between returns as directed

The Measurement of the item shall be in cum basis.

The relevant specifications as per MORT&H fifth revision shall be applicable to this item

Item No 47:

Box cutting the road surface to proper slope and camber as per drawing and MORT&H clause no 300 , including setting out, construction of shoring and bracing, removal of stumps and other deleterious matter, dressing of sides and bottom, backfilling the excavation earth to the extent required and utilising the remaning earth locally for road work.

The relevant specifications as per MORT&H fifth revision shall be applicable to this item

The Measurement of the item shall be in cum basis.

Item No 48:

Providing and laying of dry lean cement concrete (DLC) of M15 grade and compacting the same with 8 to 10 Tone vibratory roller as per the Technical specifications and as per drawing and as directed by the Engineer. Rate shall include cost of formwork if any.

The relevant specifications as per MORT&H fifth revision shall be applicable to this item

The Measurement of the item shall be in cum basis.

Item No 49:

Concrete Pavement M-30 - 250 mm th. - construction of unreinforced, dowel jointed, 250 mm thick M30 grade Reinforced cement concrete pavement as per MORT&H clause no 600,1500,1600,1700,2700 and in conformity with the lines, grades and cross sections shown on the drawings. The work shall include furnishing of all plant and equipment, materials and labour and performing all operations in connection with the work, as approved by the Engineer. The unit rate also includes full costs of Kerb construction, contraction, expansion, construction and longitudinal joints. It shall also includes joint filler, keys, caulking rod, debonding strip, sealent primer, joint sealent, dowel bar and tie rod. For construction of road TRIMIX vacuumed dewatering system shall be used.

The relevant specifications as per MORT&H fifth revision shall be applicable to this item

The Measurement of the item shall be in cum basis.

Item No 50:

Preparation of subgrade with compacting, levelling and consolidation of subgrade with miniroller /plate vibrator machine including watering and filling in depressions which occur during the process as directed by Engineer-in-charge.

Immediately following the spreading of the subgrade material rolling shall be started with mini roller/plate vibrator machine.

Except on super elevated portion where the rolling shall proceed from inner edge to outer, rolling, shall be from the edges gradually progressing towards the centre. First the edge/edges shall be compacted with roller running forward and backward. The roller shall then move inwards parallel to the centre line of the road, in successive passes uniformly lapping preceding tracks by at least one half way widths.

Rolling shall continue until the subgrade material is thoroughly keyed and the creeping of the sub-grade ahead of the roller is no longer visible. During the process rolling shall not be done when the sub grade is soft or yielding or when it causes a wave like motion in the sub-grade course.

The rolled surface shall be checked transversely and longitudinally with templates and any irregularities corrected by loosening the surface, adding or removing necessary amounts of subgrade material and rerolling until, the entire surface conforms to desired camber and grade. In no case shall use of screening be permitted to make up depressions.

The binding materials where it is required to be used shall be applied, successively in two or more thin layers at a slow and uniform rate. After each application, the surface shall be continuously sprinkled with water, the resulting slurry swept in with hand brooms or mechanical brooms to fill the voids properly, and rolled during which water shall be applied to the wheels of the rollers if necessary to wash down the binding materials sticking to them. These operations shall continue until the resulting slurry after filling of voids, forms a wave ahead of the wheels of the moving roller. After the final compaction of subgrade course the road shall be allowed to dry overnight. Next morning hungry spot shall be filled with screening of binding materials as directed, lightly sprinkled with water, if necessary and rolled. No traffic shall be allowed on the road until the base has set. The Engineer-in-charge shall have the discretion to stop hauling traffic from using the completed subgrade course if in his opinion it would cause excessive damage to the surface.

MODE OF PAYMENT:-

Payment will be made on Sq.mt. basis consolidation of finished work and shall also include cost of watering, rent of machinery, cost of fuel, wages of drivers and cleaners, earthen and murrum bund etc. and watchman etc.

The relevant specifications as per MORT&H fifth revision shall be applicable to this item

Item No 51:

Providing and fixing hot deep GI grating as per drawing. Rate shall include all cost of material, labour, tools equipments and incidental to complete the work as per specification. The hot deep galvanizing shall be confirmed to MORT&H specification table no 1900-3-viii.

The relevant specifications as per MORT&H fifth revision shall be applicable to this item

The Measurement of the item shall be in kg.

Item No 52:

Structural steel work riveted bolted or welded in builup for all type section in framed work including cutting hosting fixing in position and applying a priming coat of approved steel primer all completed as per the structural designs and direction of engineer in - charge.

The relevant specifications as per MORT&H fifth revision shall be applicable to this item

The Measurement of the item shall be in kg.