

**CONTRACT NO.**

**Bhavnagar Municipal Corporation  
BHAVNAGAR**



**(A WHOLLY OWNED BHAVNAGAR MUNICIPAL CORPORATION UNDERTAKING)**

**ESTIMATED COST**

**BID DOCUMENT FOR UPGRADATION OF DRAINAGE LINE NETWORK IN OLD SOCIETIES OF  
ADHEWADA AREA UNDER BHAVNAGAR MUNICIPAL CORPORATION (BMC), BHAVNAGAR.  
DISTRICT: BHAVNAGAR**

**ESTIMATED COST: RS.10,43,72,277.30/-**

**VOLUME – I: TECHNICAL BID**

**Employer**

**EXECUTIVE ENGINEER**

**(Drainage Dept.)**

**BHAVNAGAR Municipal Corporation**

Sir Mangal Sinhji Road, Near Kalanala,

Bhavnagar,

Bhavnagar,-364001.

Contact Number: 0278 2424801-10

## TENDER NOTICE

1	Department Name	<b>Bhavnagar Municipal Corporation</b>
2	Circle/Division	<b>Executive Engineer (Drainage Department), BMC Bhavnagar</b>
3	Tender Notice No	No.13 BMC/ DRAINAGE/SJMMSVY/tender/2024-25
4	Name of UGD PROJECT:	Government of Gujarat special Infrastructure Grant
5	Name of Work:	<b>BID DOCUMENT FOR UPGRADATION OF DRAINAGE LINE NETWORK IN OLD SOCIETIES OF ADHEWADA AREA UNDER BHAVNAGAR MUNICIPAL CORPORATION (BMC), BHAVNAGAR. DISTRICT: BHAVNAGAR</b>
6	Estimated Cost (INR)	<b>Rs.10,43,72,277.30/- (Indian Rupee Ten Crore Forty-three Lacs Seventy-two Thousand Two Hundred Seventy-seven and Thirty Only)</b>
7	Period of completion of work (In Months)	<b>1 Year (12Months) (Including Monsoons and 3 Months Trial Run)</b>
8	Period of O & M (in Years)	<b>2 Years (24 Months)</b>
9	Bidding Type	Two Bid System
10	Bid Call (Nos.)	1
11	Tender Currency Type	Single
12	Tender Currency Settings	Indian Rupee (INR)
13	Joint Venture	<b>Not Applicable</b>
14	Rebate	Applicable
15	Bid Document Fee / Bid Processing Fees / Tender Fee:	<b>Rs.21,240/- (Rs.18,000/-+ 18% GST) (Non-Refundable)</b>
16	Bid Document Fee Payable To:	<b>Executive Engineer (Drainage Department) BMC Bhavnagar</b>
17	Bid Security/EMD/Proposal Security (INR):	<b>1% of Total tender Cost Rs.10,43,723.00/- (Indian Rupee Ten Crore Forty-three Thousand Seven Hundred Twenty-three Only)</b>
18	Bid Security / EMD In Favour of:	Executive Engineer (Drainage Department) BMC Bhavnagar
	<b>Tender Dates</b>	Note: All Dates are in dd/mm/yyyy, hr: min as per Indian Standard Time (IST)
19	Bid Document Downloading Start Date	<b>Dt. 13 /01/2025 09:00 Hrs onwards</b>

20	Site Visit	At the Convenience of Contractor
	Contact Number	0278 2424801-10
	Contact Address for Site Visit	At BMC Bhavnagar
21	Pre-Bid Meeting	<b>Dt. 18 /01/2025 12:00:00 Hrs onwards</b>
	Address for pre-bid meeting	<b>Bhavnagar Municipal Corporation</b> <b>Address:</b> Sir Mangal Sinhji Road, Near Kalanala, Bhavnagar-364001. Gujarat
22	Bid Document Downloading End Date	<b>Dt.28/01/202518:00:00 hrs</b>
23	Last Date & Time for Online Receipt of Bids	<b>Dt.28/01/202518:00:00 hrs</b>
24	Physical Submission of documents last Date & Time	<b>Dt.03/02/2025 till 18:00:00 hrs</b> Bidder shall send the same in original Physical Document through RPAD/ Speed Post so as to reach to <b>BMC, Bhavnagar. Sir Mangal Sinhji Road, Near Kalanala, Bhavnagar-364001.</b>
25	Bid Opening Date	<b>Bid Opening:04/02/2025 till 17:30 Hrs</b> <b>Technical Opening: On confirmation of receipt of hard copy of Tender Fees &amp; EMD</b>
26	Bid Validity Period	180 Days from the last date of submission of bid.
27	Physical submission of Tender Fee, and Earnest Money Deposit	Instrument of tender fee & EMD shall be submitted in electronic format only through online (By scanning while uploading the bid). This submission shall mean that Tender Fee and EMD are received for purpose of opening the bid. Accordingly offer of only those shall be opened whose tender fee and EMD is received electronically. However, for the purpose of realization of instrument of tender fee & EMD, bidder shall send the same in original through RPAD/ Speed Post so as to reach to <b>BMC, Bhavnagar. Sir Mangal Sinhji Road, Near Kalanala, Bhavnagar-364001.</b> Gujarat as mentioned in point no. 24 above, during office hours. For not submitting DD/FDR/BG in original, bidder shall be banned to participate in any tender of BMC for period of 3 years as a penal action.  Any document in supporting to tender bid shall be submitted in electronic format only through online (by scanning etc.) and submission only in hard copy will not be accepted separately.

28	Payments details	<p>1. Tender fee, Earnest money deposit, PAN Card shall be uploaded online only.</p> <p>2. <b>Tender Fee (Document fee)</b> amounting to <b>Rs.21,240/- (Rs.18,000/-+ 18% GST)</b> (Rupees Thirty-five thousand four Hundred Only) in favour of "BMC Bhavnagar in form of Demand Draft shall be issued by Any nationalized bank or as per list mentioned in latest GR of Finance Department.</p> <p><b>3. Earnest money Deposit</b> <b>Rs.10,43,723.00/-</b> in form of DD or FDR or Bank Guarantee in favour of " BMC Bhavnagar ", valid up to 28 days from the date of closure of the bid validity period of 180 days i.e. (180 days + 28 days=208 days), shall be issued by any nationalized bank or as per list mentioned in latest GR of Finance Department (Enclosed).</p>
29	<b>Special Condition For Submission of EMD,BG,SD,FD:</b>	<b>Henceforth Bank Guarantee, Earnest Money Deposit, Security Deposit, Fixed Deposit, Demand draft of State Bank of India will not be accepted.</b>
	<b>OTHER DETAILS</b>	
30	Officer Inviting Bids:	EXECUTIVE ENGINEER (Drainage Dept.) BMCBhavnagar
31	Bid Opening Authority:	EXECUTIVE ENGINEER (Drainage Dept.) BMCBhavnagar
32	Address:	<b>Bhavnagar Municipal Corporation</b> Sir Mangal Sinhji Road, Near Kalanala, Bhavnagar-364001. Gujarat.
33	Contact Details of Officer Inviting Bid:	0278 2424801-10
34	Submission of tender	<p>The following documents shall be uploaded while submitting the BID online:</p> <ul style="list-style-type: none"> <li>• Scanned copy of Demand Draft as tender fee</li> <li>• Scanned copy of FDR / BG as EMD</li> <li>• <b>Scanned copy of Contractor's registration certificate ("AA" Class) and shall have to comply with Registration requirement mentioned in Volume I, Section II, Clause 1.</b></li> <li>• <b>Scanned copy of Bidder's solvency certificate. (Minimum Rs.2,08,74,455.00/- (As per Current current calendar Year)</b></li> <li>• <b>Scanned copy of GSTIN</b></li> <li>• Scanned copy of PAN card</li> <li>• Scanned copies of Experience certificates showing successful completion of work (with certificate) <b>(in 3A Format Only)</b></li> <li>• Scan copies of financial documents.</li> </ul> <p>In addition to the documents mentioned above, the</p>



		<p>documents required as per attached Forms &amp; Annexure are also to be uploaded. Bidder shall submit their offer i.e., technical bid as well as price bid in Electronic format on stipulated website&amp; date as mentioned in the tender document. No offer in physical form will be accepted.</p> <p><b>If any uploaded scanned submissions do not open, then such documents shall not be considered as “submitted”. And such unopenable docs shall be treated as “Not submitted” and shall not be taken into consideration for evaluation.</b></p>
35	<b>General Terms &amp; Conditions</b>	As Per Tender Document
36	<b>Mode of Quoting Rates</b>	Percentage rate basis, in words and figures at the end of Schedule-B.

**For any clarification the bidder may contact:**

EXECUTIVE ENGINEER - UGD PROJECTs,

Bhavnagar Municipal Corporation,

Sir Mangal Sinhji Road, Near Kalanala,

Bhavnagar-364001.

Gujarat.

Phone- 0278 2424801-10

## **1.0 Details to be furnished along with application: -**

1. Interested Bidders can view these tender documents online. The bidders who are interested in bidding in these tenders can download tender documents as mentioned above.
2. Tender Documents are available only in electronic form. Bidders shall upload the tender documents as per timeline specified as above, Tender fee and Bid Security (EMD) shall have to be furnished as specified in **Sr. No 15 to 18 and 28 of Tender Notice**. The intending bidders have to submit the following documents also. The bidder should submit all the forms electronically only.

a. Power of attorney.

A power of attorney on ₹300/-non-judicial stamp paper of appropriate value duly notarized, if power is delegated for signing the bid to other persons by applicant. (Scanned Copy).

b. Company's profile and Certificate of Registration of company under the law.

Bidders, who wish to participate in this tender, will have to register on <https://tender.nprocure.com>. Further, Bidders who wish to participate in online tenders will have to procure Digital Certificate as per Information Technology Act-2000 using which they can sign, their electronic bids. Bidders can procure the same from GNFC, Ahmedabad, who are licensed certifying authority by Government of India, and they will assist them in procuring the same as below mentioned address. Bidders who already have a valid Digital Certificate need not procure a new Digital Certificate.

M/s. (n) Code Solution, A Division G.N.F.C. Ltd.,

301, G.N.F.C. Info Tower, Bodakdev, S.G. Road,

Ahmedabad, Gujarat – 380054 (INDIA)

Phone No.079-40007501, 40007512, 40007516, 40007517 Fax 079-26857321

**Email: [nprocure@gnvfc.net](mailto:nprocure@gnvfc.net)**

## **2.0 Contacting Officer:**

Further details of the work and plans can be available from the office of  
EXECUTIVE ENGINEER (Drainage Dept.)- UGD PROJECTs,

Bhavnagar Municipal Corporation,

Sir Mangal Sinhji Road,

Near Kalanala,

Bhavnagar-364001. Gujarat

**Phone No.:**0278 2424801-10

**Email Id:** [bmcdrainage@gmail.com](mailto:bmcdrainage@gmail.com)

In case bidder needs any clarification or if any training is required for participating in online tendering, they can contact the following office:

M/s. (n) Code Solution, A Division of G.N.F.C. Ltd.,

301, G.N.F.C. Info Tower, Bodakdev, S.G. Road, Ahmedabad, Gujarat – 380054  
Phone No.079-40007501, 40007512, 40007516, 40007517 Fax 079-26857321

Email: [nprocure@gnvfc.net](mailto:nprocure@gnvfc.net)

### **3.0 DOWNLOAD OF TENDER DOCUMENT:**

The tender document for this work is available only in Electronic format, which bidders can download free of cost from the internet site <https://tender.nprocure.com/>

### **4.0 SUBMISSION OF TENDER:**

Bidder shall submit their offer in electronic format on above mentioned website within the date specified in the Tender Notice after Digitally Signing the same. Offers, which are not Digitally Signed, will not be accepted. No offer in physical form will be accepted and any such offer, if received by the BMC, will be out rightly rejected.

Submission of Tender fee, bid security, other documents shall be as per Tender Notice.

### **5.0 OPENING OF TENDER:**

The Technical bid will be opened as per the date mentioned in Tender Notice on website <https://tender.nprocure.com/>. Intending bidders or their representative who wish to participate in online tender opening can log on to <https://tender.nprocure.com/> on the due date and time, mark their presence or participate in online tender opening. For more details vendors are requested to refer "Vendor Training Manual". Bidder who wishes to remain present at BMC premises at the time of tender opening can do so. Only one representative of each firm will be allowed to remain present. Date of opening of Price bid will be informed only to the qualifying bidders.

### **6.0 GENERAL INSTRUCTIONS: -**

- a) The Bid Document Fee will not be refunded under any circumstances.
- b) EMD in the form specified in tender document only shall be accepted.
- c) The offer shall be valid for 180 days from the last date of submission of bid.
- d) Tenders without Bid Document Fee, Earnest Money Deposit (EMD), Valid Registration Certificate and which do not fulfill all or any of the conditions or those submitted incomplete, in any respect shall not be considered for evaluation.
- e) Not more than one tender shall be submitted by a Bidder.
- f) Conditional tender shall not be accepted.
- g) BMC reserves the right to accept the lowest responsive offer, based on evaluation of package and reject any or all tenders without assigning any reason.

- h)** The notice shall form a part of contract document.
- i)** The bidders are advised to read carefully the “Instruction” and “Eligibility Criteria” contained in the tender documents.
- j)** The internet site address for E-Tender is <https://tender.nprocure.com/> and that of corporate website is <https://bmcgujarat.com>
- k)** The bidder should quote percentage above/below/at par with respect to total amount put to tender in schedule B.

**EXECUTIVE ENGINEER**  
**(Drainage Dept.)**  
**BMC Bhavnagar**

## MEMORANDUM OF WORK IN BRIEF

1. **Name of work: As Mentioned in Tender Notice**
2. **Name of Employer:** EXECUTIVE ENGINEER (Drainage Dept.)  
Bhavnagar Municipal Corporation. BHAVNAGAR
3. **Name of concerned Officer: EXECUTIVE ENGINEER :**
  - a. Address: The office of EXECUTIVE ENGINEER (Drainage Dept.) BMC  
Sir Mangal Sinhji Road, Near Kalanala,  
Bhavnagar-364001.  
Gujarat,
  - b. Phone No.: 0278 2424801-10
  - c. E-mail address:bmcdrainage@gmail.com
4. **Estimated Cost:As Mentioned in Tender Notice**
5. Time allowed for completion of the work: **As Mentioned in Tender Notice**
6. Amount of Earnest Money deposit (E.M.D.) as specified in the bid: **As Mentioned in Tender Notice.**

Mode of submission of tender documents:

- 8.a) Functional guarantees of plant as per Online submission only on  
Volume IIC, Technical bid & Price bid duly <https://tender.nprocure.com/>  
filled in with Scanned copy of EMD and  
tender fee and other supporting  
documents.
- 8.b) Other documents in Hard copy -Tender fee, Bhavnagar Municipal Corporation,  
EMD is required. Sir Mangal Sinhji Road, Near  
Kalanala, Bhavnagar-364001. Gujarat  
**By RPAD / Speed Post only.**

**Note:** Tenders sent by any other mode than specified in 8a & 8b above will be outright rejected.

7. **Validity period of the offer :** 180 days from the last date of submission of bid.
8. **Opening of the Tender :** On the date specified, the electronic tender box will be opened:
9. **Place of opening :** As specified in the Tender Notice
10. **Date & Time of Opening :** As specified in the Tender Notice
11. **Amount of security Deposit:** As specified in the Tender Notice

Bid submission Checklist			
S.No	Particulars	Submission	
		Online	Physical
1	Scanned copy of <b>Tender Fee</b> in the form of DD	Yes/No	Yes/No
2	Scanned copy of <b>EMD</b> in the form of DD/BG/FDR	Yes/No	Yes/No
3	Scanned Copy of <b>Pre-Contract Integrity Pact</b> duly signed by Bidder as per Annexure of RFP	Yes/No	NA
4	Copy of GST registration certificate	Yes/No	NA
5	Copy of PAN Card	Yes/No	NA
6	Duly filled in and digitally signed declaration form as last item of Section-1 & Memorandum duly filled in & digitally signed as given in Section-2	Yes/No	NA
7	EPF Registration Certificate or ESIC certificate as applicable.	Yes/No	NA
	IF not applicable, Bidder should submit an affidavit with his bid subscribing on his company letter head duly attested by Power of Attorney stating “EPF/ESIC Not Applicable” mentioning the reason.		
8	<b>Affidavit</b> stating the authenticity of submitted document and information (On Rs 300 Non-judicial stamp paper duly signed by the authorized representative and notarized)	Yes/No	NA
9	Site visit certificate - To be submitted on company’s letter head duly sealed and signed by POA	Yes/No	NA
10	<b>Power of Attorney</b> duly authorized by notary public (On Rs 300 Non-judicial stamp paper duly signed by the authorized representative and notarized)	Yes/No	NA
11	<b>Joint Venture Agreement</b> to be executed if applicable (On Rs 300 Non-judicial stamp paper duly signed by the authorized representative and notarized)	Yes/No	NA
12	Scanned copy duly filled in approved or authenticated tender Annexures in the prescribed format	Yes/No	NA
13	MOU Memorandum of Understanding (MoU) with qualified technology provider of STP/Pipe Manufacturer/Other Technology provider	Yes/No	NA
14	<b>Details of financial information</b>		
a	Gross Annual Turnover in all kinds of Civil Engineering Works	Yes/No	NA
b	Annual Net Worth or Solvency Certificate	Yes/No	NA
c	CA Audited Balance Sheets to be attached separately	Yes/No	NA
15	Declaration of financial liabilities, work on hand/completed UGD PROJECTs on Rs.300/- non-Judicial stamp paper	Yes/No	NA
16	Scanned copy of all approved/authenticated “ <b>Technical Eligibility &amp; PQ</b> ” documents in the prescribed formats mentioned in BID FORMS		
a	<b>Eligible bidders</b>		

i	<b>Registration details</b> of the firm partnership deed/ Company Incorporation certificate/ Articles of Association/ Memorandum of Association (as applicable) based on type of establishment.	Yes/No	NA
ii	Declaration stating ineligibility for Corrupt and Fraudulent practices in his past assignments	Yes/No	NA
iii	History of termination/blacklisting/debarred by any State Govt/Municipal Corporations/ Central Govt./ Any state Govt Organization, Urban Local body and/or its undertaking company or its SPV, Asian Development Bank/ World Bank or similar international funding agencies organizations due to delay and non-performance in his past UGD PROJECTs	Yes/No	NA
<b>b</b>	<b>Eligibility criteria</b>		
iv	Minimum existence of the Firm	Yes/No	NA
v	Eligible class of Contractor- Certificate of registration as approved contractor of prescribed category-Valid proof of license and registration should be furnished with the bid <b>-Civil &amp; Electrical works</b>	Yes/No	NA
vi	Details of Plant & Machinery available with tenderer for use on the works	Yes/No	NA
vii	Details of Plant & Machinery proposed to be procured for the works	Yes/No	NA
viii	Details of technical, supervisory and administrative personnel employed/engaged or proposed for the work	Yes/No	NA
<b>c</b>	<b>Pre-Qualification criteria</b>		
ix	Minimum average annual Financial Turnover	Yes/No	NA
x	Positive net worth or Solvency certificate of required value in the tender prescribed format	Yes/No	NA
xi	Proof of experience of Similar Nature of Work	Yes/No	NA
xii	<b>Physical criteria experience</b> <i>Note: Physical criteria experience may be different from similar nature of work experience produced with the bid. But it will be part of qualifying criteria</i>	Yes/No	NA
17	The Bidder shall offer his quote in “Envelop” Online only.	Yes/No	NA
	<b>Note:</b> No document should be submitted in hardcopy except tender fee and bid security. Only the original instrument of Tender Fee and Bid Security to be submitted physically.		

**VOLUME – I**

**SECTION-II:  
INSTRUCTIONS TO BIDDERS**



## SECTION – II

### INSTRUCTIONS TO BIDDERS

#### 1.0. GENERAL

Online tenders are invited and published by the Authority as per Tender Notice, for the work **(as mentioned in tender notice)** from the contractors who are registered in **AA class**, in R&B Department or Narmada Water Resources, Water Supply & Kalpsar Department and GWSSB/WASMO department the other bidders equivalent of class in Government (State/Central), Board, Corporation, and Government Undertaking /Organisations of State & Central Government.

- (i) The concerned Contractor shall submit the certificate of registration as in concerned State/ Government bodies/ Authority along with the tender.
- (ii) The Contractors who are not registered in **AA class** in Government of Gujarat (R&B Department or Water resources Department) OR GWSSB/WASMO Department and having the above stated Registration, such Contractor shall have;
  - a) to apply on or before the last date of submission of tender documents to get himself registered in **AA class** in Government of Gujarat (R&B Department or Water resources or GWSSB/WASMO Department);
  - b) to obtain registration in AA class, in Government of Gujarat, (R&B Department or Narmada Water Resources, Water Supply & Kalpsar Department OR) before the date of work order of project contract to be issued, if awarded;
  - c) the proof of valid application for Registration in **Class AA** shall have to be uploaded with the Tender documents;

Failure of taking action mentioned above for (a) and (c) the concerned contractor shall be disqualified and for (b) agency to be bound to the decision of BMC.

- (iii) In case of Bidder participating as a Joint Venture: **(JV Not Applicable)**
  - a) The lead member shall have AA class Registration as per (i) and (ii) above
  - b) The other member shall also have AA class Registration as per (i) and (ii) above.

The proof of registration of all the members of Joint Venture in concerned State/Government bodies/Authority along with documents as per (i) or (ii) to be uploaded along with bidder's submission.

#### 1.1. SPECIAL ATTENTION

- (i) This tender consists for the work **(as mentioned in tender notice)**
- (ii) A pre- bid conference for the works, open to all intending bidders, shall be held on the date & venue as mentioned in the Tender Notice.

- (iii) All Bidders are urged to submit a written request immediately upon receipt of the tender documents for the matter where clarification and/or additional information are desired, along with the details of work. The request shall be submitted not less than four days in advance of the pre-bid conference.
- (iv) The tender document shall be submitted as per procedure laid down in Section-II, Para No. 26, for submission of tender.
- (v) Earnest money deposit details & scanned copy shall be submitted as prescribed online and after submission online, in form specified shall be submitted in office of concerned officer (**As per Sr. No. 27 of Tender Notice**), as per details given online in sealed envelope. If earnest money deposit is not received within prescribed time limit the bid shall be rejected.
- (vi) Tender shall be opened as per procedure laid down in this Section-II, clause 28 and as per detailed tender notice.
- (vii) All Bidders are cautioned that e-tender containing any deviation from the contractual terms and conditions, specifications or requirements shall be rejected as non-responsive.
- (viii) Conditional offer will be out right rejected. No condition shall be included in tender.
- (ix) **Deleted**
- (x) Qualification of bidder will be done whose tender is considered responsive and meets the specified evaluation and qualification criteria as per tender conditions.
- (xi) Bidders shall have to declare regarding the tender submitted in the prescribed format.
- (xii) The department reserves the right to qualify/ disqualify any bidder without assigning any reason thereof.
- (xiii) **The bidder shall be disqualified if;**
  - a. The bidder had made misleading or false representation in the forms, statements and attachment submitted in proof of qualification requirements and/or
  - b. A record of poor performance such as abandoning the work, not properly completing the contract, inordinate delays in completion, litigation history or financial failures etc.
  - c. The Bidder has been blacklisted by any Government/ Non-Government / Private agencies/ Organizations/ Institutions/Government Undertakings and funding Agencies in the last 05 years.

The bidder should provide accurate information on litigation and/ or arbitration resulting from contract completed or under execution by him over the last five years. A consistent history of arbitration awards/ judgments against the bidder or any partner of a joint venture may result in disqualification for proposed work. If the details of litigation history is hidden by the bidder or any partner of a joint venture and later on it comes to knowledge of the employer the bidder shall be disqualified for the proposed work and other appropriate actions shall be taken against the bidder.

The bidder should submit undertaking on non-judicial stamp paper of ₹300/- dully attested by notary public regarding document submitted, are true. BMC would have the right to forfeit the EMD and blacklist to the bidder if any of the information given by the bidder is found faulty or incorrect or misleading.

- (xiv) If the bidder has submitted tender fee and EMD on line & in hard copy, the request of the bidder for not opening of bid shall not be accepted in any circumstances.
- (xv) If bidder has not submitted in original, tender fee and E.M.D. offline, but same is scanned and submitted with his bid online or vice versa within stipulated period, to the designated officer as per Tender document, the bid shall be liable to be considered as non-responsive.
- (xvi) All those documents which are scanned and submitted should be numbered chronologically and with their reference in the self-appraisal of prequalification will have to be given for the proof of qualification.
- (xvii) The bidder/ JV Member /MoU partners whose contracts are earlier terminated / blacklisted/ debarred on account of poor performance in any State Govt/Board/ Municipal Corporations/ Central Govt./ Any State Govt Organization, Urban Local body, and/or its undertaking company or its SPV, Asian Development Bank/ World Bank or similar international funding agencies organizations during last five years, will not be eligible for this tender.
- (xviii) Any bidder who has been barred by the State/Central Government or any entity control by them (Controlling Stake) from participating in any project and the bar subsists as on the day of issue of notice inviting tender and/or submission of bid, the bidder shall not be eligible to submit the tender document either individually or as a member of consortium. However, the bidder submits the bid, the tender shall not be considered for evaluation.

- (xix) The experience of works executed in Government (State / Central), Board, Corporation, and Government Undertaking / Organizations of State & Central Government including all Public Sector Units shall only be considered for evaluation.

The experience certificate from the client equivalent to not below the rank of Executive Engineer shall only be considered. The experience of sublet works/ in house/ private/ foreign work shall not be considered. The bidder who had already applied as a prime contractor for the same tender shall not be eligible to apply under joint venture.

**Note:**

The experience of work (only for ETP/CETP work) in private organization shall be considered if the work carried out under the overall banner of industrial association either independently or by formation of SPV. (A scanned copy of the original certificate by the concerned authorized signatory of industrial association/ State/ Organization shall be required for evaluation). Bidder to submit the following documents, if employer is not a government organization:

- a. Self-attested copy of Work Order
  - b. Self-attested copy of Agreement
  - c. Self-attested copy of Completion Certificate
  - d. Self-attested copy of Final Bill
  - e. Self-attested copy of TDS certificates
  - f. Performance Certificate from employer (As per Form-23)
- (xx) Bidders shall not be listed under a declaration of ineligibility for corrupt or fraudulent practices issued by the central/ state govt. in accordance with sub clause 45.1 (c) or not in the list of black listed contractors announced by Government (State / Central), Board, Corporation, and Government Undertaking / Organizations of state & central government including all Public Sector Units.
- (xxi) Bidder (individual or any member in case of JV/ consortium) shall not have suffered bankruptcy/ insolvency during the last 5 years. For this, Certificate of CA appointed by the bidder must be produced along with a self-affidavit to same effect of prescribed stamp paper of affidavit.
- (xxii) Memorandum of Understanding (MOU) shall be done before online submission of BID to BMC.
- (xxiii) The approved Vendor list for the Civil/Mechanical/Electrical/Instrumentation and other equipments is available on GWSSB's official website at <http://www.gwssb.gujarat.gov.in>. The Vendor list as available on the date of

submission of the BID and in future at the time of approval of QAP, the latest or amended vendor list shall be applicable & considered for executing the job.

- (xxiv) BMC shall provide ROU (Right of Use) of adequate width for laying of pipeline/construction of WTP once as per availability. During excavation, laying, back filling, any damages to the hidden object beneath the earth like pipelines, cables etc. shall be the responsibility of contractor. The contractor has to rectify the same without any financial implication on BMC within stipulated time as instructed by EIC. The crop compensation only for single time is the responsibility of BMC.

However, if any delay, due to any reasons in contractor's part, if the next crop compensation is required to be paid, it will be the responsibility of the contractor and in event of failure by contractor, to do so, BMC shall deduct and recover the same amount from contractor's bills. Any damage in the area beyond the ROU, will be responsibility of the contractor. After successful completion of the pipeline works like laying, excavation, back filling etc the contractor is also required to level the field where pipelines are laid in original condition with caution.

Further ROU (Right to Use) in terms of length shall be provided as per site availability by BMC and it may be in selective available length also. Any demand by the contractor to get continuous length to start the work will not be considered by BMC under any circumstances.

- (xxv) The contractor shall have to pay the labor registration fee of Rs. 25 / labor and annual contribution of Rs. 75.00 vide Ref: PB/Monitoring Cell/ Standard Contract Document/2013-14/2294, Dated: 07/09/2013. (Circular Enclosed).
- (xxvi) Since this is an EPC contract, the bidders are to quote their rates based on the actual market scenario. Any rates which are found to be abnormal higher/lower or unworkable shall lead to rejection of the bid. The decision of the BMC shall be final and legally binding to all the bidder.
- (xxvii) It shall be the sole discretion of the competent authority to decide the total numbers of packages for evaluation/award to the bidder based on the facts and circumstances of the cases.

This will be based on the least cost combination and as may be the most advantageous to BMC and shall be final and binding to all the bidders.

- (xxviii) The rates for recommended Spare Parts/ Patented materials as required for successful operation of the facilities for Operation & Maintenance works shall be considered while quoting the rates for O&M.

- (xxix) The Employer wishes to clarify that regardless of the contents of a bid, the successful Bidder shall be required to conform in all respects to the requirements of the Contract, and all proposals shall be subject to the approval of the Engineer In-charge. Acceptance of the Bidder's proposal for the purposes of bid evaluation and award of tender shall not be construed as approval by the BMC. All details will subsequently be subject to the approval of the Engineer In-charge during execution of the Contract. No claim for additional payments shall be entertained, other than in accordance with the Contract.
- (xxx) If mutually agreed the Operation and Maintenance contract can be extended for further four years.
- (xxxi) All necessary repairs, maintenance, overhaul, replacements etc., shall be made during the Operation and Maintenance, to maintain the Plant & associated works at the status of formal handing over after the commissioning. After completion of the Operation and Maintenance period the Sewage Treatment Plant(s) is to be handed over to BMC in satisfactory working condition. At the end of Operation and Maintenance period the plant shall be handed over to the Employer in fully functional condition and without capacity degradation..
- (xxxii) In the event of any rectification of a defect or replacement of any defective goods during the warranty period, the warranty for the rectified/replaced goods shall be extended to a further period of twelve months (12) months from the date such rectified / replaced goods start functioning to the satisfaction of the purchaser.
- (xxxiii) The Pact begins when both the parties have legally signed it. It expires for the Contractor/Vendor 12 months after the completion of whole work i.e. Including O&M under the contract and for all other bidders. If any claim is made/lodged during the time, the same shall be binding and continue to be valid despite the lapse of this Pacts as specified above, unless it is discharged /determined by the competent authority of BMC.
- (xxxiv) The Contractor shall completely indemnify and hold harmless BMC and its employees against any liability, all claims by statutory authorities, losses under various Labour Laws, statutes or any civil or criminal laws in connection with employees deployed by him or damages sustained by it or them by reason of any breach of contract, wrongful act or negligence by the Contractor or any of its employees engaged in the provision of the manpower services to BMC.

## GENERAL DESCRIPTION OF THE WORK

This is a BID DOCUMENT FOR PROVIDING, SUPPLYING, LOWERING, LAYING, JOINTING R.C.C. NP3 PIPE UPGRADATION OF SEWER COLLECTING SYSTEM AND EXISTING ROAD RESTORATION WORK AT VARIOUS LOCATION OF BHAVNAGAR MUNICIPAL CORPORATION, BHAVANAGR DISTRICT: BHAVNAGAR.

The successful bidder shall have to undertake site surveys, route surveys for ascertaining the terrain, topography of site and planning the scheme as well as to conduct geotechnical investigations for designing of foundation system of various structures. The contractor shall carry out all the process & hydraulic design, civil, structural, mechanical, and electrical and instrumentation designs and submit to client or their representative for review and approval before executing the same. This is applicable to all the components of this project. The successful bidder shall have to prepare and submit 'As Built Drawings' depicting the exact construction carried out on site, in soft and hard copy format. Defect liability period shall be part of the contract and start from successful commissioning of the plant.

BMC will be responsible to get all statutory permissions and clearances from the concerned central/ state or local statutory authorities. However, the contractor shall have to manage the day-to-day co-ordination and follow up activities based on these clearances on site. BMC shall provide required help and assistance for such day-to-day activities.

After the successful commissioning of the scheme, the contractor shall operate and maintain the system for **(As Mentioned in Tender Notice Sr No 8)** years. This includes carrying out necessary repairs of equipment, which meet original specifications; replacement of any components required for smooth running of the system, etc. during O&M period, the replacement of the items should be of the same specifications as in the original contract documents. Efficiency of all the systems as considered for design should be maintained throughout the O & M period. The power factor should be maintained throughout the maintenance period.

The detailed description of the works is included in the "Extent of Work" under Volume-III (A).

### PARTICULARS PROVISIONAL

The particulars of the proposed works given as well as in the accompanying brief note are provisional and must be considered only as advance information to assist bidders.

### 1.2. DEFINITION

In this document the following words and expressions have the meaning hereby assigned to them.

1.2.1. **APPROVED / APPROVAL:**

Means approval in writing.

1.2.2. **B.I.S:**

Means Bureau of Indian Standards.

1.2.3. **BIDDER / TENDERER:**

Means individual, proprietary firm, firm in partnership, Limited Company, Corporation or group of firms forming a joint venture, MOU Partner applying to become eligible to tender.

1.2.4. **DIGITAL SIGNATURE:**

Any electronic documents, which contains encrypted message digest using hash algorithm and Tender public key is known as Digitally Signed Documents and the process of generating such document is called digitally signing it.

1.2.5. **CONSTRUCTION PLANT:**

Means all equipment, appliances or things of whatsoever nature required for the execution, completion or maintenance of the primary work or temporary works but does not include materials or other things intended to form or forming part of permanent work.

1.2.6. **CONTRACT:**

Means the instruction and information to bidder, general and special conditions of contract, specifications, drawings, schedules of quantities & tender prices, other parts of the Bid Document, the formal agreement between the employer and contractor and all addenda and attachments related to the above.

1.2.7. **CONTRACTOR:**

Means the bidder with whom the contract has been made for executing the works.

1.2.8. **CONTRACT VALUE:**

Means the agreed amount stated in the Contract Agreement for Designing, Supplying, Construction, Installation, Testing, & Commissioning including O&M of the works and to remedy of any defects, and includes adjustments (if any) in accordance with the Contract

1.2.9. **CAPITAL COST :**

Means the agreed amount stated in the Contract Agreement for Designing, Supplying, Construction, Installation, Testing, & Commissioning of the works for the stipulated period in



accordance with the Contract. It is the total cost needed to bring a project to a commercially operable status.

**1.2.10. CONTRACTOR'S EQUIPMENT:**

Means all equipment, tools, apparatus, machinery, vehicles and other things required for the execution and completion of the works and the remedying of any defects. However, Contractor's Equipment excludes Temporary works, Departmental equipment (if any) or plant, materials and any other things intended to form or forming part of the permanent works.

**1.2.11. COMPLIANCE WITH LAWS:**

The Contractor shall, in performing the Contract, comply with all applicable Laws related to all actions of his obligation as per the contract.

**1.2.12. CONTRACTOR'S OBLIGATIONS:**

Means the obligation to execute the Project in all its entirety and shall, without limitation, include Operation and Maintenance.

**1.2.13. CONTRACTOR'S USE OF EMPLOYER'S DOCUMENTS:**

As between the Parties, the Employer shall retain the copyright and other intellectual property rights in the Employer's requirements and other documents made by (or on behalf of) the employer. The contractor may, at his own cost, copy, use, and obtain communication of these documents for the purposes of the contract. They shall not, without the Employer's consent, be copied, used or communicated to a third party by the Contractor, except as necessary for the purposes of the Contract.

**1.2.14. COUNTRY:**

Means the Country in which the site (or most of it) is located, where the Permanent Works are to be executed.

**1.2.15. COMMISSIONING:**

Means the successful operation of the project after successfully running for a period of three (1) months as a part of trial run or till prescribed parameters are not attained & whichever is later of the two.

**1.2.16. COMPLETION:**

Means the date of successful commissioning of all the equipment/ facility in the scheme after satisfactory running for three months as a part of trial run or till prescribed parameters are not attained & whichever is later of the two

1.2.17. **DAY:**

Means a day from midnight to midnight.

1.2.18. **DEFECTS LIABILITY PERIOD:**

Means the period of **3 years** (36 Month) from the certified date of completion of work. It shall be counted after the successful trial runs for a period of 3 months or till prescribed parameters are not attained & whichever is later of the two. During the defect liability period the contractor shall be responsible for repair and replacement of any defective material used on the entire work and he will carry the full liability to make good to the complete satisfaction of the Engineer In-charge, any defects in the completed work or any bad work visible or detected afterword's.

1.2.19. **DRAWINGS:**

Means the drawings referred to in the specifications, any modifications of such drawings approved in writing by the Executive Engineer, and such other drawings as may from time to time be furnished or approved in writing by the Engineer-in-charge.

1.2.20. **E- TENDER :**

Tender in which the bidder can participate online by means of logging in onto the respective website is called E- Tender.

1.2.21. **EMPLOYER / OWNER / DEPARTMENT:**

Bhavnagar Municipal Corporation Gujarat or the person named as Employer or Owner in the Contract Agreement and the legal successor in title to this person.

1.2.22. **EMPLOYER'S EQUIPMENT:**

Means the apparatus, machinery and vehicles (if any) made available by the Employer for the use of the Contractor in the execution of the Works, as stated in the Employer's requirements but does not include plant which has not been taken over by the Employer.

1.2.23. **EMPLOYER'S USE OF CONTRACTOR'S DOCUMENT:**

As between the Parties, the Contractor shall retain the copyright and other intellectual property right of the Contractor's Documents and other design documents made by (or on behalf of) the Contractor.

The Contractor shall be deemed by signing the Contract to give the Employer a non-terminable, transferable, non-exclusive royalty-free license to copy, use and communicate the Contractor's Documents, including making and using modifications of them. This license shall:

- Apply throughout the actual or intended working life (whichever is longer) of the relevant parts of the Works.
- Entitle any person in proper possession of the relevant part of the works to copy, use and communicate the Contractor's documents for the purposes of completing, operating, maintaining, altering, adjusting, repairing and demolishing the works, and
- In the case of Contractor's Documents which are in the form of computer programs and other software, permit their use on any computer on the site and other places as envisaged by the Contract, including replacements of an computers supplied by the Contractor. The Contractor's Documents and other design documents made by (or on behalf of) the Contractor shall not, without the Contractor's consent, be used, copied or communicated to a third party by (or on behalf of) the Employer for purposes other than those permitted under this Sub-Clause.

**1.2.24. ENGINEER-IN-CHARGE:**

Means the Engineer-in-Charge of the works, or in-charge of specified parts of the works under the contract or such other assistants or sub-ordinates to whom the Engineer-in Charge may have delegated certain duties, acting separately within the scope of the particular duties entrusted to them.

**1.2.25. ESTIMATED COST:**

The estimated cost of the Project (the "Estimated Cost") has been specified at Sr No 6 of Tender Notice.

**1.2.26. FACILITY:**

Means the entire system to be designed and constructed in accordance with the provisions hereof, including the equipment, buildings, structures, ramps, pits, pipes, pipeline appurtenances, fencing, lighting, testing and analysis equipment, tools, computers, software programs, safety equipment, plant machinery, supplies, instruments and inventory incorporated therein, as well as all open areas within the site, and including any additions, modifications, alterations, adjustments, replacements and repairs as may be made thereto from time to time.

**1.2.27. GOODS:**

Means Contractor's Equipment, Materials, Plant and Temporary Works, all or any of them as appropriate.

1.2.28. **GOVERNMENTAL AUTHORITY / GOVERNMENT:**

Means any Central or State authority or body exercising executive, legislative, judicial, regulatory or administrative functions, including, without limitation, any Government authority, agency, department, board, commission or instrumentality of Indian or any political subdivision thereof, court, tribunal, arbitrator or self-regulatory organisation.

1.2.29. **IT ACT-2000:**

Means Information Technology Act, 2000 of Government of India

1.2.30. **JOINT AND SEVERAL LIABILITIES:**

If the Contractor constitutes (under applicable Laws) a joint venture, consortium or other unincorporated grouping of two or more persons:

- These persons shall be deemed to be jointly and severally liable to the Employer for the performance of the contract.
- These persons shall notify the Employer of their leader who shall have authority to bind the Contractor and each of these persons; and

The contractor shall not alter its composition or legal status without the Prior consent of the Employer.

1.2.31. **LAWS:**

Means and includes all the provisions of all National (or state) legislation, Indian statutes, regulations, ordinances, codes, official or other standards, administrative or other rules, zoning and other plans and restrictions, building and other permits, judgements awards and decrees of, or agreements with any Governmental, semi-Governmental or quasi- Governmental Authority as currently in effect or as may be in effect from time to time and /or as may be amended or supplemented from time to time.

1.2.32. **MAINTENANCE STANDARD:**

Means the requirements for maintaining, repairing, and renewing the Facility:

- a. As set forth in this tender document;
- b. Required pursuant to applicable Law;
- c. As may be necessary for keeping the facility in a satisfactory working condition such that the Facility will continuously comply with the Operation Standard; and
- d. As may be necessary to ensure that the Facility shall continuously be in an optimum working condition and state in relation with the lifetime of the Facility.

1.2.33. **MATERIALS:**

Means things of all kinds (other than Plant) intended to form or forming part of the Permanent Works, including the supply (only materials if any) to be supplied by the Contractor under the Contract.

1.2.34. **MATERIAL SUPPLIER:**

Means the person who supplies goods or services. A supplier may be distinguished from a contractor or subcontractor, who commonly adds specialized input to deliverables also called vendor.

1.2.35. **MONTH:**

Means from the beginning of a given date of calendar month to the end of preceding date of the next calendar month.

1.2.36. **O & M MANUAL:**

Means the final Manual for the Operation and Maintenance of the Facility to be prepared in accordance with the requirements of Bid Documents by the contractor. Bidder shall provide this at the time of commissioning of the Project.

1.2.37. **ONLINE :**

Any activity that is done on website is referred as 'online' activity for e.g., Submission of Bid online would mean that technical & price Bid has to be submitted on website.

1.2.38. **OFFLINE :**

Any activity that is done in conventional route is referred as 'Offline' activity for e.g. "Submission of Tender fee, Earnest Money Deposit , Registration Certificate, Solvency Certificate, etc in Offline mode" would mean that the tender fee, Earnest Money Deposit, Registration Certificate, Solvency Certificate etc is to be Submitted to the Office of the concerned Executive Engineer physically.

1.2.39. **OPERATION AND MAINTENANCE OBLIGATIONS:**

Mean the obligation of the Contractor pursuant to the agreement to operate and maintain the facility on and from the start date of O&M until the date of completion of this Agreement.

**1.2.40. OPERATION AND MAINTENANCE PERIOD:**

Means the time period after the issue of Successful Commissioning Certificate and continuing for the term of the Agreement.

**1.2.41. OPERATION AND MAINTENANCE COST:**

Means the amount agreed upon by the Employer to the Contractor, towards fulfilment of the Contractor's Operation and Maintenance Obligations.

**1.2.42. OPERATION STANDARD: Means**

- The Performance Guarantees;
- All applicable Laws;
- All of the requirements, policies and procedures set forth in the O & M Manual
- All other operational requirements set forth in this Agreement.

**1.2.43. PERFORMANCE GUARANTEES:**

Means the List of Guarantees offered / provided by the Contractor in his Bid Submission pursuant of the Bid Documents.

**1.2.44. PERMANENT WORKS:**

Means the works to be designed and executed by the Contractor under the Contract.

**1.2.45. PIPE SUPPLIER:**

Means the person that supplies pipes.

**1.2.46. RUPEE:**

Means Indian National Rupees (INR)

**1.2.47. SCANNED COPY :**

Electronic Copy of any document generated using a Scanner is called scanned copy.

**1.2.48. SITE:**

Means the specific areas / lands and other places on, under, in or through which, the works are to be executed or carried out and any other lands or places provided by the owner for the purposes of the contract together with such other places as may be specifically designated in the Contract or subsequently approved as forming part of the site.

**1.2.49. SYSTEM :**

Means the computer which hosts the website (<https://tender.nprocure.com>), using which Bidder participates in the tendering process.

1.2.50. **SUBSTANTIAL COMPLETION:**

Substantial Completion of the work means when the work or designated portion thereof is sufficiently completed in accordance with the contract except for any minor outstanding works and defects which will not substantially affect the use of works or section for their intended purpose.

1.2.51. **TAKING OVER:**

Means, the Owner shall take over the project after contractual completion of the O&M period and meeting all contractual obligations, Terms & Conditions as agreed by the contractor.

1.2.52. **TEMPORARY WORKS:**

Means all temporary works of every kind required for successful execution of the Contract.

1.2.53. **TESTS ON COMPLETION:**

Means the tests which are specified in the Contract or agreed by both Parties or instructed as a Variation, and which are carried out (Test on Completion) before the works or a section (as the case may be) are taken over by the Employer.

1.2.54. **TRIAL RUN PERIOD:**

Trial run period for the work is 3 months of the entire scheme including achievement of prescribed performance parameters.

In the event of non-achievement of prescribed parameters within a period of 3 months, specified above the trial run period could be extendable to a period till the performance parameters are achieved. During the trial run period the contractor shall be responsible for the maintenance of the entire scheme including all staff, labour, material, power etc. repair of any defects/ replacement of the defective material used at the cost at his own cost.

1.2.55. **UPLOAD :**

The process of transferring electronic document from Bidder's computer using internet connection to the website (<https://tender.nprocure.com>) is called uploading.

1.2.56. **EXECUTIVE ENGINEER:**

Means the Executive Engineer the overall in charge of the works.

1.2.57. **WEEK:**

Means seven consecutive days.

1.2.58. **WORKS:**

Means the works / action to be executed in accordance with the contract.

**1.3. BID INVITATION:**

Means the call / invite by The **Bhavnagar Municipal Corporation** (hereinafter referred to as "the Employer" or BMC) from all interested and eligible bidder's for Water Supply Schemes as per Tender Notice.

**1.4. DOWNLOAD OF TENDER DOCUMENTS:**

The tender documents are available in electronic form, from the website <https://tender.nprocure.com>. Interested bidders can view these tender documents online and can download tender documents.

**1.5. Particular Provisional**

The particulars of the proposed works given herein as well in the accompanying brief note are provisional and must be considered only as advance information to assist bidder.

**1.6. Present Status of the Work:**

This is a proposed plant along with facilities, needs to be designed and executed as per the specifications and BOQ etc.

**2.0 Time of Performance:**

The successful bidder will be expected to complete the works as per Sr no. 7 of tender notice from the date of Letter of Intent.

The O&M time period shall be (**As Mentioned in Tender Notice Sr No 8**) (including defect liability period), from the date of issue of Successful Commissioning Certificate.

**3.0 Project Implementing Agency:**

The "Bhavnagar Municipal Corporation " shall be the project- implementing agency. This contract shall be administered and managed by the "**Executive Engineer (Drainage Department) Bhavnagar Municipal Corporation, Sir Mangal Sinhji Road, Near Kalanala, Bhavnagar**, for and on behalf of Bhavnagar Municipal Corporation and shall act as the "Engineer In-charge."

**4.0 Allocation of Risk & Responsibilities:**

**4.1 Contractor:**

The preliminary designs and details contained in the bid documents are based on limited and indicative field data as available with the Employer at the time of preparation of the



bidding documents. Bidder shall be responsible to verify/ examine/ check and make his own assessment of the site, site data, soil data and the schematic details shown in the bid documents based on his own investigations and/ or additional surveys, if required, at bidder's own cost.

The contractor shall be responsible to make good and bring to original position road and land surface, etc. damaged during laying of pipelines and construction of structures or while carrying out any activities related to this contract, at his cost.

The Contractor shall be responsible for all the damages that may occur during the execution of the work, to the underground cables, power lines, telephone lines, other water/sewer lines and other infrastructure facilities etc. while executing the works under this contract and shall bear all costs relating to repairs / replacements.

- 4.2 The contractor shall be responsible for failure of any components of the works executed by him during the full period of contract and the defect liability period. The contractor shall have to replace defective/ damaged/non-standard components of the executed works as may be identified by the engineer in charge at the cost of the contractor.

The Contractor will prepare and present interim/running and final bills.

The Contractor shall be responsible for the safety and performance of all civil and other structure up to the end of period of defect liability period. The damages/defects identified by the "Engineer in charge" shall be made good, as per Standards, by the contractor at his cost and risk. In case of collapse of structures in part or full replacement/ reconstruction shall be done by the contractor at his cost and risk.

#### **The Employer:**

- a) The **Bhavnagar Municipal Corporation** assures all participants for the contract that, adequate financial resources are available to cover the financial requirements and funds are available to meet the disbursement needs of the construction contracts in accordance with the provisions of tender documents.

All the material shall be inspected by Bhavnagar Municipal Corporation internal system and/or through Third Party Agency appointed by the board.

BMC will provide indicative drawings and design parameters as may be required for works to be designed by the contractor.

Bhavnagar Municipal Corporation will approve and pay all interim / running / final bills presented by the Contractor after due verification against the provisions of contract.

Statutory charges and other charges such as fees, insurance, damage, NOC etc. will be in the scope of Contractor. Statutory clearances and permissions shall be in the scope of Contractor. BMC will only provide necessary support to the Contractor during coordination with respective agencies. The responsibility and liability of statutory clearances lies with the Contractor. No claim for extension of time will be entertained in this regard.

The BMC will make available land for laying the pipeline & will be responsible for payment of crop compensation etc. in case of laying the pipeline in private/ government land. However, once clearance/ possession is obtained and established through mutual consent of the owner, its day-to-day management on site shall be the responsibility of the contractor for which Bhavnagar Municipal Corporation shall provide only necessary help and assistance.

- b) All bids are to be completed and returned to the Employer in accordance with these Instructions to Bidders.
- c) A copy of the available reports and data has been kept for reference in the office of: (Name, Address, Contact Person & nos. of Executing Authority as per appendix to bid details)

**6. ONE BID PER BIDDER:**

Each bidder shall submit only one bid either by himself, or as a partner in a joint venture. A bidder who submits or participates in more than one bid under this proceed will cause all those bids to be rejected.

**7. COST OF BIDDING:**

The bidder shall bear all costs associated with the preparation and submission of its bid, up to acceptance of the offer. The Employer will in no case be responsible or liable for those costs.

**8. SITE VISIT:**

- 8.1 The bidder is advised to depute a suitable team to visit and examine the Site of Works and its surroundings for fully understanding of the job and ascertain the difficulties that may be encountered during execution of the works and for obtaining

for himself, on his own responsibility, all information that may be necessary for preparing the bid and entering into the Contract. The cost of visiting the Site shall be entirely at bidder's own expense.

## **8.2 COMMUNICATION:**

### **8.2.1. AIRPORTS:**

Ahmedabad is the nearest International Airport from the site, Baroda is the nearest domestic Airport from the site of work.

### **8.2.2. Railway:**

The Railway station is at Surat, Vadodara, Ahmedabad, Mumbai and Delhi are connected by B.G. Railways. All the district places of the state are connected by railways.

### **8.2.3. Roads:**

Express highway is passing from Ahmedabad to Vadodara. National Highway 8 A, 8B & 8C are passing in Gujarat State. All the districts and taluka places including cities are connected with well-defined road networks.

## **9 DETAILS OF APPROACH**

Approach to the site of works: The bidder has to make own arrangements for approaching the site

## **10 GENERAL FACILITIES**

### **10.1. Hotel/ Guest House Facilities:**

At Bhavnagar hotels up to Three-star standard and Government Circuit house are available. The Govt. Circuit houses are available at all district places.

### **10.2. Housing:**

The Bhavnagar Municipal Corporation has not envisaged any provision of house colony for contractors. The contractor, therefore, has to make his own arrangement for housing his staff and labourers.

### **10.3. Marketing facilities**

Marketing facilities for day-to-day needs are generally available. Special & major marketing centres are in nearby cities Ahmadabad, Rajkot, Vadodara, Anand etc.

#### 10.4. **Water Supply**

The charges and expenditure for arrangement and usage of water shall be borne by the Contractor during construction phase and Operation and Maintenance phase.

#### 10.5. **Medical Aids**

Government and private Hospital facilities are available at all districts. However, the contractor will have to make own arrangement for medical services for his labour and staff.

#### 10.6. **Electric Power**

The contractor will have to arrange with Gujarat Electricity Board, Gujarat for his power requirements during construction phase & Trail run. All charges for the use of power including maintenance shall be borne by the contractor and paid directly to the concerned authorities. He shall comply with all the requirements for purchase and use of electric power. During Operation and Maintenance, power charges will be reimbursed by the BMC to the extent of maximum consumption decided by Engineer-In-Charge.

#### 10.7. **Post, Telegraph and Telephones**

Post and Telephone services are available for public use at all district places.

#### 10.8. **Supply of Diesel, petrol and Oil**

Petrol and diesel pumps are installed by private agencies in all district places. The contractor shall have to make his own arrangement for procuring the lubricants required by him.

### 11 **CLIMATE AND WORKING SEASON**

#### 11.1. **Temperature**

Gujarat State has tropical climate. The daily minimum temperature ranges from 5° Celsius in December- January to 27° Celsius in April-May. The daily maximum temperature varies from 30 Degree Celsius in December- January to 47 Degree Celsius in April –May.

#### 11.2. **Rainfall**

Average annual Rainfall ranges from less than 500 mm the North West region to over 2000 mm in the South, with most part of the State receiving 200mm to

1000mm of rainfall. About 95% of rainfall occurs during the months June to September leaving remaining period of the year almost dry.

**11.3. Working Season:**

Since rainfall is spread over the period starting from middle of June to the end of September, It is generally not contentions and intense except for few days.

The above information of Climate of the project area is given only as helping information in good faith and BMC does not carry any liability for providing this information. The interested parties may refer the reports and forecast issued by the Indian Meteorological Department or other weather agencies for their use.

**B. BIDDING DOCUMENTS**

**12. CONTENT OF BIDDING DOCUMENTS**

12.1 The bidding documents are those stated below, and should be read in conjunction with any Addenda issued there to in accordance with Clause 14.

<b>VOLUME: I</b>	<ul style="list-style-type: none"><li>• Section I : Tender Notice</li><li>• Section II : Technical Bid</li></ul>
<b>VOLUME – II</b>	<ul style="list-style-type: none"><li>• General conditions and contract (GCC)</li></ul>
<b>VOLUME – III:</b>	<ul style="list-style-type: none"><li>• General Technical Specification (Civil)</li><li>• Item Wise Technical Specification (Civil)</li><li>• Data sheet</li></ul>
<b>VOLUME –IV</b>	<ul style="list-style-type: none"><li>• Price bid.</li><li>• Schedule B</li></ul>
<b>VOLUME-V</b>	<ul style="list-style-type: none"><li>• Operation &amp; maintenance</li></ul>

12.2 The bidder is expected to examine carefully the contents of the Bidding documents. Failure to comply with the requirements of bid submission will be at the bidder's own risk. Pursuant to **Clause 28** under “**E. Opening of Tender**” bids which are not substantially responsive to the requirements of the bidding documents will be rejected.

**13 CLARIFICATION OF BIDDING DOCUMENT:**

A prospective bidder requiring any clarification of the bidding documents may notify the Employer in writing or by fax (hereinafter the term "fax" is deemed to include electronic transmission such as facsimile, cable and telex) at the Employer's address indicated in the Invitation for Bids. The Employer will respond to any

request for clarification, which it receives earlier than 4 days prior to Pre-bid meeting. Copies of the Employer's response, including a description of the enquiry, will be communicated on **tender.nprocure.com**.

#### **14. AMENDMENTS OF BIDDING DOCUMENTS:**

- 14.1 At any time prior to the deadline for submission of bids, the Employer may, for any reason, whether at its own initiative or in response to a clarification requested by a prospective bidder modify the bidding documents by issuing amendment.
- 14.2 Any addendum/amendment thus issued shall be part of the bidding documents pursuant to Sub-Clause 12.1, and shall be communicated on tender.nprocure.com
- 14.3 To afford prospective bidders reasonable time in which to take an addendum into account in preparing their bids, the Employer may extend the deadline for submission of bids, in accordance with Clause 26, Submission of Tender.
- 14.4 All amendments and modifications issued by the Employer shall be deemed to be integral part of the contract to be signed with the successful bidder.

#### **C. PREPARATION OF BIDS**

#### **15. LANGUAGE OF BID:**

The bid, and all correspondence and documents, related to the bid, exchanged between the bidder and the Employer shall be written in the English language. Supporting documents and printed literature furnished by the bidder may be in another language provided they are accompanied by an accurate translation of the relevant passages in the English language, in which case, for purposes of interpretation of the bid the English translation shall prevail.

#### **16. DOCUMENTS COMPRISING THE BID:**

- 16.1 The bid submitted by the bidder shall comprise two envelopes submitted simultaneously, one containing only the "**Technical Proposal**" and the other the "**Price Proposal**".
- 16.2 The technical proposal shall contain the following;
- (i) Bid Form for Technical Proposal and Appendix to Technical Proposal;
  - (ii) Power of Attorney
  - (iii) Information on Qualification
  - (iv) Confirmation of Eligibility
  - (v) Schedule of Major items of equipment
  - (vi) Schedule of major items of Constructional plant
  - (vii) Schedule of key personnel
  - (viii) Schedule of compliance with the bidding documents

- (ix) Schedule of construction facilities
- (x) Schedule of construction method
- (xi) Any other material required to be completed and submitted by bidders in accordance with these instructions to bidders.
- (xii) Form of Bid Security

16.3 The price proposal shall contain the following;

- (i) Bid form for price proposal and Appendix to price proposal;
- (ii) Schedule of prices:
- (iii) Schedule of Payment
- (iv) Any other materials required to be completed and submitted by bidders in accordance with these Instructions to Bidders.

**17. BID FORM & PRICE SCHEDULE:**

The Bidder shall complete the Bid Forms and schedules furnished in the bidding documents in the manner and detail indicated therein, following the requirements of Clause 15 and Clause 16.

**18. BID PRICES:**

18.1 Unless specified otherwise in Employer's requirements, Bidders shall quote for the entire facilities on a "single responsibility" basis such that the total bid price covers all the Contractor's obligations mentioned in or to be reasonably inferred from the bidding documents in respect of the design, manufacture, including procurement and subcontracting (if any), delivery, construction, installation and completion of the facilities. This includes all requirements under the Contractor's responsibilities for testing, pre-commissioning and commissioning of the facilities and, where so required by the bidding documents, the acquisition of all permits, approvals and licenses, etc. services as may be specified in the bidding documents, all in accordance with the requirements of the Conditions of Contract.

18.2 The bidders shall have to give detailed rate analysis in justification of the prices as may be required by the employer as a part of the evaluation process, if so desired by the employer.

**19. BID CURRENCIES:**

The prices shall be quoted on fixed and firm price basis in Indian currency i.e. Indian currency (INR) Only.

**20. BID VALIDITY:**

- 20.1 Bids shall remain valid for a period of **180 days** from the last date of submission of bid.
- 20.2 In exceptional circumstances, prior to expiry of the original bid validity period, the Employer may request that the bidders extend the period of validity for a specified additional period. The request and the responses there to, shall be made in writing. A bidder may refuse the request without forfeiting its bid security. A bidder agreeing to the request will not be required or permitted to modify its bid, but will be required to extend the validity of its bid security for the period of the extension, and in compliance with Clause 18 in all respects.

**21 BID SECURITY:**

- 21.1 The bidder shall furnish, as part of its bid with the technical proposal, a bid security amount as specified in the Tender Notice.
- 21.2 The bid security shall, at the bidder's option, be in one of the following form:
- (a) A Demand Draft payable to the officer inviting bid as per tender notice and issued by short listed bank as per tender notice.
  - (b) Fixed deposit receipt pledged in the name of the officer inviting bid as per tender notice and issued by short listed bank as per tender notice and valid up to 28 days from the date of closure of the bid validity period of 180 days. **i.e. (Total of 180+28=208 days).**
  - (c) Unequivocal and unconditional Bank Guarantee in the prescribed format given in this document issued by short listed bank as per tender notice and valid up to 28 days from the date of closure of the bid validity period of 180 days. The format of the bank guarantee shall be in accordance with the sample form included in Section–IV as Form-19. Other formats may be permitted subject to the prior approval of the Employer. The bid security shall remain valid for 28 days beyond the original validity period for the bid and beyond any period of extension subsequently requested under Sub-Clause 20.2. **i.e. (Total of 180+28=208 days)**
- 21.3 Any bid not accompanied by an acceptable bid security shall be rejected by the Employer as non-responsive.
- 21.4 The bid securities of unsuccessful bidders will be returned as promptly as possible.
- 21.5 The bid security of the successful bidder will be returned when the bidder has signed the Contract Agreement and furnished the required performance security.



21.6 Within 10 days from the date of issue of the letter accepting his tender, the successful Bidder shall furnish the required Security Deposit for performance and plus additional security if any for unbalanced bids in accordance with the condition of the Contract and attend the office of the Engineer In-charge for execution of the Contract documents. If he fails to furnish the Security Deposit for performance or to execute the Contract for the work offered to him, his EMD shall be forfeited and the Bidder may be disqualified from tendering for further works for three years.

21.7 The bid security may be forfeited;

- (a) If the bidder withdraws its bid, during bid validity period specified
- (b) If any document submitted by the bidder are false and fraudulent
- (c) If the successful bidder fails
  - i. To furnish security deposit in accordance with the relevant clause in the bid.
  - ii. To sign the contract with in time limit specified in the bid.

21.8 In case of forfeiture of EMD, Bidder shall be disqualified and shall not be allowed to bid for further works under Bhavnagar Municipal Corporation for three years.

## **22. ALTERNATIVE PROPOSALS BY BIDDERS:**

Bidders are not permitted to give any alternative offer containing technical or other alternatives. Their bid proposals shall be in total conformity of the employer's requirement as described in the bidding documents.

## **23 PRE- BID MEETING:**

23.1 The bidder or its official representative is invited to attend a pre-bid meeting, which will take place at:

**Venue** : As mentioned in Tender Notice

**Date** : As mentioned in Tender Notice

23.2 The purpose of the meeting will be to clarify issues and to answer questions on any matter that may be raised at that stage.

23.3 The bidder is requested to submit any questions in writing or by cable, to reach the Employer not later than four day before the pre-bid meeting.

23.4 Minutes of the meeting, including the text of the questions raised and the responses given, will be transmitted without delay to all of the bidding documents. Any modification/ corrections/ amendments to the bidding documents shall be declared after the pre-bid meeting and shall be the listed as part of the minutes of the pre-bid meeting or separately thereafter as may be necessary. The pre bid minutes and the modifications /corrections/ amendments issued by the employer

subsequent to the issue of bidding documents shall be signed with the successful bidder.

- 23.5 Non-attendance at the pre-bid meeting will not be a cause for disqualification of a bidder.

**D. SUBMISSION OF BIDS**

**24 METHOD OF TENDERING:**

- 24.1. If the tender is uploaded by an individual, it shall be digitally signed by the individual.
- 24.2. If the tender is uploaded by a proprietary firm, it shall be digitally signed by the proprietor.
- 24.3. If the tender is uploaded by a firm, in partnership, it shall be digitally signed by all the partners of the firms or alternatively by a partner holding power of attorney for the firm in which case a certified copy of the power of attorney shall accompany the tender, a certified copy of the partnership deed, full name, current address of the firm, current addresses of all the partners of the firm shall also accompany the tender.
- 24.4. If the tender is uploaded by a limited company or a corporation, it shall be digitally signed by a duly authorized person holding the powers of attorney for signing the tender. Such limited company or corporation may be required to furnish satisfactory evidence of its existence before the contract is awarded. They should also furnish Articles of Memorandum of Association.
- 24.5. Each bidder shall submit only one bid for the particular work. A bidder who submits more than one bid in the particular work will be disqualified.
- 24.6. The joint Venture: (If applicable) is allowed as per Clause no. 34 of Section-II
- The Lead Partner shall submit complete information required in the forms pertaining to each firm in the group and state along with the Bid as to which of the firms shall have the responsibility for tendering and completion of the Contract document and furnish evidence admissible in law in respect of the authority assigned to such firm on behalf of the group of firms for tendering and for completion of the Contract documents. Full information and satisfactory evidence pertaining to the participation and responsibility of each member of the group of firm in the Tender shall be furnished along with the tender. A certified copy of the Joint Venture Agreement in prescribed form (specified at Form-22) shall be submitted along with the Tender.
- 24.7. The tender documents uploaded in the name of an individual bidder shall not be used by a Joint Venture. Joint venture shall have to upload the tender document in the name of JV only, if he wants to apply.

- 24.8. Each bidder shall submit only one bid for the particular work. A bidder who submits more than one bid in the particular work will be disqualified.
- 24.9. All witnesses and sureties shall be person of status and probity their full name, occupation and addresses when they fill the vendor registration form provided in the website. [www.gwssb.nprocure.com](http://www.gwssb.nprocure.com)
- 24.10. In case at time of tender uploading, if any of the above information has changed then the Bidder shall correct the same by making the modification in his personal profile.

## **25 ACCOMPANIMENTS TO TENDER**

The Bidder shall have to upload following documents which are digitally signed by Bidder's Digital Certificate with his tender.

- 25.1. Scanned Copy of the latest Income Tax Return with permanent account number (PAN) and Income Tax ward where assessed.
- 25.2. The bidder shall submit GSTIN along with other details required under GST Act to BMC the contractor shall be responsible for deposition of applicable GST to the concerned authority.
- 25.3. Scanned copies of client certificate showing, performance of the Bidder working with BMC/ GWIL / GWSSB or any employer for ongoing works as per prescribed Proforma mentioned in Section-III.
- 25.4. A scanned copy of declaration showing the details of all works completed and works on hand with the contractor and the value of works that remain to be executed.
- 25.5. Scanned copy of Registration or renewal receipt as approved contractor of concerned state Govt./ Railway/ CPWD/Government shall be submitted by bidder as per Volume I, Section II, Clause 1 General.
- 25.6. Scanned copies of the Power of Attorney duly authorized by a notary public, if power is delegated for signing the Bid to other person by the Bidder.
- 25.7. Scanned copy of E.M.D. in accordance with relevant clause in "Tender Notice" of tender notice and the original shall also be submitted in physical form by RPAD/Speed Post.
- 25.8. Scanned Copy of the Solvency Certificate from Bank of required amount as per Tender Notice. **(As per Current Calander Year)**

- 25.9. Scanned copy of Account payee Demand Draft for Tender Fee in accordance with relevant clause of Tender Notice, and also in physical form shall also be submitted by RPAD/Speed Post.
- 25.10. Scanned copy of all the prescribed Forms & Annexure mentioned in Section-III, also in physical form in separate sealed cover by RPAD/Speed Post in the office of The Executive Engineer as mentioned in Tender Notice.
- 25.11. Scanned copy of the detailed statement of the turnover (Engineering Works Only) of last seven completed financial years audited and certified by the Chartered Accountant.
- 25.12. The bidder should submit undertaking on non judicial stamp paper of ₹300/- duly notarized regarding document submitted, are true. BMC would have the right to forfeit the EMD and black list to the bidder if any of the information given by the bidder is found faulty or incorrect or misleading.
- 25.13. If the Bidder Firm is a member of a Group of Companies (with a common name), scanned copies of all relevant documents clearly indicating the stake of the bidding Firm in the equity of each firm of the Group, Turnover, Net Tangible Worth and Cash Flow of each company wherein the stake of the Bidding Firm is 51% or more in terms of equity.
- 25.14. All MOU's shall be on a Non Judicial stamp paper of appropriate value duly notarised and signed by respective authorised representatives.
- 25.15. Form of Pre-integrity pact
- 25.16. GST Registration certificate and details
- 25.17. Attested copy of Memorandum of Work in Brief
- 25.18. EPF Registration Certificate or ESIC certificate as applicable or Affidavit with bid subscribing on company letter head duly attested by Power of Attorney stating non-applicability of EPF/ESIC mentioning the reason.
- 25.19. CA Audited Balance Sheets to be attached separately.

Note: The above accompaniments should be included in List of Submittals, Form-O.

## **26. SUBMISSION OF TENDER:**

- 26.1. The Bidder must submit online duly filled in the entire tender document i.e., technical bid and price-bid available on website the rate and the along with other details in Schedule B of tender document.
- 26.2. The bidder shall fill the required details/ data/ information in the prescribed form of tender document.
- 26.3. Tender in offline mode will not be accepted.

- 26.4. The tender i.e. Technical bid and Price bid, dully filled in shall be uploaded on tender.nprocure.com up to the date and time mentioned in the Tender Notice.
- 26.5. The employer at his discretion can extend the last date for submission of tender by amending the bidding document in which case all rights and obligations of the employer and bidder will thereafter be subject to the last date as extended. The bidder shall be responsible for extending the validity of tender accordingly, failing which his bid shall be rejected as non-responsive.
- 26.6. Bidders will have to submit F.D.R./DD/Bank Guarantee for Earnest Money Deposit and Demand Draft of tender fee in a separate sealed envelope and other technical documents in another sealed envelope. The documents shall be submitted by RPAD/Speed Post only to the designated officer, as mentioned in the Tender Notice & submission made by courier shall not be considered. Each cover must clearly be marked with the contents i.e. **“TENDER FEE & EMD”** and **“TECHNICAL BID DOCUMENT”**

**27. LATE AND DELAYED TENDER:**

As a rule the system will not accept any Tender after the due date and time and hence in case of E-Tenders there will be no late tender.

**27.1 STATING OF RATES**

The percentage above/below/at par at the end of Schedule – B must be submitted in words and figures only on the website. Amount in words will be automatically generated by system. Total amount of each item and the grand total in figures and the respective words will be automatically calculated by the computer and displayed.

**E. OPENING OF TENDER**

**28. OPENING OF TENDERS**

The Designated Officer of BMC will open the e-Tender on the date as mentioned in the tender notice, if possible in his office at the address specified in the Tender Notice. The intending Bidders, if they wish may participate in online Tender opening process and view the result on tender.nprocure.com To participate in online tender opening, bidder will have to log in with his user ID and password and click on “Mark my attendance button” to view Tender result. For more details, please refer “Vendor Training Manual.”

**1. Opening of Technical Bid:**

The designated officer of Bhavnagar Municipal Corporation will open technical bid first at the address specified in the Tender Notice. The evaluation of Technical Bid will be done as per **“Clause F: Evaluation of Tender”**.

**2. Opening of Price Bid:**

The price Bid of ONLY qualified bidders shall be opened as decided here after.

The designated Officers of Bhavnagar Municipal Corporation will open each price bid on or after the date and time mentioned in the Tender or time and date pre-intimated to qualified bidders on and the print out of total amount quoted in Schedule B and the condition if any put forth by the Bidder. The Bidder can see his price bid as well as other Bidders' entire price Bid who have participated in the E-Tender.

All Tenders will be opened online irrespective of the presence of the Bidder.

## **F. EVALUATION OF TENDER**

### **EVALUATION & COMPARSION OF TECHNICAL PROPOSAL:**

The Employer will carry out a detailed evaluation of the bids in order to determine whether the bidders are qualified and whether the technical aspects are substantially responsive to the requirements set forth in the bidding documents. In order to reach such a determination, the Employer will examine the information supplied by the Bidders and other requirements in the bidding documents, taking into account the following factors:

#### **QUALIFICATION**

The determination will take into account the Bidder's financial, technical, production capabilities and past performance; it will be based upon examination of the documentary evidence of the Bidder's qualifications submitted by the Bidder, pursuant to Clause 24, as well as such other information as the Employer deems necessary and appropriate; and

An affirmative determination will be a prerequisite for the employer to continue with the evaluation of the technical proposal; a negative determination will result in rejection of the Bidder's bid.

#### **TECHNICAL:**

Overall completeness and compliance with the Employer's Requirements

## **29 EVALUATIONS OF TECHNICAL BIDS**

- 29.1. The bidder shall be qualified on the basis of information furnished by the bidder in accordance with Clause-25 above, in support of his capability with reference to qualification criteria laid down.
- 29.2 Even though the bidder meets the above qualification criteria, he shall be disqualified if:
  - a. The bidder had made misleading or false representation in the forms, statements and attachment submitted in proof of qualification requirements and/or

- b. A record of poor performance such as abandoning the work, not properly completing the contract, inordinate delays in completion, litigation history or financial failures etc.
- c. Bidder has been blacklisted by any Government/ Non-Government / Private agencies/ Organizations/ Institutions/ Government Undertakings and funding Agencies in the last 05 years.

The bidder should provide accurate information on litigation and/ or arbitration resulting from contract completed or under execution by him over the last five years. A consistent history of arbitration awards/ judgments against the applicant or any partner of a joint venture may result in disqualification for proposed work. If the details of litigation history are hidden by the applicant and later on it comes to knowledge of the employer the bidder shall be disqualified for the proposed work and other appropriate actions shall be taken against the bidder.

The bidder should submit undertaking on non-judicial stamp paper of Rs. 300/- duly attested by notary public regarding document submitted, are true. Board would have the right to forfeit the EMD and black list to the bidder if any of the information given by the bidder is found faulty or incorrect or misleading.

- 29.3 During the process of evaluation the Bhavnagar Municipal Corporation may visit and inspect the works carried out by the bidder in order to assess the performance of the work. The bidder shall have to make arrangement for inspection of work at the respective work site only. This shall also be considered for evaluation with reference to performance of the bidder.
- 29.4 Depending upon the actual bid capacity assessed and other qualifying requirements, the applicant will be qualified for the work. However, at the price bid evaluation stage, a careful check of the appropriate references with reference to the information submitted by the bidder will be done and in no case, a contract will be awarded to a bidder lacking in the financial criteria.

### **30. Evaluation of Price bid**

- 30.1. Quoted Tender rates shall have to be reasonable and competitive to meet with the timely and satisfactory performance of the contract.
- 30.2 Reasonability of Tenders' proposed method and technique of construction, construction programme, sequence of components of the work and proposed resources assigned to the work shall be seen where it has been called for in the tender.
- 30.3. (a) If the Bid of the successful bidder is seriously unbalanced in relation to the estimated cost of the work/ item (s) to be performed under the Contract, Bhavnagar Municipal Corporation may require the bidder to produce detailed

rate price analysis for any of all Items of the Bid of the quantities to demonstrate the internal consistency of this rate Price with the construction methods proposed. After evaluation of the rate analysis, the competent authority may require, that, the amount of the Performance Security set forth in “**Clause No.21 under Bid Security**” above of the contract be increased at the expense of the successful Bidder to a level sufficient to protect the Bhavnagar Municipal Corporation,, against financial loss in the event of default of the successful Bidder under the contract.

- (b) In respect of those items for which the quoted rates are more than 10% above the overall percentage of accepted tender, the payment of such items in the running bills shall be made at rate of that item which was used for the estimate plus or minus overall variation percentage of the accepted tender plus 5% of the estimated rate of that item. The balance amount as per accepted tender rate shall be withheld from the running bills and will be released as per R&B Department Circular no. PARCH/102008/ (61) dated 03-05-2013. No interest will be payable for such withheld amount. This shall be taken care by way of payment schedule and quoted rates need not be changed.
  - (c) The contract performance for actual execution and the payments to be made for the work shall be based on such bid rates as per (a) and (b) above wherever applicable for the purpose of running account bills. However, the final payments shall be made based on the item wise quoted rates.
  - (d) Any decision of Bhavnagar Municipal Corporation regarding the interim rates at which payment shall be made in accordance with the above Clauses shall be final and binding to the Bidder.
  - (e) The application of the above clause (a) & (b) above shall be at the discretion of the employer.
- 30.4 As the work shall be executed on EPC contract basis on lump sum amount in the abstract of price schedule, however the contractor should have quoted the item wise rate in the breakup of price schedule for the purpose of running account bill. In case of variation of the quantities in any item which needs revision of rates in accordance with "**Clause No. 14, Volume-I (B)**", the revision of rate of the particular item shall not be considered more than the quoted rate of such item.
- 30.5. To assist in the examination, evaluation and comparison of Tenders, the Bhavnagar Municipal Corporation may ask the Bidders individually for clarification of their tenders including break up of work done. The request for clarification and the response shall be in writing but no changes in the price or substance of the tender shall be sought, offered or permitted.



**31** Bhavnagar Municipal Corporation reserves the right to accept or reject any Tender without assigning any reason.

**32. PROCESS TO BE CONFIDENTIAL:**

Information relating to the examination, clarification, evaluation and comparison of bids and recommendations for the award of a contract shall not be disclosed to bidders or any other persons not officially concerned with such process. Any effort by a bidder to influence the Employer's processing of bids or award decisions by any way may result in the rejection of the bidder's bid.

**33 PRELIMINARY EXAMINATION OF TECHNICAL PROPOSAL:**

The Employer will examine the bids to determine whether they are complete, whether the documents have been properly signed, whether-the required security is included, and whether the bids are generally in order. Any bids found to be non-responsive for any reason or not meeting the minimum levels of the performance or other criteria specified in the bidding documents will be rejected by the Employer and not included for further consideration.

**34.0 JOINT VENTURE CONSORTIUM (JV) (Not Applicable)**

Joint venture consortium of Maximum Two firms/ members / companies, as partners shall be allowed for the works.

All the Members of the JV shall be jointly and severally responsible for this Contract. The Member of the JV holding highest stake shall be the Lead Partner. The JV shall comply with the following requirements:

- (a) A Joint venture agreement must be submitted along with the documents in which minimum share of lead member shall have to be 60% and share of other members, individually shall not be less than 25%.
- (b) All the members of the Joint Venture firms shall have to collectively satisfy all the criteria mentioned.

In joint venture both the members shall be an Indian citizen, Indian partnership firm or Indian private/ public limited company.

All the members of Joint Venture shall have registration as per Volume I, Section II, Clause I.

- (c) The individual members who join in JV shall have to give an undertaking that they will maintain status-quo till the completion of the work is awarded to the JV

Consortium, the same JV Consortium shall be maintained till the satisfactory completion of the work. This undertaking shall be submitted on Stamp paper ₹300/-. Duly signed by authorized signatory, which shall be notarized.

- (d) In case of Bidder participating as a Joint Venture, on his selection for award of contract, all the partners/members of the Joint Venture will have to sign the Contract with the employer and will be jointly and severally liable for performance of the contract. Award of Contract will be in the name of Joint Venture consortium which will be considered as "Legal Entity" as far as this Bid/ Contract is concerned.
- (e) The Bid, and in case of a successful bid, the Form of Contract Agreement, shall be signed with the name of Joint Venture which will be legally binding on all the partners;
- (f) Lead partner shall be declared as Prime Bidder authorized to be in charge; and this authorization shall be evidenced by submitting a Power of Attorney signed by legally authorized signatories of all the partners;
- (g) The member in charge shall be authorized to incur liabilities, receive payments and receive instructions for and on behalf of any or all partners of the Joint Venture and the entire execution of the contract including defect liability period;
- (h) All members of the Joint Venture shall be jointly and severally liable for the execution of the Contract in accordance with the Contract terms, and a relevant statement to this effect shall be included in the Authorization mentioned under (b) above as well as in the Bid Form and the Form of Contract Agreement (in case of a successful Bid); and,
- (i) A copy of the stamped and notarized agreement entered into by the Joint Venture partners shall be submitted with the Bid. Roles, responsibilities and financial stakes of all members of the Joint Venture consortium shall be clearly and unambiguously prescribed in the Joint Venture agreement. In case of non prescription, the JV agreement will be declared as invalid and the bid will be treated as non responsive.
- (j) In case of Financial Criteria, if bidder participate in Joint Venture, financial strengths of each of the JV members individually shall not be less than minimum qualifying criteria worked out in proportionate to their financial stakes in the JV.

In case of physical criteria, either of the JV members shall meet the qualifying requirement in any single completed project without taking into account their financial stake in the JV agreement.

Each JV member shall have required Registration, solvency certificate, project manager having 5 years experience, existence of company as per tender requirement. Each member shall satisfy these requirements separately.

- (k) The contractors participating in the name and form of a Joint Venture consortium shall have to clearly and unambiguously define the role, responsibilities and financial stake of each of the partners, the lead partner shall also have to be defined. On award of contract to such a Joint Venture consortium, each of the members of the Joint Venture consortium shall have to sign the Contract. Each member of the JV shall be jointly and severally responsible for the performance of the contract.
- (l) An original notarized copy of the agreement as prescribed in Form-22 entered into by the joint venture partners shall be submitted with the bid. It should also distinctly show the financial participation of each member of the joint venture and the responsibility of each member as regards planning and execution of the work.
- (m) In case of conflict between the terms in contract agreement and the Joint Venture documents, the terms in the contract agreement shall prevail.
- (n) The experience of the Sole Entity / Joint Venture only in India shall be applicable for WTP works in this bid.

**35. DELETED**

**G. AWARD OF CONTRACT**

**36 SUCCESSFUL BIDDERS:**

The Employer will award the Contract to the bidder whose bid has been determined to be substantially responsive in terms of minimum qualification requirement and technical requirements to the bidding documents and who has offered the Lowest Evaluated Bid Price, provided that such bidder has been determined to be eligible & qualified in accordance with the provisions mentioned under “**Clause F. Evaluation of Tender**” in **Section-II**. A substantially evaluated responsive Tender is one, which conforms to all the terms, conditions and specifications of tender documents without material deviation or reservation. The material deviation or reservation is one,

- 36.1. Which affects in any substantial way the scope, quality or performance of the works.
- 36.2. Which limits in any substantial way inconsistent with tender documents, the Employer’s ‘right’ or the Bidder’s obligations to the contractor.

36.3. Whose rectification would affect unfairly the competitive position of other bidders presenting substantially responsive tender.

**37 EMPLOYER'S RIGHT TO ACCEPT ANY BID OR TO REJECT ANY OR ALL BIDS:**

37.1. Those Tenders which do not have Digital Signature attached shall be rejected.

37.2. Tender without Earnest Money Deposit(EMD), will be treated as non-responsive and will be out rightly rejected.

37.3. Notwithstanding the above, the Bhavnagar Municipal Corporation reserves the rights to accept or reject any bid or to cancel the Bidding process and reject all Bids at any time prior to award of contract, without thereby incurring any liability to the affected Bidder or Bidders or any obligation to inform the affected Bidder or Bidders on the grounds of the competent authority's action.

37.4. In addition to the above, the Tender will also be liable to be rejected out rightly if, the Bidder or in the case of a firm, each partner or the person holding the Power of Attorney thereof does not digitally sign.

**38 NOTIFICATIONS OF AWARD:**

38.1 Prior to the period of bid validity prescribed by the Employer, the Employer will notify the successful bidder by fax, confirmed by registered letter, that its bid has been accepted. This letter (hereinafter and in the Conditions of Contract called the "Letter of Intent") shall name the sum which the Employer will pay the Contractor in consideration of the execution, completion and maintenance of the Works by the Contractor as prescribed by the Contract (hereinafter and in the Conditions of Contract called "the Contract Price").

38.2 The notification of award will constitute the formation of the Contract.

38.3 Upon the furnishing by the successful bidder of a performance security (and domestic preference security where required).

**39 SIGNING OF CONTRACT AGREEMENT:**

39.1 At the same time that he notifies the successful bidder that its bid has been accepted, the Employer will send the bidder the Form of Contract Agreement, incorporating all agreements between the parties.

39.2 Within 15 days of receipt of the Form of Agreement, the successful bidder shall sign the Form and return it to the Employer.

39.3 As soon as the work is awarded and Letter of Award (LOA) is issued to the contractor, a tripartite agreement between Urban Local Bodies (ULB), Bhavnagar Municipal Corporation

(BMC) and contractor shall be executed on ₹300/- non judicial stamp paper and duly notarized by notary public. Form 27 in Volume I is the proforma for tripartite agreement.

#### **40 PERFORMANCE SECURITY:**

40.1. The successful bidder shall have to pay Performance Security in the form of Unequivocal bank guarantee issued by any shortlisted bank as per Notice Inviting Tender having branch at Ahmedabad or Bhavnagar and the same shall become refundable as per Clause No. 01 under General Conditions of Contract.

#### **41 CORRUPT OR FRAUDULENT PRACTICES:**

41.1 Bhavnagar Municipal Corporation requires that bidders/suppliers/contractors have followed the highest standard of ethics during the procurement and execution of such contracts. In pursuance of this policy:

(a) Defines for the purposes of this provision, the terms set forth below as follows:

(i) **“Corrupt practices”** means behaviour on the part of officials in the public or private sectors by which they improperly and unlawfully enrich themselves and/or those close to them, or induce others to do so, by misusing the position in which they are placed, and it includes the offering, giving, receiving, or soliciting of anything of value to influence the action of any such official in the procurement process or in contract execution; and

(ii) **“Fraudulent practice”** means a misrepresentation of facts in order to influence a procurement process or the execution of a contract to the determination of the Borrower, and includes collusive practice among bidders (prior to or after bid submission) designed to establish bid prices at artificial non-competitive levels and to deprive the borrower of the benefits of free and open competition;

(b) Will reject a proposal for award if it determines that the bidder recommended for award has engaged in corrupt or fraudulent practices in competing for the contract in question;

(c) Will declare a firm ineligible, either indefinitely or for a stated period of time, to be awarded a contract if it at any time determines that the firm has engaged in corrupt and fraudulent practices in competing for, or in executing, a contract.

If at any stage it is found that bidder had hidden material information or had submitted information which is false and fraudulent shall be debarred from bidding in Bhavnagar Municipal Corporation tender for three years and EMD shall be forfeited. The matter shall also be brought to notice to the registration authority of the contractor.

## **42 GENERAL RULES AND DIRECTIONS:**

- 42.1. No receipt for any payment alleged to have been made by a Contractor in regard to any matter relating to this tender or the contract shall be valid and binding on BMC unless it is signed by the Engineer-in-Charge.
- 42.2. The measurements of work will be taken according to the usual method in use in BMC and no proposal to adopt alternative methods will be accepted. The decision of the 'Engineer-in-Charge as to what is the usual method in use in the BMC, will be final.
- 42.3. Under no circumstances shall any contractor be entitled to claim enhanced rate for any item covered in this Contract except price variation for specified items as per contract.
- 42.4. The Contractor shall not be permitted to tender for the work in which his near relative is working in that Division or its sub-division as an Engineer of any category, Divisional Accountant, Store Keeper, and in the Circle Office as a Superintending Engineer Controlling that division as on date when Tender is submitted.  
**(Note:** By the term "near relative" it is meant wife, husband, parent, and grandparent)
- 42.5. The contractor shall compulsorily furnish his latest address (es) including the latest address of his partners and place(s) of filing his/their income tax returns along with the tender (in the annexure form appended hereinafter). Any changes, if occur, in such address, during the tenure of contract, the latest address (es) shall invariably and forthwith be intimated by the Contractor to the concerned Engineer-in-Charge.
- 42.6. Receipt for payment made on account of the work, when executed by a firm shall be signed by all the partners except where the contractors are described in their tender as firm in which case the receipt shall be signed in the name of the firm by one of the partners or by some other person having authority to give effectual receipts for the firm.
- 42.7. Every Blank (fields) in the Tender document (Forms, Schedule, etc.) must be filled up by the Bidder and shall be submitted online.
- 42.8. Erasures and corrections:  

Persons tendering are informed that no erasures or alternations by them in the text of document downloaded from website will be allowed and such erasure and alterations will be disregarded. If there is any error in writing, Bidder can edit the same and correct it. Please refer to the Vendor Training Manual.
- 42.9. The contract will normally be made within 180 days from last date of receipt of Tenders.

#### **43.0 DECLARATION FORM: (FORM-H)**

43.1. In conjunction to Sub Clause 'C' under "29. Evaluation to Technical bids" the bidder should submit undertaking as per Form-H on non-judicial stamp paper of Rs.300/- duly attested by notary public regarding document submitted, are true. BMC would have the right to forfeit the EMD and blacklist the bidder if any of the information given by the bidder is found faulty or incorrect or misleading.

#### **44.0 REQUIREMENTS OF A BIDDER**

44.1 The applicant in the same name and style shall be a well-established Civil/Mechanical/Electrical (as per type of the tender) Engineering Contractor and shall have Registration in the required class for the work. The agencies whose contracts have been terminated on account of non-performance/poor performance in any work and debarred contractors will not be eligible for this Tender.

#### **44.2 COMPETENCY OF TENDER: -**

Contract will be awarded to responsive Bidders on the basis of prequalification criteria and evaluation of price-bid accordingly.

44.3 The Bidders/Bidders are required to deploy the necessary machineries/ equipment's (by owning/ hiring/ leasing) for the execution of work as specified in Clause 3.0, Section-III of this Volume

44.4 The Bidder shall employ Project Manager, Engineers, technicians and other key personnel and other Civil/Mechanical/Electrical Technical Staff as specified.

#### **45.0 SUPPORTING DOCUMENTS:**

**45.1.** The bidder must provide by uploading evidence of having adequate experience and performance which include supporting certificate or report relating to physical, financial, technical and other capability of the bidder from the respective clients in their original language along with certified translation of all relevant portions of the information about the financial capacity in Indian Rupees Only.

#### **45.2. MACHINERIES**

The work of Sewage Treatment Plants will require sufficient numbers of equipments like hauling equipment, allied equipments, and other such machinery tools and plants required for the smooth execution of the work. Bidder should have sufficient machinery which is required for execution.

The list of machinery as available with contractor or intended to be acquired should be furnished invariably by the bidder with the documents. Other machinery specifically available but under use or to be used for other project could be listed in addition.

**VOLUME – I**

**SECTION-III: QUALIFICATION CRITERIA & EVALUATION  
PROCEDURE**



## **QUALIFICATION CRITERIA & EVALUATION PROCEDURE**

### **A. GENERAL**

#### **1.0 GENERAL:**

All information requested for in the down loaded forms should be furnished against the respective columns in the forms in electronic formats. If information is nil it should also be mentioned as nil or no such case. If any particular query is not applicable in case of the applicant, it should be stated as not applicable However, the tender/ Bidders are cautioned that not giving complete information called for in the tender Documents in the form required or not giving it in clear terms or making any charge in the prescribed forms may result in the Bidder being summarily disqualified.

- 1.1 The tender's/ Bidder's name shall appear on each page of the prescribed Proforma.
- 1.2 Reference, Information and certificates from the respective clients certifying suitability, technical know-how or capability of the Bidder shall be signed by that client, in full with his name underneath in block letter and designation in that organization.
- 1.3 No further information will be entertained after submission of Tender Document unless it is called for by the BMC.
- 1.4 Any effort by a Bidder / Bidder to influence the BMC in the process of examination. Clarification, evaluation of Tender and in decision concerning qualification, may result in disqualifying the Bidder.
- 1.5 The successful per-qualification made in the case of any Bidder for any other work of BMC will not be considered valid for the present work.
- 1.6 The time for completion of the work is 30 Months from the date of 'Notice to Proceed'.
- 1.7 The intending Bidder shall get himself registered with nproucre.com for obtaining his unique identification number and digital signature required for participating in the bid.

1.8 The bids received under this single stage, two envelope procedure, shall be assessed and evaluated based on the qualification criteria and evaluation procedure prescribed hereunder.

**2.0 LIST OF ACCOMPANIMENTS:**

Bidder shall include following accompaniment to tender documents while submission.

2.1 Letter of transmittal (Scanned Copy)

**2.2 Power of attorney:**

A power of attorney on non-Judicial stamp paper of appropriate value duly notarised by a notary public, if power is delegated for signing the bid to other persons by applicant. (Scanned Copy)

**2.3 Certificate of registration: (Class of Registration)**

A Certificate of registration as approved contractor of concerned State Government/ Railway/CPWD/ Government bodies. The applicant(s) who are registered with other Government (State/Central), Board, Corporation, and Government Undertaking / Organizations of state & central government including all Public Sector Units shall submit proof of application made for registration for “**AA**” class in Gujarat State (Scanned copy).

Bidder Must be Submit Scanned Copy of Experience Certificate showing successful completion of work and it should be Similar with Related to nature of work (with Certificate IN 3A FORMAT ONLY).

**2.4 Supporting document:**

Every blank (Fields) in the tender documents (Forms, Schedules, etc.) must be filled by the Bidder and submitted online. Tender forms which are not completed will not be accepted online use of dash (-) is not permitted. Please write “Not applicable” or “Nil” as and where required by Bidder.

<b>SL. NO.</b>	<b>FORM NO.</b>	<b>DESCRIPTION OF PROFORMA</b>
1	Form-0	List of Submission
2	-	Proforma for "Letter for submission of tender".
3	Form-1	Details of organization structure of the bidder
4	Form: 2	Details of Personnel
5	Form: 3	Details of Machinery Equipment's and work Plan
6	Form: 4	Information relating to Financial Criteria
7	Form-5	Financial data
8	Form-6	List of works already completed by the Bidder
9	Form-7	Details of works on hand with Bidder
10	Form-8	Details of experience of completed work (similar nature)
11	Form-9	Additional Information and Litigation History / Debarment / Blacklisting
12	Form-10	Information for tenders submitted but not awarded
13	Form-11	Certificate for experience of work
14	Form-12	Joint Venture data (If applicable)
15	Form-13	Personnel/ staff proposed for the project
16	Form-14	Curriculum Vitae of Project Manager and all key Technical Staff

SL. NO.	FORM NO.	DESCRIPTION OF PROFORMA
17	Form-15	Proposed site organization and Management
18	Form-16	Details of experience for physical qualification criteria
19	Form-17	Approach & Methodology with conceptual design & supporting calculations of the system.
20	Form-18	Form-H (Declaration)
21	Form-19	Proforma for Bank Guarantee (EMD)
22	Form-20	Work wise details of work completed/ in progress by the contractor.
23	Form-21	Proforma for Performance bond/ Performance guarantee Proforma for bid security
24	Form-22	Proforma for Joint Venture Agreement (If Applicable)
25	Form-23	"Assured Pipe Supply Declaration" (MOU with Manufacturer of DI pipe)
26	Form-24	Proforma for memorandum of understanding (MOU) with pipeline supplier (If Applicable)
27	-	Site visit certificate - To be submitted on company's letter head duly sealed and signed by PoA.
28	-	MoU for engagement of Agency for specialized work to be included in the Tender Form (if applicable)

### 3.0 ELIGIBILITY FOR QUALIFICATION:

- 3.1 The Bidder in the same name and style shall be a well-established Civil Engineering contractor with at least 5 (Five) years' experience and capability for construction of all types of Civil / Mechanical / Electrical Engineering works.
- 3.2 The Bidder in the same name and style must give evidence of having adequate experience in mobilizing equipment and personnel for large value contracts and in

the deployment of heavy construction equipment for the type of work described earlier.

3.3 The Bidder must have adequate staff and equipment for carrying out work in accordance with time schedule.

3.4 The Bidders/Bidder must have a Project Manager with not less than 5 (Five) years' experience in managing construction in the field of Civil Engineering works as mentioned in Clause 3.1 and similar work, along with minimum number of engineering, technical and other key personnel with adequate experience in civil engineering work as under:

(1)	Project Manager (Degree engineer in any discipline with minimum 8 years of experience)	2 no.
(2)	Process Engineer with Master's Degree in Environmental Engineering (5 years experience)	0 no.
(3)	Civil Engineers (Degree holders)	4 Nos.
(4)	Mechanical Engineers (Degree holders)	0 No.
(5)	Electrical Engineer	0 No.
(6)	Supervisors (Diploma holders)	3 Nos.
(7)	Technical Assistants (Diploma / ITI)	3 Nos.

**Note:**

- i. If sufficient staff does not exist at the time of bidding, an undertaking for employing the necessary staff shall be given by the Bidder.
- ii. Successful Bidder shall deploy minimum key Personnel mentioned above during execution of work at site.

3.5. The Bidder must provide evidence of having adequate experience. The Bidder should up load the digitally signed scanned copies to supporting certificate, reports relating to physical, financial, technical, machinery and other capability of the applicants in their original language along with certified translation of all relevant portions of the certificate/reports in English duly attached with their Digital Signature. The applicant should upload the financial capabilities in Rupees only.

3.6 The Bidders are required to upload digitally signed scanned copies along with their applications certificates obtained from the concerned authorities/ employers towards proof.

3.7 Qualification of the bidder:

To be qualified for award of Contract, bidders shall:

- (a) Submit a written power of attorney authorizing the signatory of the bid to submit the bidder;
- (b) Submit Qualification requirements specifying financial capacity, technical capacity, minimum acceptable levels with regards to Bidder's experience in relevant projects and other relevant factors such as work in hand, future commitments, and litigation history as given and described in the **Appendix 1** to Instruction to Bidders.
- (c) Submit proposals regarding work methods, scheduling and re sourcing which shall be, provided in sufficient detail to confirm the bidders' capability to complete the works in accordance with the specifications and the time for completion.
- (d) Submit Memorandum of Understanding (MoU) with pipe manufacturer clearly stating the terms & conditions of the MoU. Such MOU shall not be amended or modified without prior consent from BMC during the period of performance of contract; BMC shall not allow such change except for special reasons in the interest of expeditious implementation of the project.

3.8 **If the bidder is joint venture (JV Not Applicable)**

- (a) In case of bidder participating as a Joint Venture, on his selection for award of contract, all members of the Joint Venture will have to sign the contract with the Employer and will be jointly and severally liable for performance of the contract/ Award of contract will be in the name of Joint Venture consortium which will be considered as "Legal Entity" as far as this bid/contract concern.
- (b) The bid, and in case of a successful bid, the Form of Contract Agreement, shall be signed with the name of Joint Venture which will be legally binding on all partners;
- (c) One of the partners shall be declared as Prime Bidder authorized to be in

charge; and this authorization shall be evidenced by submitting a power of attorney signed by legally authorized signatories of all the partners;

- (d) The partner in charge shall be authorized to incur liabilities, receive payments and receive instructions for and on behalf of any or all partners of the joint venture and the entire execution of the Contract;
- (e) All partners of the joint venture shall be jointly and severally liable for the execution of the Contract in accordance with the Contract terms, and a relevant statement to this effect shall be included in the Authorization mentioned under (b) above as well as in the Bid Form and the Form of Contract Agreement (in case of a successful bid); and
- (f) A copy of the Stamped and notarized agreement entered into by the joint venture partners shall be submitted with the bid. Roles, responsibilities and financial stakes of all members of the Joint Venture consortium shall be clearly and unambiguously prescribed in the Joint Venture agreement. In case of non-prescription, the JV agreement will be declared as invalid and the bid will be treated as a single bidder, in the name of bidder, who has purchased the bid documents.

Note: In addition to the above JV conditions mentioned in "Clause 34. Joint Venture Consortium" shall also be referred.

- 3.9 Bidders shall also submit proposals of work methods and schedule, in sufficient detail to demonstrate the adequacy of the bidders' proposals to meet the Employer's Requirements.
- 3.10 All guarantees shall be in the name of the joint venture if the bid is submitted in the form of a joint venture.

#### **4.0. MINIMUM PRE- QUALIFICATION CRITERIA:**

To qualify, each bidder in the same name and style should have achieved the following performances:

#### **4.1. List of Mandatory documents to be submitted**

- a. Registration**
- b. EMD/Bid Security /Tender Fee**
- c. pan card**
- c. Solvency Certificate (As per Current Calander Year)**
- d. Turn Over Certificate sign by C.A (Average Annual Last 3 Years)**
- e. Bid Capacity**
- f. E.P.F Registration Certificate**
- g. Experience Certificate (in 3A Format Only)**
- h. Income Tax Return (ITR) (Last 3 Year)**
- f. Document supporting similar nature of work & Financial and physical criteria.**

If bidder fails to submit above documents or mandatory criteria are not fulfilled, bidder shall be considered as not qualified and their financial bid shall not be open. To qualify, each bidder in the same name and style should have achieved the following performances:

- a. Registration:** As per Section: II, Instruction to Bidder, Clause 1

#### **b. EMD and Tender Fees**

Earnest Money Deposit (EMD) of 1% of tender cost is to be deposited. Scanned copy of E.M.D. in accordance with relevant clause in "Tender Notice" of tender notice and the original shall also be submitted in physical form by RPAD/Speed post.

#### **Tender Fees: (Document fee)**

**Tender Fee: amounting to Rs.21,240/- (Rs.18,000/- + 18% GST) (Indian Rupees Twenty-eight Thousand Three Hundred Twenty Only)** in favour of "BMC" in form of Demand Draft shall be issued by Any nationalized bank or as per list mentioned in latest GR of Finance Department (**Non-Refundable**)



### **C. Solvency Certificate**

Bank Solvency of minimum **Rs.2,08,74,455.00/-** Solvency Value Certificate of the organization should be of current calendar Year issued by Nationalized Bank or Bank listed as per latest GR of. Finance Department. **(As per Current Calander Year)**

### **FINANCIAL**

#### **4.2.1 TURNOVER:**

Bidder must have achieved minimum average annual financial turnover (at current price level) from contract receipt of works (in all classes of civil engineering construction works only) of **Rs.5,21,86,140.00/-** in last three financial years, from April 2021 to March 2024.

**Note:** The details pertaining to turnover for the year April 2021-2022 to March 2023-2024 shall be certified by Chartered Accountant on his own letter head and duly attested.

#### **4.2.4 SIMILAR NATURE OF WORK:**

The bidder must have completed similar nature of work i.e., Water supply Projects / Drainage/Sewerage Project within last seven financial years i.e., from April 2017-18 to March 2023-24 and up to one month prior to last date of submission of the bid of value not less than:

One Contract 80% of Estimated Cost Or equal to **8,34,97,822.00/-**

**Or**

Two Contract 50% of Estimated Cost Or equal to **Rs.5,21,86,140.00/-**

**Or**

Three Contract 40% of Estimated Cost Or equal to **Rs.17,48,911.00/-**

### 4.2.3 AVAILABLE BID CAPACITY

The Bidder who fulfils the qualifying criteria mentioned above shall be qualified only if he fulfils the requirement of bidder's capacity. The bidding capacity of any tender/ Bidder is required to be more than or equal to the estimated cost of the work i.e., **Rs.10,43,72,277.300/-**The bidder's capacity shall be computed as shown below.

$$\text{Available Bid Capacity} = [(A \times N \times 2.0) - B]$$

Where:

<b>A</b>	=	Maximum value of construction works executed in any one year during the last Five years updated at the financial year updated at <b>2023-2024 Price level.</b>
<b>B</b>	=	Value of the existing commitments as on date of bid submission for works (complete or partial) to be completed in the next 1 <b>year (12 Months)</b> . The details shall be countersigned by the Executive Engineer or the equivalent officer of the employer on whose behalf the firm is carrying out the works.  Also, declaration of financial liabilities, work on hand/completed projects on Rs.300/- non-Judicial stamp paper.  In the case of a Joint Venture (If Applicable), parameters A and B shall be determined based on details pertaining to such partners who propose to undertake physical execution of work and in proportion to their participation/stake as specified in respective clause in the tender documents.
<b>N</b>	=	Years prescribed for completion of the work for which bids are invited. <b>(1 Year) - (12 Months)</b>

If the Tender has been invited as a Package/Slice Minimum aggregate required Bid Capacity shall be considered and accordingly the Bidder may qualify for less number of Packages/Slices. In case of individual Tenders (not invited in a single Basket) the Bidder may qualify for a particular work (based on his Technical Bid), but at the time of evaluation of Price Bid, if a greater number of such individual Bids are evaluated simultaneously, aggregate Bid Capacity shall be considered. In such a case, if the Bidder does not have adequate capacity for all the Bids in which his Bid is the lowest responsive Bid, he may be considered for a smaller number of Bids. Decision of the Employer based on the least cost combination as may be the most advantageous to Competent authority shall be final and binding to all the Bidders.

**Note to 4.1 Financial Criteria:**

- I. The statement showing the value and details of completed works, existing commitments and ongoing works as well as the stipulated period of completion remaining for each of the work listed should be countersigned by the officer not below the rank of an Engineer-In-Charge.
- II. The certificate for past performance should be as per prescribed Proforma in Form-11...
- III. The Bidders are required to upload latest client's certificates in Form-11 (or in any format with yearly breakup) obtained from the concerned authorities/ employers towards proof of their having executed contracts satisfactorily along with their bids. The quantities involved should be certified by the top executive of the firm in the prescribed Proforma in Form-11 (or in any format with yearly breakup) of Volume-I.
- IV. Physical and financial performance of any work not supported by client certificate in Form-11 or in any form will not be considered for qualification.
- V. The Bidder should furnish the information about financial capability (similar nature of work) in Form-8 (To satisfy Financial Criteria 4.1.2). Bidders are required to substantiate the information by submission of appropriate client certificates (Form - 11).
- VI. The Bidder must provide by uploading evidence of having adequate experience. The bid should include supporting certificate or report relating to physical, financial, technical and other capability of Bidder in their original language along with certified translation of relevant portion of the certificate/ report in English. The Bidder should furnish the information about financial capability in Rupees only.
- VII. Depending upon the actual bid capacity assessed and other qualifying requirements, the bidder will be qualified for the work.
- VIII. The bidder is required to submit the declaration of his financial liabilities, work on hand/completed projects on ₹300/- non-judicial stamp paper. In case of false statement/ declaration the bidder shall be liable for penal action. Further, the details furnished in the relevant form as per tender should be in line to the declaration by the bidder.

- IX. The criteria mentioned above shall be evaluated based on the details submitted with the documents. Such bidder shall have to submit the details in the prescribed proforma which are applicable to them. Bidders should read the note under each Form/Annexure carefully and submit the details accordingly.
- X. Turnover of previous year and cost of completed / executed similar nature of work shall be given additional weightage to bring them to 2023-2024 Price level to account for price escalation as illustrated below::

Financial Year	Turnover/ Cost of Executed work	Turnover/Cost of Executed work at previous completed financial year's price level
2017-2018	G	1.77 x G
2018-2019	F	1.61 x F
2019-2020	E	1.46 x E
2020-2021	D	1.33 x D
2021-2022	C	1.21 x C
2022-2023	B	1.10 x B
2023-2024	A	1.00 x A

**Note:**

- i) Financial year means period beginning from the 1st April to 31st March of the next year.
- ii) The details pertaining to Turnover for the year 2017-18 to 2023-24 and the details pertaining to Net Cash Accrual, Net Worth and Net Working Capital for the year 2017-18 to 2023-24 shall be certified by Chartered Accountant on his own letter head and duly attested. The cost of material supplied by the Government/ Client shall not be taken into account for experience against Turnover & Similar nature of work

**4.2. PHYSICAL CRITERIA:**

The bidder must have successfully carried out minimum quantities of the following work in any one project during last Seven (7) i.e., 2017-18 to 2023-24 and up to one month prior to last date of submission of the bid.

#### **4.3.1 PIPELINE:**

##### **A. Metallic Pipeline: (Not Applicable)**

##### **B. Non-Metallic Pipeline -**

Procure, Lowering, Laying, Jointing, Testing and Commissioning of minimum length (as under) of Non-metallic (RCC NP 3 Pipe) pipeline in any single project during last Seven (7) i.e., 2017-18 to 2023-24 and up to one month prior to last date of submission of the bid. If the pipeline work has been completed along with successful hydro testing, such works shall also be considered for the evaluation based on the facts and circumstances as certified by the client.

The material supplied by the client will not be considered for procurement purpose.

Type of Pipeline	Min. Diameter (In mm)	Min. Length (In Km)
Non-Metallic	≥ 250 mm	12 Km

##### **4.3.2 PUMPING MACHINERY: (Not Applicable)**

##### **4.3.3 ELEVATED STORAGE RESERVOIR: (Not Applicable)**

##### **4.3.4 STORAGE SUMP (Not Applicable)**

##### **4.3.5 CONSTRUCTION OF INTAKE WELL: (Not Applicable)**

##### **4.3.6 WATER TREATMENT PLANT: (Not Applicable)**

##### **4.3.7 OPERATION & MAINTENANCE:**

###### **Note to 4.3 Physical Criteria:**

- I) The works for which bidder have not entered in to contract agreement will not be considered
- II) The above experience shall be within last Seven (7) i.e., 2017-18 to 2023-24 and up to one month prior to last date of submission of the bid for which Form - 3A/11 must be submitted.
- III) Experience as sub-contractor shall not be considered.
- IV) The experience of works executed in Government (State/Central), Board, Corporation, and Government Undertaking /Organizations of state & central government shall only be considered for evaluation. The experience certificate from the client equivalent to not below the rank of Executive Engineer shall be considered. The experience of sublet works shall not be considered.

- V) All MOUs shall be on a Non judicial stamp paper of appropriate value duly notarized and signed by respective authorized representatives.
- VI) The Bidder/JV MEMBER/MOU partners contract should not have been terminated/blacklisted/debarred in any State Govt/ Municipal Corporations/ Central Govt./ Any state Govt Organization, Urban Local body and/or its undertaking company or its SPV, Asian Development Bank/ World Bank or similar international funding agencies organizations due to delay in projects during last five years.
- VII) The works for which bidder have not entered in to contract agreement will not be considered.
- VIII) If the bidder claiming Technical/ Physical Eligibility Criteria for the works has completed any of the works in joint venture with any other company then, along with the experience certificates, the firm shall submit the joint venture agreement for that particular work. Experience certificates not accompanied by joint venture agreement shall not be considered for evaluation. The credit for the bidder which has completed a work in joint venture is allocated as follows:

~~(1) If the bidder has completed the work as a member in the project, then the bidder can claim credit for the entire scope of the work in proportion to the stake (e.g., if the capacity of the ESR executed is 30 ML and if the firm has executed the project as member with a 40% stake then the firm can claim credit for (40% x 30 ML) 12 ML works. A statutory auditor certificate specifying the payments received for the project should be submitted. In the event of percentage participation in the project calculated through the statutory auditor certificate differs from the percentage in the Joint Venture Agreement, the percentage participation calculated through payments received shall be considered for evaluation purposes.~~

Note: The above condition shall also apply to Clause No. 4.2.4 'Similar Nature of work' under financial criteria.

- IX) The above experience shall be within last Seven (7) i.e., 2017-18 to 2023-24 and up to one month prior to last date of submission of the bid for which Form -3A/11 must be submitted.

- X) All MOUs shall be on a Non judicial stamp paper of appropriate value duly notarized and signed by respective authorized representatives.
- XI) Bidder should fulfil the following criteria mentioned under Clause 4.0, Minimum Qualifying Criteria. If not fulfilled, he will be out rightly rejected.

**VOLUME – I**

**SECTION-IV: QUALIFICATION DATA SHEET  
TO BE FILLED UP BY THE BIDDER**



**QUALIFICATION DATA SHEET  
TO BE FILLED UP BY THE BIDDER**

The qualification questionnaire contains the following forms:

<b>SL. NO.</b>	<b>FORM NO.</b>	<b>DESCRIPTION OF PROFORMA</b>
1	Form-0	List of Submittals
2	-	Proforma for "Letter for submission of tender".
3	Form-1	Details of organization structure of the bidder
4	Form: 2	Details of Personnel
5	Form: 3	Details of Machinery Equipment's and work Plan
6	Form: 4	Information relating to Financial Criteria
7	Form-5	Financial data
8	Form-6	List of works already completed by the Bidder
9	Form-7	Details of works on hand with Bidder
10	Form-8	Details of experience of completed work (similar nature)
11	Form-9	Additional Information and Litigation History / Debarment / Blacklisting
12	Form-10	Information for tenders submitted but not awarded
13	Form-11	Certificate for experience of work
14	Form-12	Joint Venture data
15	Form-13	Personnel/ staff proposed for the project
16	Form-14	Curriculum Vitae of Project Manager and all key Technical Staff
17	Form-15	Proposed site organization and Management
18	Form-16	Details of experience for physical qualification criteria

SL. NO.	FORM NO.	DESCRIPTION OF PROFORMA
19	Form-17	Approach & Methodology with conceptual design & supporting calculations of the system.
20	Form-18	Form-H (Declaration)
21	Form-19	Proforma for Bank Guarantee (EMD)
22	Form-20	Work wise details of work completed/ in progress by the contractor.
23	Form-21	Proforma for Performance bond/ Performance guarantee Proforma for bid security
24	Form-22	Proforma for Joint Venture Agreement <b>(Not Applicable)</b>
25	Form-23	"Assured Pipe Supply Declaration" (MOU with Manufacturer of DI pipe)
26	Form-24	Proforma for memorandum of understanding (MOU) with pipeline supplier (If Applicable)
27	-	Site visit certificate - To be submitted on company's letter head duly sealed and signed by PoA.
28	-	MoU for engagement of Agency for specialized work to be included in the Tender Form (if applicable)

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**Note:**

1. If necessary, additional sheets may be added to the forms. Each page of each form should be clearly marked in the right top corner as follows: Form-0, page 1; Form I, page 2, etc.
2. Some of the forms will require attachments. Such attachments should be clearly marked as follows: Attachment 1 to Form I, Attachment 2 to Form I, etc.

**FORM- O**

<b>SR NO</b>	<b>LIST OF SUBMITTALS</b>		<b>CONFIRM IF SUBMITTED (YES/NO)</b>	<b>PAGE NO</b>
1	Covering Letter	Letter of transmittal <b>(Scanned Copy)</b>		
2	Power Of Attorney	Power of attorney on Rs. 300/- Non-Judicial stamp paper duly notarised, if power is delegated for signing the bid to other persons by applicant. <b>(Scanned Copy)</b>		
3	Certificate Of Registration	Certificate of registration as approved contractor of concerned State Government/ Railway/ CPWD/ Government bodies. The applicant(s) who are registered with other Government (State / Central), Board, Corporation, and Government Undertaking / Organizations of state & central government including all Public Sector Units shall submit proof of application made for registration for <b>“AA” class</b> in Gujarat State <b>(Scanned copy)</b> .		
4	Permanent Account Number (PAN) And Income Tax Details	Copy of the latest Income Tax Return with permanent account number (PAN) and Income Tax ward where assessed. <b>(Scanned copy)</b> .		
5	Company Establishment Details	Letter of Incorporation of the company (Individual or any member in case of JV/ consortium)		
6	List Of Work On Hand And Work Completed	A scanned copy of declaration showing the details of all works completed and works on hand with the contractor and the value of works that remain to be executed. <b>(List of Work on hand to be supported with non-judicial stamp paper of Rs. 300/ duly notarized)</b> .		
7	Earnest Money Deposit	Scanned copy of E.M.D. in accordance with relevant clause in “Tender Notice” of tender notice and the original shall also be submitted in physical form by RPAD/Speed post		

8	Tender Fee	Scanned copy of Account payee Demand Draft for Tender Fee in accordance with relevant clause of Tender Notice, and also in physical form shall also be submitted by RPAD/Speed post		
9	Solvency Certificate	Scanned Copy of the Solvency Certificate from Bank of required amount as per Tender Notice.		
10	Undertaking Regarding Document Submitted, Are True.	The bidder should submit undertaking on non-judicial stamp paper of Rs. 300/- duly notarized regarding document submitted, are true.		
11	Joint Venture Agreement	<del>Bidder (individual or any member in case of JV/ consortium) shall not have suffered bankruptcy/ insolvency during the last 5 years. For this Certificate of CA appointed by the bidder must be produced along with a self affidavit on non-judicial stamp paper of ₹300/- duly notarized</del>		
12	Bidder Past Performance	The bidder, whose contracts are earlier terminated on account of poor performance in BMC works, will not be eligible. For this tender Self Declaration by bidders is required		
13	Supporting Document	Form-0 to Form-24		
14	MOU Allowed for Qualifying Criteria on Non Judicial Stamp Paper Of Rs. 300/- Duly Notarized	1-Pumping Machineries (If Applicable)		
		2-Water Treatment Plant (If Applicable)		
15	MOU to Be Submitted on Non-Judicial Stamp Paper Of Rs. 100/- Duly Notarized	1-Pipe Supply assurance (If Applicable)		
16	Other Documents	Schedule of construction method		
17		Work plan		

18		Schedule of Major items of equipment		
19		Schedule of key personnel		

**Note:** All submittals shall be numbered chronically and reference of page nos shall be mentioned in “**FORM-0**”. The same is to be uploaded online and submitted in physical form as well

## LETTER FOR SUBMISSION OF TENDER

**To**

Executive Engineer (Drainage Department)  
Bhavnagar Municipal Corporation  
Bhavnagar

**BID DOCUMENT FOR UPGRADATION OF DRAINAGE LINE NETWORK IN OLD SOCIETIES OF ADHEWADA AREA UNDER BHAVNAGAR MUNICIPAL CORPORATION (BMC), BHAVNAGAR. DISTRICT: BHAVNAGAR**

Sir,

- 1 Having examined the details given in the invitation to Bidder for qualification and brief note, the condition of contract, Specification, Drawings and bill of quantities and Nos. .... for the execution of above-named work, we the undersigned, offer to execute and complete such works and remedy any defects therein in conformity with the conditions of contract, Specifications, Drawings, Bill of Quantities and quoted amount in accordance with the said conditions.
- 2 We hereby certify that all the statements made and information supplied in the enclosed forms and accompanying statements are true and correct.
- 3 We have furnished all information and details necessary for qualification and have no further pertinent information to supply.
- 4 We submit the certified solvency certificate of Rs. \_\_\_\_\_ Crores and authorize the Board to approach the Bank issuing the solvency certificate to verify the correctness thereof. We also authorize, Board to approach individuals, employers, firms and Corporation to verify our competency and general reputation.  
We hereby apply for qualification for

**BID DOCUMENT FOR UPGRADATION OF DRAINAGE LINE NETWORK IN OLD SOCIETIES OF ADHEWADA AREA UNDER BHAVNAGAR MUNICIPAL CORPORATION (BMC), BHAVNAGAR. DISTRICT: BHAVNAGAR**

We undertake, if our Tender is accepted, to commence the works immediately after the receipt of the Engineer's notice to commence, and to complete the whole of the works comprised in the contract within the time stated in the Appendix to tender.

- 5 We agree to abide by this Tender for the period of 180 days from the last date fixed for receiving the same and it shall remain binding upon us and may be accepted at any time before the expiration of that period.
- 6 We enclose here with fixed Deposit receipt / Deposit at call receipt / cross demand draft / Bank Guarantee amounting to (as per Tender Notice) Towards Earnest Money Deposit which is to be absolutely forfeited by Board should we not Deposit the amount of Security Deposit specified in the Clause 1, General Conditions of Contract, Volume-IB
- 7 We enclose..... DD in favor of BMC Ltd Bhavnagar & office name (as applicable) amounting to Rs. \_\_\_\_\_ towards tender fees.
- 8 Unless and until a formal Agreement is prepared and executed this Tender, together with your written acceptance thereof, shall constitute a binding contract between us.
- 9 We also submit a general description on the approach to the construction methods,

- technologies proposed etc. and the detailed Work Plan proposed for execution.
- 10 We submit the following certificates in support of our suitability, technical know-how and capability for having successfully completed the following works.

**Sr. No.                      Works**  
**Client / owner**  
**Bhavnagar Municipal Corporation**  
**Bhavnagar**

- 11 We hereby confirm that there are no deviations to the terms & conditions of the contract and we are liable for execution of this contract in accordance with the stipulated conditions of the contract.
- 12 We understand that you are not bound to accept the lowest or any tender you may Receive. Dated this \_\_\_\_\_ day of \_\_\_\_\_ (Year) Signature \_\_\_\_\_ in the capacity of \_\_\_\_\_ Duly authorized to sign tender for and on behalf of \_\_\_\_\_
- 13 We are enclosing herewith "Form H"
- 14 Irrespective of whatsoever has been stated to the contrary anywhere else in our offer no technical deviations have been taken and the entire work shall be performed as per your specifications and Tender documents.

Signature of Applicant.

**(NAME IN BLOCK CAPITALS)**

Address

\_\_\_\_\_

Seal of Applicant

Date of submission

Witness \_\_\_\_\_

Address \_\_\_\_\_

Occupation \_\_\_\_\_

Enclosures:

**FORM - 1**

**DETAILS OF ORGANIZATION STRUCTURE OF THE BIDDER**

1.	Name of Bidder	
2.	Nationality of Bidder	
3.	Office address Telegraphic Address Telephone Number Fax Number E-mail address.	
4.	Year of Establishment	
5.	Location of Establishment	
6	Bid is submitted as a) An individual b) A proprietary firm c) A firm in partnership d) A limited Company or Corporation e) A Group of Firms / Joint Venture (if applicant is of category "F" give complete information in respect of each other). f) A Group of Companies	
7.	Attach the Organization chart showing the structure of the organization including the names of the Directors and Position of officers	
8.	Number of years of experience a) as a prime contractor (Contractor shouldering main responsibility) i) in own country ii) other countries (Specify countries) b) in a joint venture i) in own country ii) other countries (Specify countries)	
9.	For how many years has your organization been in business of Civil Engineering works under its present name? What were your fields when your organization was established?	
	Whether any new fields have been added in your organization? and if so, when?	
10	Whether you were required to suspend construction for a period of more than six months continuously after the work was started? If so, give the name of project and reasons thereof.	
11	Have you ever left the work awarded to you incomplete? (If so, give name of project and reasons for not completing work)	
12	In how many of your projects penalties were imposed for delays? (Please give details)	



13	In which fields of civil engineering construction do you claim specialization and interest?	
14	Give details of experience in water supply projects, pipe laying works, installation of large capacity of pumps etc- with modern technology and quality control.	
15	Give details of experience for construction of large water supply and sewerage projects.	
16	Give details of experience in using heavy earth moving machinery, machineries for pipe laying and installation of pumping machinery	
17	Give details of testing laboratory, if any.	
18	In how many of your works cases of litigations have arisen?	
19	If the applicant intends to enter into a Joint Venture for the project, please give the following information otherwise state.	N/A

**FORM – 2**  
**DETAILS OF PERSONNEL**

Give details of key Technical and Administrative Personnel who could be assigned the work in the following Proforma.

A)	1) 2) 3)	Details of the Board of Directors Name of the Director Address Organization of the Board of Director			
B)	1) 2) 3) 4) 5) 6) 7)	Key Technical and administrative Personnel and Consultants Individual's Name Professional Qualification Present position in the firm Professional experience and details of works carried out No. of years worked with the applicant. Languages known Additional information			
C)	Key Technical, Administrative Personnel				
	Sr. No.	Key Personnel	Nos.	Professional Experience	Qualification
	1.	Project Manager (Civil)			
	2.	Electromechanical Engineer			
	3.	Site Engineer			
	4.	Technical Assistant			
D)		Skilled and other labor (indicate number category wise) 1) Skilled labor 2) Other labor			

**FORM – 3**  
**DETAILS OF MACHINERY EQUIPMENTS AND WORK PLAN**

Plant & Equipment's Owned & Proposed for the Project

Name of Applicant or partner of a joint venture:
--

The Applicant will provide adequate information to demonstrate clearly that it has the capability to meet the requirements for each and all items of equipment listed in the Employers requirements. A separate Form-3 will be prepared for each item of equipment proposed by the Applicant. For each item of equipment, the applicant should attach a copy of ownership certificate or lease agreement.

Name of Equipment		
Equipment information	1. Name of manufacturer	2. Model and power rating
	3. Capacity	4. Year of manufacture
Current status	5. Current location	
	6. Details of current commitments	
Source	7. Indicate source of the equipment <input type="checkbox"/> Owned <input type="checkbox"/> Rented <input type="checkbox"/> Leased <input type="checkbox"/> Specially manufactured	

Omit the following information for equipment owned by the **J/V partner**.

Owner	8. Name of owner	
	9. Address of owner	
	Telephone	Contact name and title
	Facsimile	Telex
Agreements	Details of rental / lease / manufacture agreements specific to the Project	

FORM - 4

**INFORMATION RELATING TO FINANCIAL CRITERIA**

Name of Applicant or partner of a joint venture:

All individual firms and all partners of a joint venture are requested to complete the information in this form. The information supplied should be the annual turnover of the Applicant (or each member of a joint venture), in terms of the amounts billed to clients for each year for work in progress or completed.

Use a separate sheet for each partner of a joint venture.

Applicants should not enclose testimonials, certificates, and publicity material with their applications; they will not be taken into account in the evaluation of qualifications.

**Annual turnover data for the last three financial years i.e. .... to ..... (Rs. In lacs)**

Year	Turnover	Net cash accrual	Net worth	Annual income from contracting	Annual income from other sources
<b>[A] Lead partner:</b>					
<b>[B] Joint Venture Partner:</b>					

**Note:** The declared figures as mentioned above shall be supported with balance sheet certified by Chartered Accountant and duly notarized for the respective financial year.

**FORM - 5**  
**FINANCIAL DATA**

(Give details separately for each member in case of a joint Venture.)

1)	Name of Firm	
2)	Name of Partner / Director	
3)	Capital (a) Authorized (b) Issued and paid up	
4)	Furnish Balance sheet and profit and loss statement with Auditor's Reports and Income Tax assessment orders for last Three (3) financial years. It should, interlaid include the following information i) Working Capital ii) Foreign Investment iii) Turnover for the last three (3) financial year, the contract receipts for Civil Engineering works (Furnish reference page number to balance sheet attached)	

Sr. No.	Year	Turnover (Rs in Crores)	Reference page No. to balance sheet or other documents
(I)			
(II)			
(III)			
(IV)			
(V)			
(VI)			
(VII)			

**GROSS INCOME IN THE LAST Seven FINANCIAL YEAR**

Sr. No.	Year	Gross Income (Rs in Crores)	Reference page No. to balance sheet or other documents
(I)			
(II)			
(III)			
(IV)			
(V)			
(VI)			
(VII)			

6.	Maximum gross income from contract works during last three (3) financial year	
7.	What is the maximum cost of the project that has been handled? (Please give details)	
8.	Have you ever been denied tendering facilities by any Government / Government Undertaking Organisations / Public sector under taking etc.? (If Yes, Please give details)	
9.	List your sources of finance	
10.	Amount of financial soundness certified by Bank. (Attach copy of certificate)	
11.	Name and address of Bank from whom reference can be obtained	
12.	Have you ever been declared bankrupt? (If yes, please give details)	

**Note:** Firms owned by individuals, and partnerships, may submit their balance sheets certified by a registered accountant, and supported by copies of tax returns. Attach Certificate(s) issued by any Bank or Financial Institution for available credit to the Lead partner and joint venture partner.

**SIGNATURE OF BIDDER**

**FORM-6**

**List of works already completed by the bidder during last 7 financial years i.e. From..... to..... & up to one month prior to last date of submission of the bid**

S r. No.	Na me of wor k	Pla ce/ Dis t./ Sta te	Tend ered amou nt Rs. In Lac	Cost on compl etion Rs. In lac	Dat e of start ing	Origi nal time limit in mont hs	Exten ded time limit in month s	Time taken in mont h to comp lete the work	Actual date of comple tion	Reason for delay in comple tion	Rema rks
1.	2.	2a.	3.	4	5a	5b.	5c.	5d.	5e	6	7

Note: Necessary completion certificate showing the year wise breakup of amount of work done from concerned officers shall be attached with the tender.

Date:

Signature of the Bidder.

**FORM-7**

**DETAILS OF WORKS ON HAND WITH BIDDER**

Work performance and Value of the existing commitments (Work on Hand) as on the date of bid submission for works (complete or partial) to be completed in the next ..... years (Project Duration In Years) (In separate form for each work)

***(Give details separately for each member in case of a joint Venture.)***

1)	Name of Work	
2)	Agreement No. & Date	
3)	Country and Location	
4)	Client's Name and Address	
5)	Tendered Cost of work (Rs. in Lacs)	
6)	Brief description of works including principal features and quantity of main items.	
7)	<b>Details of work on hand</b> i) Date of Starting ii) Percentage of Physical completion iii) Amount billed for the work completed iv) Cost of work remaining to be executed v) Stipulated date of completion <b>vi) Anticipated date of completion.</b>	
8)	Name of Applicant's Engineer-in-Charge with Professional Qualification.	
9)	Explain for non-completion of work within stipulated time limit if so.	
10)	Whether any Penalties / Fine / Stop notice / Compensation/ Liquidated Damages imposed? (Yes or No), (If Yes, give amount and explanation)	



11)	Details of Litigation / Arbitration cases, if any pertaining to ongoing works.	
12)	Attach Client's certificate for the details furnished in the Form-3A/ Form-11 (Not below the rank of Executive Engineer or equivalent).	

***SIGNATURE OF BIDDER***

**Note:** Necessary certificates showing the year wise breakup of amount of work done from the officer concerned shall be attached with the tender.

**FORM – 8**

**DETAILS OF EXPERIENCE OF COMPLETED WORKS (SIMILAR NATURE)**

**Give details of the similar type of work completed during last seven (7) financial year from i.e. .... to ..... & up to one month prior to last date of submission of the bid in the following Proforma. (Separate form for each work)**

***(Give details separately for each member in case of a joint Venture.)***

1)	Name of Work	
2)	Agreement No. & Date	
3)	Country and location	
4)	Client's Name and Address	
5)	Total Tendered cost of work (Rs. in Lac)	
6)	Cost of completed work	
7)	Brief description of works including principal features and quantity of main items.	
8)	Annual achievement (duly supported by certificate <b>from Engineer- In -Charge</b> )  a) Of key quantities, total physical output of last seven (7) financial year (Separately for each item) (For EPC contract for Water Supply Projects /Drainage/ Sewerage Projects)  b) Financial Output in Rupees (Cost of Work) (Including cost of materials supplied by the client)	
9)	Period of completion  (a) Originally stipulated time limit. (b) Date of starting (c) Stipulated date of completion	

	(d) Extended time limit if any, Actual time taken to complete the work. Reasons for non-completion of work in stipulated time limit / extended time limit if so.	
	(e) Actual Cost of Work Done	
10)	Name of applicant's Engineer - in -charge of the work and his educational qualification	
11)	Were there any Penalties/ Fines / Stop notice / Compensation / Liquidated Damage imposed? (Yes or No. If yes, give case wise details)	
12)	Give the details of Annual Financial Performance and your experience in execution in mobilizing Lift Irrigation, Pipeline Project	
13)	Details of Litigation / Arbitration cases, if any pertaining to work completed.	
14)	Attach Client's certificate in Form-3A (Not below the rank of Executive Engineer or equivalent)	

*SIGNATURE OF BIDDER*

- (\*) If the information is hidden or misleading by the bidder, he shall be disqualified for the Tender and debarred for three financial years.**

**FORM - 9**

**ADDITIONAL INFORMATION AND LITIGATION HISTORY / DEBARMENT /  
BLACKLISTING**

Name of Applicant :

**1. PLEASE DESCRIBE:**

Company's history of litigation or arbitration / Debarment / Blacklisting from contract executed in the last ten years or currently under execution. Please indicate for each case the year, name of employer, cause, matter in dispute, disputed amount, and whether the award was for or against the company.

2. Please add any further information that you consider to be relevant to the evaluation of your application. If you wish to attach other documents, please list below:

**SIGNATURE OF BIDDER**

**FORM – 10**

**INFORMATION FOR TENDERS SUBMITTED BUT NOT AWARDED**

- a) Please add any further information which the applicant considers relevant in regard to his capabilities.
- b) Please give a brief note indicating by applicant considers himself eligible for qualification for the work.
- c) List of works for which tender have already submitted to the client but not awarded

<b>Sr. No</b>	<b>Name of Work</b>	<b>Estimated amount (In Crores Rs.)</b>	<b>Date of Submission of Offer</b>	<b>Name of Client</b>	<b>Likely date of award</b>	<b>Position with ref. to lowest bid.</b>

**Note:** Giving additional information as per (a) and (b) shall not automatically lead to prequalification.

SIGNATURE OF BIDDER

**FORM – 11**  
**CERTIFICATE FOR EXPERIENCE OF WORK**

This is to Certify that M/s \_\_\_\_\_ was awarded the work of \_\_\_\_\_ (Agreement / contract No. & Year \_\_\_\_). As individual / in a Joint Venture with \_\_\_\_\_ other details of the work are as under.

1(a)	Name of Joint Venture (If applicable)	
1(b)	-Office address. -Name of state -Telegraphic address - Telephone number with STD code -Fax number. -E-mail address.	
2)	Percentage of share of the agency as per Joint Venture agreement (If applicable)	
3)	Tendered amount Rs. in Lac.	
4)	Actual cost of work completed, including price escalation	
5)	Time Limit in months	
6)	(A) Actual date of starting. (B) Stipulated date of completion	
7)	Actual / expected date of completion	
8)	Whether any fine imposed for not carrying the work as per stipulated time Schedule? (If Yes please give details)	
9)	Execution of pipe line work, type of pipe, diameter in mm & length in kms	
10)	Execution of Elevated storage with capacity and ground storage with capacity in million liters	
11)	Execution of pumping machinery in KW ( excluding standby)	
12)	Execution of treatment plant, type and capacity in mld	
13)	Execution of intake arrangement, head regulators and other similar structures, capacity in mld.	

**Note :**

- 1 The agency has carried out the work timely/ late and satisfactorily/ unsatisfactorily.
- 2 Details of quantities of main items of similar nature of work shall be given in the respective column.

**SIGNATURE OF ACCOUNTANT**

**NAME OF ACCOUNTANT**

**DATE:**

**PLACE:**

**SIGNATURE OF ENGINEER-IN-CHARGE**

**NAME AND SEAL OF ENGINEER-IN-CHARGE**

**DATE:**

**PLACE:**

**FORM - 12 (Not applicable)**

**JOINT VENTURE DATA**

A copy of the joint venture agreement must be attached to Form 4. In case the joint venture agreement is not acceptable, the joint venture may be requested to modify the agreement accordingly. Failure to submit a modified Joint venture agreement within twenty one days upon receipt by the applicant of the request for modification will disqualify the applicant for further consideration.

<b>Names of all partners of a joint venture</b>		<b>Financial Stake of A firm (In Percentage)</b>
<b>Partners</b>	<b>Name of Firm</b>	
1. Lead partner		
2. Partner		

**FORM - 13**  
**PERSONNEL / STAFF PROPOSED FOR THE PROJECT**

Name of Applicant or partner of a joint venture

For specific positions essential to contract implementation, applicants should provide the names of at least two candidates qualified to meet the specified requirements stated for each position. The data on their experience should be supplied in separate sheets using one Form-14 for each candidate.

1.	Title of position: <b>Project Manager</b>
	Name of prime candidate:
	Name of alternate candidate:
2.	Title of position: <b>Water Supply Engineer</b>
	Name of prime candidate
	Name of alternate candidate
3.	Title of position: <del>Electro Mechanical Engineer</del>
	Name of prime candidate
	Name of alternate candidate
4.	Title of position: <b>Site Engineer and Technical Assistant (Diploma/ITI) Engineer</b>
	Name of prime candidate
	Name of alternate candidate

**Note:** Attach **Manning (Personnel) Schedule** stating each personnel's roles and responsibility for work to be carried out for the project.



**FORM - 14**  
**CURRICULUM VITAE OF PROJECT MANAGER & ALL KEY TECHNICAL**  
**PERSONNEL's**

Name of Applicant or partner of a joint venture

Proposed Position:		Candidate <input type="checkbox"/> Prime <input type="checkbox"/> Alternate	
<i>Candidate information</i>	1. Name of candidate		2. Date of birth
	3. Professional qualifications:		
<i>Present employment</i>	4. Name of employer		
	Address of employer:		
	Telephone:		Contact (manager / personnel officer):
	Facsimile:		Telex:
	Job title of candidate:		Years with present employer:

Summarize professional experience over the last \_\_\_ years, in reverse chronological order. Indicate particular technical and managerial experience relevant to this Project.

From	To	Company / Project / Position / Description of relevant technical & managerial project specific experience

**FORM - 15**

**PROPOSED SITE ORGANIZATION & MANAGEMENT**

Name of Applicant or partner of a joint venture

- A. Preliminary Site Organization Chart at HO level & at field level:
- B. Narrative Description of Site Organization & Project Management Chart
- C. Description of Relationship between Head Office and Site Management<sup>1</sup>
- D. Description of Approach & Methodology to carried out work of this project.

---

Note: Indicate clearly which responsibility and what authority will be delegated to site management.

FORM – 16

**DETAILS OF EXPERIENCE FOR PHYSICAL QUALIFICATION CRITERIA**

Sr. No.	Name of work	Cost of work in Rs. Lakhs	Work completed/ in progress	Particulars of item	Unit (MLD )	WTP Capacity	Remarks

**Note:** For each experience criteria Form-11 shall be submitted by the contractor duly signed by the employer

**FORM – 17**

**Approach and Methodology with Conceptual Design and Supporting Calculations of the System**

Bidder may submit their work plan, details methodology with Conceptual Design and Supporting Calculations of the System to be adopted for this work.

**SIGNATURE OF THE BIDDER**

**FORM-18**

**PROFORMA FOR LETTER OF UNDERTAKING (FORM-H)**

**(TO BE EXECUTED ON NON-JUDICIAL STAMP PAPER OF Rs. 300/- AND  
SUBMITTED BY THE TENDERER ALONG WITH HIS TENDER IN A SEPARATE  
COVER)**

To,

Executive Engineer (Drainage Department)  
Bhavnagar Municipal Corporation  
Bhavnagar

Dear Sir,

- i. I/We hereby declare that I/We have visited the site and fully acquainted myself / ourselves with local situations regarding materials, labour and other factors pertaining to the work before submitting this tender.
- ii. I/We hereby declare that I/We have read the Tender Documents published on website tender.nprocure.com and accordingly submitted online price Bid for the work of -----  
-----  
-----
- iii. I/We hereby declare that I/We have carefully studied the conditions of contract and specifications and other documents of this work and agree to execute the same accordingly.
- iv. I/We hereby declare that my/our near relatives are not working in in this GUDM/BMC or in its BMC as an Engineer of any category, Divisional Accountant, Store Keeper as on today.
- v. I/we hereby declare that I/we are not declared ineligibility for corrupt or fraudulent practices issued by the central/state govt. In accordance with **Sub Clause No. 41 Corrupt or Fraudulent Practices** or not in the list of black listed contractors announced by GWSSB/ GWIL / Govt of Gujarat or its Public Sector Undertakings, Government of India, Other states Government or Public Sector Units.
- vi. I/ We hereby submit our tender and undertake to keep our tender valid for a period of 180 days from the date of opening of tenders i.e. up-to ----- . I/We shall not vary/ alter or revoke my/ our tender during the validity period of tender. This undertaking is in consideration of **Bhavnagar Municipal Corporation** agreeing to open my/ our tender, consider and evaluate the same for the purpose of award in

terms of provisions of tender documents. Should this tender be accepted, I/ We also agree to abide by fulfill and comply with all the terms and conditions and provisions of the above-mentioned tender documents.

- vii. I/We also declare that the bid duly filled in online and digitally signed and the required Earnest Money Deposit, Tender Fee and other required documents (scanned copy submitted online) will be handed over in physical form to the ..... **by RPAD/Speed Post/ Hand Delivery only.**

If this declaration is found to be incorrect then without prejudice to any other action that may be taken I/we shall be debarred from bidding in Bhavnagar Municipal Corporation tender for three years and my/our security deposit may be forfeited by Bhavnagar Municipal Corporation in full & the tender, if any, to the extent accepted, may be cancelled.

**Signature along with seal of the Company**

-----  
(Duly authorised to sign the tender on behalf of the Bidder)

Name:

Designation:

Name of Company (BLOCK LETTERS)

**WITNESS :**

Signature :

Date :

Date :

Postal Address :

Name & Address :

Telephone/Fax No.

**Form-19**  
**FORM OF BANK GUARANTEE**  
**(Earnest Money Deposit)**

Whereas M/s ..... ( herein after called the Tenderer) is desirous and prepared to tender for work in accordance with Terms & Conditions of Tender Notice of (financial year) dated ..... and whereas We, ..... Bank; agree to give the Tenderer a guarantee for the Earnest Money Deposit.

1. Therefore, we hereby affirm that we are Guarantors on behalf of the Tenderer upto a total of Rupees .....( i.e. Rs.....) and we undertake to pay the BMC Ltd.,Bhavnagar ..... upon his first written demand and without demur, without delay and without necessity of previous notice of individual or administrative procedure and without necessity to prove the bank the defects or shortcomings or debit of the contractor any sum within the limit of Rupees.....
2. We further agree that the guarantee here in contained shall remain in full force and effective during the period that would be taken for the acceptance of the tender. However, unless a demand or claim under this guarantee is made only in writing on or before the ..... We shall be discharged from all liabilities under the guarantee thereafter.
3. We undertake not to revoke the guarantee during its currency except with the previous consent of the Executive Engineer , ..... in writing.
4. We lastly undertake not to remove the guarantee for any change in constitution of the Tenderer or the Bank.

Signature and Seal of the  
Guarantor Bank:

Address:

Date:

**Form-20 (Form-3A)**

**WORK WISE DETAILS OF WORK COMPLETED/ IN PROGRESS BY THE CONTRACTOR**

1. Name of Contractor :
2. Name of Work :
  
3. Estimated Cost of Work Put to Tender :
  
4. Tendered Amount :
  
5. Date of starting of the work :
  
6. Date of completion of the work :  
(As per contract agreement)
  
7. Actual Date of Completion of Work :
8. Amount of work done upto :
9. Brief history of the work :

Sr. No.	Particular	Unit	Qty.

- 10 State whether details as above given by the contractor correct, if not as to what is the correct information. :

- 11 State whether the contractor has executed the work in progress satisfactory as per specification/ has completed the work, satisfaction, if any give the correct position of the work. :



**Form-21**

**PERFORMANCE GUARANTEE**

**(See clause No. 1)**

(The date of this bond must not be prior to the date of the instrument in connection with which it is given) \_\_\_\_\_

Principal (Contractor) \_\_\_\_\_

Surety (Nationalized Bank) \_\_\_\_\_

Sum of bond (express in words and figures) \_\_\_\_\_

Contract No. and date of contract \_\_\_\_\_

**KNOW ALL MEN BY THESE PRESENTS THAT WE, THE PRINCIPALS AND SURETY** above named are held and firmly bound unto the \_\_\_\_\_ hereinafter called the Employer in the amount stated for payment of which' sum, well and truly to be made, we bind ourselves, our heirs, executors, administrators and successors jointly and severally, firmly by these presents subject to the provisions of which the aforesaid Contractor on demand and without demand on a claim being made by the Employer.

**THE CONDITION OF THIS OBLIGATION IS SUCH that** whereas the principals have entered in to a contract with the Employer numbered and 'dates as shown above and hereto \_\_\_\_\_ attached \_\_\_\_\_ for \_\_\_\_\_ the \_\_\_\_\_ execution \_\_\_\_\_ of work \_\_\_\_\_

**NOW THEREFORE,** if the Principal shall well and truly perform and fulfil all the undertakings, covenants, terms, conditions and agreements of said contract during the original terms of the said Contract and any extensions thereof that may be granted by the Employer with or without notice to the surety and during the life or any guarantee required under the contract and shall also well and truly perform and fulfil all the Undertakings, covenants, terms, conditions and agreements of any all duty and unduly authorized modifications of said Contract that may hereafter be made, notice of which modifications to the surety being hereby waived or shall pay over, make good and reimburse to the Employer all loss and damages which the employer may sustain by reason of failure or default on the part of said Principal so to do.

We \_\_\_\_\_ further agree that the guarantee herein Contained shall remain in full force and effect during the period that would be taken for the validity of the said Contract, and that it shall continue to be

enforceable till all the dues of the employer under or by virtue of the Contract have been fully paid and its claims satisfied or discharged or till the Employer certifies that the terms and conditions of the Contract have been fully and properly carried out by the said Contractor and accordingly discharges the guarantee. Failing which Employer is at liberty to forfeit the performance Security and recover the amount by way of invocation/encasement. Unless a demand or claim under this guarantee is made on us in writing on or before the \_\_\_\_\_ we shall be discharged from all liability under this guarantee thereafter.

**IN WITNESS WHERE OF**, the above bounded parties have executed this instrument under their several seals on the date indicated above the name and corporate seal, of each corporate party being hereto affixed and these presents duly signed by its undersigned representatives, pursuant to authority of its governing body.

In the presence of witness \_\_\_\_\_ individual

Principal

1. \_\_\_\_\_ as to \_\_\_\_\_ (seal)

2. \_\_\_\_\_ as to \_\_\_\_\_ (seal)

3. \_\_\_\_\_ as to \_\_\_\_\_ (seal)

4. \_\_\_\_\_ as to \_\_\_\_\_ (seal)

By \_\_\_\_\_ affix Corporate Seal

Attested

Corporate Surety

Business address

Affix by \_\_\_\_\_ Corporate Seal

Title \_\_\_\_\_

For and on behalf of the Employer

**Form-22 (Not Applicable)**

**JOINT VENTURE AGREEMENT**

**(To be notarized on stamp paper of appropriate value)**

(1) ~~The Joint Venture agreement made and entered into at \_\_\_\_\_(place) on \_\_\_\_\_ day of \_\_\_\_\_(YEAR) by and between.~~

- a. ~~Firm A (Name with address of the registered office)~~
- b. ~~Firm B (Name with address of the registered office)~~

(2) ~~**Definitions:** In this deed the following words and expressions shall have the meaning set out below.~~

- a. ~~"The Employer" shall mean BMC.~~
- b. ~~"The Works" shall mean \_\_\_\_\_  
\_\_\_\_\_ (Name of work) which is more particularly described in the pre-qualification and tender documents issued thereof by the Employer.~~
- c. ~~"The Tender" shall mean the Tender to be submitted by Joint Venture to the Employer for the work /works.~~
- d. ~~"The Contract" shall mean the contract entered /to be entered into between the Joint Venture and the Employer for the works.~~

(3) ~~**Joint Venture (J.V):**~~

~~The Parties hereto declare that they have agreed to form a Joint Venture for the purpose of submitting the pre-qualification Application/ tender document initially and then tender and if successful for the execution of the works as an integrated Joint Venture. The parties are not under this agreement entering into any permanent partnership of Joint Venture to tender or undertake any contract other than the subject works. Nothing herein contained shall be considered to constitute the parties of partners to constitute either Party the agent of the other.~~

(4) ~~**Witnesses:** Whereas Gujarat Urban Development Company Limited as BMC. Employer has invited tenders from intending bidders and the Board has permitted a group of firms (not exceeding three) forming a Joint Venture to eligible to be a bidder. And whereas \_\_\_\_\_ party of the first part and \_\_\_\_\_ party of the Second part/third part(if applicable) are desirous to enter into a Joint Venture in the nature of partnership engaged in the joint undertaking for the specific purpose of execution of the work of constructing \_\_\_\_\_ and whereas Parties of the first and Second part /third part(if applicable) reached understanding to submit pre-qualified/ tender, if pre-qualification, and to execute the contract if awarded;~~

**~~This agreement witness as follows.~~**

- ~~(a) — The parties do not enter into an agreement of any permanent partnership of Joint Venture to tender or undertake any Contract other than the specified above;~~
- ~~(b) — That the operation of this Joint Venture firm concerns and is confined to the work of \_\_\_\_\_ of Board~~
- ~~(c) — The name of the Joint Venture firm for convenience and continuity shall be~~
- ~~(d) — The Address of Joint Venture for communication shall be as under.~~
- ~~(e) — The Joint Venture shall jointly submit pre-qualification application on the above name according to all terms and conditions stated in the relevant instructions contained in the bid documents.~~
- ~~(f) — That this Joint Venture shall regulate the relations between the parties thereto and shall include without being limited to them the following conditions.~~
  - ~~(1) — \_\_\_\_\_ firm shall be the lead company in charge of the Joint Venture for all intents and purpose.~~
  - ~~(2) — In case the said work is awarded to the Joint Venture, the partners of the Joint Venture will nominate a person with duly notarized power of Attorney on stamp paper, who will represent the Joint Venture with the authority to incur liabilities, receive instructions and payments, sign and execute the contract for an on behalf of the Joint Venture,~~
  - ~~(i) — All the (Maximum Three) parties agree to make financial participation and to place at disposal of Joint Venture the benefits of its individual experience, technical knowledge, skill and shall in all respect bear its share as regards planning and execution of the work and responsibilities including the provision of information, advice and other assistance required in the Joint Venture and participation shall be in proportion of, Firm – A.....% and Firm – B.....%~~
  - ~~(ii) — All rights, interests, liabilities, obligations work experience and risks (and all net profits or net losses) arising out of the contract shall be borne by the parties in proportion to their shares. Each of the parties shall furnish its proportionate share in any bonds, guarantees, sureties required for the works as well as its proportionate share in connection with the works. The share and participation of the two/three partners in working capital and other financial requirements shall be in ratio as mentioned above.~~
- ~~**(5) — Internal responsibilities and liabilities:**~~
  - ~~(a) — The division of individual scope of work may be worked out mutually by the parties but the party shall be jointly and severally liable to the employer for the whole work.~~
  - ~~(b) — The parties specifically undertake to carry out their separate works in full compliance with the contract with the employer. Each party shall be responsible jointly and severally for consequences if any arising out of defective or delayed execution of works which falls within the individual's party's area of responsibility and/ or it has been caused due to acts~~

and /or omission of the concerned party.

~~(c) — The parties jointly and severally agree to replace modify or repair any defect in their respective portions of works in accordance with the terms and condition of the contract with the employer.~~

~~(d) — The parties jointly and severally shall indemnify and hold harmless to each other against any claim made by the employer or any other third party for injury, damage, loss or expenses is attributed to the breach /non-performance of his responsibilities by the indemnifying party in accordance with the agreements and /or contract with the employer.~~

~~(e) — None of parties have joined in any other Joint Venture for the said works.~~

**~~(6) — Responsibilities and liabilities of Joint Venture towards the employer:~~**

~~(1) — Parties hereto shall be jointly and severally liable and responsible for the acts, deeds and things done or omitted to be done in respect of the execution of the contract and for any financial liability arising there from.~~

~~(2) — Parties hereto shall be jointly and severally responsible to the Employer for the execution of the works in accordance with the contract conditions;~~

~~(3) — Parties hereto shall be jointly and severally indemnifying to the Employer against any claim made against the employer or any other third party for any injury, damage or loss which may be attributed to the breach of the obligations under the contract pursuant to the contract.~~

**~~(7) — Site management:~~**

~~(a) — The execution of the work on the site will be managed by a Project Manager appointed by the Joint Venture and who will report to the \_\_\_\_\_(J.V.) the project manager shall be authorized to represent the Joint Venture on site in respect of matters arising under the contract.~~

~~(b) — The \_\_\_\_\_ (Name of the J.V.) shall be jointly and severally liable to the employer for the execution of the contract commitment in respect of the works in accordance with contract conditions.~~

**~~(8) — Termination of the Agreement:~~**

~~This agreement shall be terminated in the following circumstances.~~

~~(a) — The employer awards the contract for the work to the other Bidder.~~

~~(b) — The employer cancels the work to award the contract.~~

~~(c) — On completion of the defect liability period as stipulated in the contract agreement of the works and all the liabilities thereof are liquidated.~~

~~(9) — No partner has right to assign any benefits, obligation of liability under the agreement to any third party without prior written consent of the other partner as well as Board~~

**~~(10) — Financial matter:~~**

~~(a) — Bank Account in the name of the Joint Venture will be opened with any scheduled or nationalized Bank to be operated by an individual signatory as decided mutually by the~~

Joint Venture partners.

- (b) ~~All the partners shall be responsible to maintain or cause to maintain proper Books of accounts balance sheet and profit and loss account as to the state of affairs of the firm as at the end of the financial year and as to the profit and loss made or incurred by the firm for the year ended on that date, respectively shall be prepared and the same shall subject to audit by a Chartered Accountant.~~
- (c) ~~None of the party shall be entitled to make any borrowing on behalf of the Joint Venture without express prior written consent of the other party.~~
- (d) ~~Bank guarantee for the application /execution of the work shall be provided jointly from a bank acceptable to the employer.~~
- (11) Negotiation:** ~~Any negotiation of agreement between the parties hereto and the employer subsequent to the submission of the tender and prior to award, shall take place only with consent of each of the parties who shall be represented at the such negotiation by one or more representative(s) duly empowered to make such negotiation or agreement.~~
- (12) Legal jurisdiction:** ~~All questions relating to validity interpretation of this agreement shall be governed by the law of India and shall be subject to jurisdiction of High court at AHMEDABAD.~~
- (13) Settlement of disputes:** ~~Any dispute in interpretation of any condition mentioned herein shall be referred to an arbitrator/tribunal by mutual consent of the partners and such proceedings shall be governed by Gujarat Public Works contract disputes tribunal act of 1992 and as amended from time to time. The award of arbitrator shall be final and binding on the party hereto. Neither the obligation of each party here to the performance of contract nor the execution of work shall stop during the course of arbitration proceeding or as a result thereof.~~
- (14) Insurance:**
- (a) ~~The Joint Venture through the parties individually shall take such insurance in connection with the work in accordance with the tender condition as acceptable to the employer.~~
- (b) ~~The cost of the insurance premium paid by the Joint Venture shall be borne and paid by the parties in proportion to the respective shares of work. Other insurance taken individually by the parties shall be fully borne by the respective parties.~~
- (15)** ~~No change shall be made in this agreement without prior written consent of the employer and other party. However, if the employer directs the parties to make changes in the agreement so as to fulfill tender conditions the parties discuss with employer and mutually agreed such changes required to be made in the agreement.~~

~~(16) **Default and withdrawals from the Joint Venture.**: In case that either party fails to observe the provision stipulated in this agreement withdrawal from the Joint Venture, Loss and/or expenses incurred by other party due to such default and /or withdrawals shall be fully compensated by the party who has defaulted.~~

~~(17) All matter relating to or arising due to this agreement shall be treated as confidential and shall not be disclosed to any other party. In witness whereof the parties have caused their duly authorized representatives to sign below.~~

~~Witness:~~

~~1 Signed for and on behalf of firm A  
2 Date Seal~~

~~Witness:~~

~~1 Signed for and on behalf of firm B  
2 Date Seal~~

**Form-23 (If Applicable)**

**“Assured Pipe Supply Declaration” (MOU with Manufacturer of DI pipe)**

In the interest of timely completion of the Project, after discussions and getting assurance from the manufacturer, the following schedule is proposed in order to meet the milestones and desire target of the Projects.

Name of the Pipe Supply Firm	Location of Manufacturing Unit	Size of Pipe		Quantity (In MT)	Assured date of delivery at site (zero date starts from date of work order)
		Diameter (In mm) (FID)	Length (In Km)		

Total number of days for supply of pipe shall be 120 days from the date of work order. We hereby declare that the supply of pipes for the Project will be ensured by us (within 120 days) as per the above-mentioned schedule. We are aware, that, in case the above schedule is not met with by us, we shall be liable for paying the Liquidated damages as prescribed in the tender documents for non-fulfillment of assured supply of pipes.

Authorised Signatory of the Contractor

Authorised Signatory of the Manufacturer.



**FORM - 24 (If Applicable)**

**MEMORANDUM OF UNDERSTANDING (MOU)**

This MEMORANDUM OF UNDERSTANDING hereinafter referred to as MoU made on \_\_\_ Day \_\_\_\_\_(month and year) at \_\_\_\_\_ by and between.

(Name and Pipe Manufacturer with address) \_\_\_\_\_, represented by \_\_\_\_\_ Authorized Signatory, which expression shall unless repugnant to the subject or context include its administrators, Successors and assigns.

(Name of Bidder with Address) \_\_\_\_\_, represented by \_\_\_\_\_ (Authorized Signatory), which expression shall unless repugnant to the subject or context includes its administrator, successor and assigns

Hereinafter referred to as "Parties" in the collective sense and each of which is referred to as " \_\_\_\_\_ (Name of Pipe Manufacturer)" & " \_\_\_\_\_ (Name of Bidder)" in the individual sense.

WHEREAS BMC (hereinafter referred to as Employer) has invited tender (hereinafter referred to as the ("project")) for the following work:

Name of Project: \_\_\_\_\_

\_\_\_\_\_

WHEREAS if the said project is awarded to " \_\_\_\_\_"(Name of Bidder) to execute the said project and it would also need \_\_\_\_\_ pipes and we the " \_\_\_\_\_"(Name of Bidder) hereby enter into this MoU with " \_\_\_\_\_(Name of Pipe Manufacturer)\_\_\_\_\_" for timely execution of \_\_\_\_\_ pipe line work and supply of pipes as per "Form 23 - Assured pipe Supply Declaration" attached herewith and as per the tender conditions and further we mutually agree to execute the said project jointly and both the parties would be jointly and severally responsible for execution of the said projects as per the Bidding Documents.

IN WITNESS WHEREOF all the parties mentioned herein above have signed this MOU on the day, month and year first above mentioned.

No change shall be made in this agreement without prior consent of Employer and other party. However, If the Employer direct the parties to make changes in MOU agreement so as to fulfil the tender condition / requirement, the parties shall discuss with the employer and shall mutually agree for such changes as may be required to be made in the agreement.

In the interest of timely completion of the project, after discussion and getting assurance from manufacture of \_\_\_\_\_ pipe, the following schedule for \_\_\_\_\_ pipe supply is proposed in order to meet the milestones and desired target of the projects.

Total number of days for supply of pipe shall be \_\_\_\_\_ days from the date of work order. We hereby declare that the supply of pipes for the Project will be ensured by us (within \_\_\_\_\_ days) as per the above-mentioned schedule. We are aware that, in case the above schedule is not met with by us, we shall be liable for paying the Liquidated damages as prescribed in the tender documents for non-fulfilment of assured supply of pipes.

**For, (Name of Bidder)**

**For, (Name of Pipe Manufacturer)**

**Authorised Signatory**

**Authorised Signatory**

**Encl.:** Form 23 - Assured Pipe Supply Declaration

CONTRACT NO.

**Bhavnagar Municipal Corporation  
BHAVNAGAR**



**(A WHOLLY OWNED BHAVNAGAR MUNICIPAL CORPORATION UNDERTAKING)**

**ESTIMATED COST**

**BID DOCUMENT FOR UPGRADATION OF DRAINAGE LINE NETWORK IN OLD SOCIETIES OF  
ADHEWADA AREA UNDER BHAVNAGAR MUNICIPAL CORPORATION (BMC), BHAVNAGAR.  
DISTRICT: BHAVNAGAR**

**ESTIMATED COST: RS. 10,42,72,277.30/-**

**VOLUME – II: GENERAL CONDITION OF CONTRACT**

**Employer**

**EXECUTIVE ENGINEER  
(Drainage Dept.)**

**BHAVNAGAR Municipal Corporation**

Sir Mangal Sinhji Road, Near Kalanala,

Bhavnagar,

Bhavnagar,-364001.

Contact Number: 0278 2424801-10

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## I N D E X

<b>GENERAL CONDITIONS OF CONTRACT</b>	
Clause 1	Security deposit
Clause 2	Liquidated damages for delay
Clause 3	Default by contractor
Clause 4	Action when the progress of any particular portion of the work is unsatisfactory
Clause 5	Non exercise of powers under clause 3 not a waive
Clause 5-A	Powers to seize tools, plants, machineries, materials and stores of the contractor on invocation of clause 3
Clause 6	Extension of Time limit
Clause 7	Final Measurements and final bill on completion of work
Clause 8	Intermediate and final payments
Clause 9	Payment at reduced rates
Clause 10	Bills to be submitted monthly
Clause 11	Bills and rates payable
Clause 12	Materials to be supplied by the Department
Clause 12-A	Consumption and return of materials supplied by the Department
Clause 12-B	Safe custody of materials supplied by the Department
Clause 13	Drawings, designs, instruction of the Engineer- in- Charge and specifications, order of
Clause 14	Excess over Tender Quantities, Extra Items and Variations
Clause 15	No. Claim to any payment or compensation for alterations or for restrictions of work
Clause 16	Claims under the contract
Clause 17	Remedies for inferior or bad work, materials of workmanship and maintenance clause
Clause 17-A	Defect liability clause
Clause 18	Work to be open for inspection- Contractor's responsible agent to be present.
Clause 19	Notice to be given before work is covered up
Clause 20	Damage to contract work- in- progress and damages to surrounding properties.
Clause 20-A	Damages due to acts of God and unprecedented floods
Clause 21	Contractor to supply plant, ladders, scaffolding etc, and is liable for damage arising from non-provision of lights, fencing etc
Clause 21-A	Regulations for scaffolds, working platforms, gangways and stairways
Clause 21-B	Regulations for hoisting appliance

Clause 22	Measures for prevention of fire
Clause 23	Liabilities to contractors for any damages done in or outside work
Clause 24	Risk & Cost Clause
Clause 25	Recovery from Contractors
Clause 26	Work not to be sublet; consequences for unauthorised subletting, bringing and becoming insolvent
Clause 27	Sums payable by way of compensation to be considered as reasonable compensation without reference to actual loss.
Clause 28	Changes in the constitution of firm to be notified
Clause 29	Works to be under directions of Superintending Engineer
Clause 30	Settlement of Disputes and Arbitration
Clause 31	Deleted
Clause 32	Lump sums in estimates.
Clause 33	Action where no specifications
Clause 34	Definition of work
Clause 35	Non refund of quarry fees & Royalties
Clause 36	Compensation under the Workmen's Compensation Act
Clause 36-A	Liability of the contractor in case of accidents
Clause 36-B	Arrangements for personal safety requirements and first aid
Clause 37	Quantities in the tender to be considered approximate and they are subject to variations
Clause 38	Employment of famine or other labour
Clause 39	Claim for compensation for delay in starting the work
Clause 40	Claim for compensation for delay in the execution of work
Clause 41	Entering upon or commencing any portion of work
Clause 42	Minimum age of persons employed
Clause 43	Method of payment
Clause 43-A	Set off Clause....
Clause 44	Check Measurements
Clause 45	Termination by Engineer in Charge
Clause 46	Payment upon Termination
Clause 47	Rates exclusive of applicable Goods and Service Tax (GST) and inclusive of all other taxes
Clause 47-A	Income Tax
Clause 48	Employment through Employment Exchange and local labour
Clause 49	Fair wages
Clause 50	Deleted
Clause 51	List of Machinery

Clause 52	Deleted...
Clause 53	Local labour on normal rates
Clause 54	Land on Hire and rental charges
Clause 55	Vaccination to labourers
Clause 56	Camp facilities to workers
Clause 57	Gum boots, hand gloves, masks etc, to labourers
Clause 58	No distinction between harijans and other workers
Clause 59	Price Variation Clause
Clause 60	Fencing and Lighting
Clause 61	Liabilities for accidents to persons
Clause 62	Access to site and work on site
Clause 63	Reports regarding labour
Clause 64	Treasure trove
Clause 65	Indemnity
Clause 66	Insurance of labourers
Clause 67	Setting out
Clause 68	Cement Register
Clause 69	Materials and works Test Register
Clause 70	Progress Schedule
Clause 71	Secured Advance. (Deleted)
Clause 72	Advance payment (Deleted)
Clause 73	Advance against machineries (Deleted)
Clause 74	Mobilization Advance
Clause 75	Licence for contact labour
Clause 76	Recovery of Testing Charges and handing over empty cement bags
Clause 77	Recover of Sales Tax
Clause 78	Building and other construction works welfare cess (Labour cess)
Clause 79	Notice Board

## GENERAL CONDITIONS OF CONTRACT

### **(CLAUSE-1) Security Deposit:**

Within ten days from the date of issue of the letter accepting his Tender, the successful Bidder shall furnish the required Security Deposit for performance and attend the office of the Engineer In-Charge for execution of the Contract documents. If he fails to furnish the Security Deposit for performance or to execute the Contract for the work offered to him, his EMD shall be forfeited, and the Bidder may be disqualified from tendering for further works.

The successful bidder shall have to pay initial performance security deposit in the form of an unequivocal bank guarantee equivalent to 5% of Capital Cost and 5% of Operation and Maintenance Cost separately issued by any nationalized bank or as per list mentioned in latest GR of Finance Department.

### **Special Condition For Submission of EMD, BG,SD,FD:**

**Note: Henceforth Bank Guarantee, Earnest Money Deposit, Security Deposit, Fixed Deposit, Demand draft of State Bank of India will not be accepted.**

Further amount equivalent to 5% of the Capital Cost shall be deducted from the running bill as retention money during construction period and 5% of the Operation and Maintenance Cost shall be deducted from the running bill as retention money during Operation and Maintenance period.

The Contractor will be permitted to give an unequivocal composite bank guarantee from any nationalized bank or as per list mentioned in latest GR of Finance Department of GOG (Government of Gujarat), to cover the performance security and the retention money.

Without limitation to the provisions of the preceding paragraph, whenever the Employer's representative determines an addition to the Contract Price as a result of a change in cost and/or legislation or as a result of variation amounting to more than 25 percent of the portion of the Contract Price payable in a specific currency, the Contractor, at the Employer's representative's written request, shall promptly increase the value of the performance security in that currency by an equal percentage.

The performance security for the works shall be valid beyond 30 days from the date of completion and successful commissioning and performance security for the Operation and Maintenance works shall be valid 30 days beyond the date of completion of the Operation and Maintenance period.

5% performance security and 5% retention money recovered from each running bills till successful completion of the work (Total 10% of contract value) shall be released as mentioned below:



- (i) Performance Bank Guarantee equivalent to 50% of total security deposit shall be released after 30 days from the date of successful commissioning subject to the receipt of 10% amount of the O&M contract value as O&M security deposit from contractor.
- (ii) Remaining 50% of total security deposit shall be released after 30 days from the date of successful completion of the defect liability period i.e., 3(Three)year from the date of successful completion.
- (iii) The successful bidder shall deposit Performance security of 10% of the O&M contract value in the form of an unequivocal bank guarantee. The performance security will remain valid beyond 60days from the date of completion of O&M period.
- (iv) On successful completion of O&M and settlement of all dues recoverable from contractor Security Deposit for O&M period shall be released within 30 days from the date of successful completion of O&M works.

<b>Stage</b>	<b>Release of Security Deposit</b>
After 30 days from the date of successful commissioning (Subject to the receipt of 10% amount of the O&M contract)	50% of Security Deposit as Performance Security in the tender prescribed format (calculated on Capita Cost)
After 30 days from the date of successful completion of the defect liability period.	Remaining 50% of Security Deposit (calculated on Capita Cost)
On successful completion of O&M (Subject to settlement of all dues recoverable from contractor)	Security Deposit for O&M period (calculated on O&M Cost)

Prior to making any claim under the performance security, the Employer shall, in every case, notify the Contractor stating the nature of the default for which the claim is to be made.

**(CLAUSE-2) Liquidated damages for delay:**

**2.1 Overall Physical Progress of work:**

- a) The schedule of completion of the work shall be as under: -

<b>Time</b>	<b>Percentage of work (Physical)</b>	<b>MODE OF DEDUCTION AT EACH MILESTONE</b>
25%	15%	DEPOSIT
35%	25%	DEPOSIT
50%	40%	DEPOSIT
60%	50%	DEPOSIT
75%	75%	DEPOSIT
<b>100%</b>	<b>100%</b>	<b>MODE OF DEDUCTION AT EACH MILESTONE</b>

- b) However, if the contractor fails to meet any of the milestone both in time (e.g., 25 % for first milestone) and corresponding Physical progress (e.g. 15 % for first milestone) as mentioned above, amount to be retained at the rate of 0.1 percentage of that

milestone value per day till said designated part (s) is completed. In case, if the contractor executes and meets the subsequent milestone criteria, then the earlier retained amount shall be released. However, such retention / release for the slippage of subsequent / other milestones shall be applicable in the similar manner.

- c) However, if the contractor meets any of the next milestones of physical completion of work within the corresponding time limit as per the table above, the amount kept as deposit as per Para (b) above, shall be returned to the contractor after completing that milestone.
- d) If the contractor does not complete the entire work under the scope on the date of Completion, (i.e., 100% of the physical progress at the end of 100% of the time of completion), Liquidated damages at the rate of 0.1% of contract value per day of delay shall be recovered from the contractor. In such case, the amount retained as deposit shall be converted into liquidated damages.
- e) In case the time limit for completing the work is extended under any circumstances by BMC the milestone for completing the works will get changed according to the table as specified in Clause (a) above. in case, the work is not completed within the extended time limit and no further time extension to be granted, the liquidated damages shall be payable as 0.1% of the total contract value per day subjected to the maximum amount of 10% of the Estimated amount put to tender or total contract value whichever is higher.

**2.2 Pipeline Crossing Works:**

- a) The contractor must complete the pipeline crossing works requiring permissions of following authorities, within stipulated time limit as mention below. The contractor is required to plan and frame his project execution schedule accordingly.

NO.	AUTHORITY	TIME LIMIT IN MONTHS
a.	Railway	6 months from the date of receiving the work permit or 2 months from the date of receiving caution order from Railway or 6 months from the date of issue of LOI, whichever is later <b>(While calculating the total time limit for completion of the structures of Railway, the relevant rules of the railway authority should also be taken into account.)</b>
b.	National Highway	6 months from the date of receiving the permission from Concerned Authority or from the date of issue of LOI, whichever is later
c.	State Highway	6 months from the date of receiving the permission from Concerned Authority or from the date of issue of LOI, whichever is later
d.	Major Canal Crossing	6 months from the date of receiving the permission from Concerned Authority or from the date of issue of LOI, whichever is later

NO.	AUTHORITY	TIME LIMIT IN MONTHS
e.	Minor Canal Crossing	3 months from the date of receiving the permission from Concerned Authority or from the date of issue of LOI, whichever is later
f.	Gas / Oil / Petroleum Pipeline	6 months from the date of receiving the permission from Concerned Authority or from the date of issue of LOI, whichever is later
g.	Forest	6 months from the date of receiving the permission from Concerned Authority.

- b) If contractor fails to execute the works as in (a) above within stipulated time limit as mention above, he shall attract compensation at 0.1% cost of respective work per day of delay, calculated on the basis of BOQ, and it will have cumulative effect till the actual date of completion of the delayed work. The compensation recovered under this clause will be of permanent nature and will remain non-refundable under any circumstances.

### 2.3 Supply of Pipes:

- a) The contractor shall pay specific attention to timely supply of pipes under the project. The contractor is bound to supply pipes as per the specification laid within the time period stipulated in work plan approved by EIC. For ensuring the same, the contractor has to upfront declare at the time of bidding, their method of procurement of pipes i.e. (i) Through cash (if yes, this has to be reflected in their cash flow / fund flow plan to be submitted by contractor within one month from the date of signing of contract agreement) (ii) Through credit (iii) Through Letter of Credit (LOC); etc. In case of LOC, the contractor will enter into/ open LOC with the approved vendor within one month from the date of approval of QAP of pipes matching with delivery schedule. The maximum ceiling for number of times for opening of LOC is four, however the date of opening of last LOC with approved vendor for supply of pipes will be 4 months prior to stipulated end date for supply of pipes as per approved work plan.

- 2.4 The aggregate maximum of liquidated damages Payable under clause No 2 shall not Exceed 0.1% of contract value per day and shall be subject to the maximum amount of 10 % of the estimated amount put to tender or contract value whichever is higher.

- 2.5 The reasons requiring recovery of liquidate damages of ten percent of the contract value for performance shall be sufficient cause for termination of contract and for forfeiture of security deposit including amount of performance bond/security and registration of the contractor shall also be kept in abeyance for three years from the date as fixed in all cases.

### **(CLAUSE-3) Default by Contractor:**

If the Contractor shall neglect of fail to proceed with the work with due diligence or if he violates any of the provision of the Contract, the Engineer-in-Charge shall give the Contractor a notice, identifying deficiencies in performance and demanding corrective

action, such notice shall clearly state that it is given under the provision of this clause. After service of such notice, the contractor shall not remove any plant; equipment and material from the site. The Government shall have a lien on all such plant; equipment and material from the date of such notice till the, said deficiencies have been corrected as mentioned in the said notice.

If the contractor fails to take satisfactory corrective action within ten days after receipt of such notice, the Engineer In-charge on behalf of Governor of Gujarat shall terminate the contract in whole. In case, the entire contract is terminated, the amount of security deposit and performance bond if any together with the value of the work done but not paid for, shall stand forfeited to the Government. The plants, equipment and materials, held under this clause shall then be at the disposal of the Government to recover the amount equivalent to the liquidated damages and registration of the contractor shall be kept in abeyance for three years from the date as fixed in all such cases.

The Engineer In-charge, if necessary, shall direct that a part of the whole of such plant, equipment and material be removed from the site within a stipulated period, if the Contractor fails to do so, the Engineer- in-charge shall cause them or any part of them to be sold holding the net proceeds of such sale to the credit of the Contractor. After settlement of accounts, the lien by the Government of the contractor's remaining plant equipment and balances of materials shall be released.

Termination of the contract in whole shall be an adequate authority for the Engineer In-charge to demand discharge of the obligations from the guarantors of the security for the obligations from the guarantors of the security for the performance.

**(CLAUSE-4) Actions when the progress of any particular portion of the work is unsatisfactory.**

If the progress of any particular portion of the work under Contract is unsatisfactory, the Engineer-in-charge shall, notwithstanding that the general progress of the work is satisfactory, in accordance with Clause-2 be entitled to take necessary action under Clause-3, after giving the Contractor ten days' notice in writing and the contractor shall have no claim whatsoever for any compensation for any loss caused to him due to such action.

**(CLAUSE-5) non-exercise of power under Clause-3 not a waiver.**

In any case in which any of powers conferred upon the Engineer-in-charge by Clause 3 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 and such powers shall notwithstanding be exercisable at any future date.

**(CLAUSE-5A) Powers to seize tools, plants, machineries, materials and stores of the contractor on invocation of clause 3**

In the event of the Engineer- in charge taking action under clause 3, he may, if so desire, take possession of all or any tools, plants, machineries, materials and store in or upon the work or the site thereof or belonging to the contractor or procured by him and intended to be used for upon the work of the site thereof or belonging to the contractor or procured by him and intended to be used for the execution of the work or any part thereof, by paying or allowing for the same in account at the contract rate or in case of contract rates not being

applicable at such reasonable rates, as may be comparable to current market rates where ascertainable of similar articles and comparable condition, to be certified by the Engineer-in-charge. In the alternative the alternative the Engineer-in-charge may by notice in writing to the contractor or his clerk of the works foreman or other authorized agent require him to remove such tools, plants, machineries, materials or store 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 Engineer- in- charge may remove them at the contractor's expense or shall remove them by auction or private sale at the risk and cost of the contractor in all respects, and the certificate of the Engineer-in -charge as to the expenses of any such removal and the amount of the proceeds and expenses of any such removal shall be final and conclusive against the contractor.

**(CLAUSE-6 ): Extension of time limit: -**

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 any other ground he shall apply in writing to the Engineer -in- charge before the expiration of the period stipulated in the tender or before the expiration of 30 days from the date on which he was hindered whichever is earlier and the Engineer-in-charge may, if in his opinion, believe that there are reasonable grounds for granting an extension, grant such extension, as he thinks necessary or proper. The decision of the competent authority in this matter shall be final.

**(CLAUSE-7 ): Final measurement and final bill on completion of work:**

As soon as the work is completed, the contractor shall give a notice of such completion to the Engineer-in- charge and on receipt of such notice the Engineer-in-charge shall inspect the work and if he is satisfied that the work is completed in all respects then Engineer In-charge shall take final measurements: -

No certificate of completion shall be issued not shall the work be considered to be complete till the contractor shall have removed from the premises, on which the work has been executed, all scaffoldings, sheds and surplus materials, except such, as are required for rectification of defects; rubbish and all huts and sanitary arrangements required for his workmen on the site in connection with the execution of the work, as shall have been erected by the contractor for the workmen and cleared all dirt from all parts of building(s) in, upon or around which the work has been executed or of which he may have possession for the purpose of the execution thereof and cleared floors, gutters and drains, cased doors and sashes, oiled locks and fastening labelled keys clearly and handed them over to the Engineer- in- charge or his representative and made the whole premises fit for immediate occupation or use to the satisfaction of the Engineer-in-charge. if the contractor shall fail to comply with any of the requirements of these conditions as aforesaid, on or before the date of completion of the works, the Engineer-in-charge may, at the expense of the contractor, fulfil such requirements and dispose of the scaffolding, or surplus materials and rubbish etc. as he thinks fit and the contractor shall have no claim in respect of any such scaffolding or surplus materials except for any sum actually released by the sale thereof less the Cost of fulfilling the requirements and any other amount that may be due from the contractor. If the expenses of fulfilling such requirements are more than the amount realised such disposal as aforesaid the contractor shall forthwith, on demand, pay such excess. The Engineer- in-

charge shall also have the rights to adjust the amount of excess against any amounts that may be payable to the contractor.

**(CLAUSE-8): Intermediate and final payments:**

No payments 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 part of the work then 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 of 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 or unskilled work to be removed and taken away and reconstructed, or re-erected, nor shall any such payment be considered as an admission of the due performance of the contractor or any part thereof in any respect or the accruing of any claims, nor shall it conclude, determine, or affect in any way the power of the Engineer-in-charge as to the final settlement and adjustment of the account or otherwise or in any other way vary or effect the contract. The final bill shall be submitted by the contractor within one month of the completion of the work, otherwise the Engineer-in-charge's certificate of the measurements and of the total amount payable for the work shall be final and binding on all parties.

**(CLAUSE-9): Payment at reduced rates:**

The rates for items of works shall be valid only when the items concerned are accepted as having been completed fully in accordance with the sanctioned specifications. In cases where the items of work are accepted as not so completed, the Engineer In-charge can make payments at reduced rates.

**(CLAUSE-10): Bill to be submitted monthly**

A bill shall be submitted by the contractor each month on or before the date fixed by the engineer-in-charge for all works executed in the previous month and 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 ten 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 authorized agent whose countersignature 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): Bills and rates payable:**

The contractor shall submit all the bills on the printed forms at the office of the Engineer-in-charge. The charges to be made in the bills shall always be entered at the rates specified in the agreement or at the partly reduced rates subject to the approval of the Engineer-in-

charge in the case of items not completed/executed as per agreements or in the case of any extra work ordered in pursuance of these conditions and not mentioned or provided for the tender, at the rate here in after provided for such work.

**(CLAUSE-12): Materials to be supplied by the department.**

If the specification of the work provides for the use of any special description of materials to be supplied from the Department 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 therefore as here in after 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 this contract specified in the schedule or memorandum hereto annexed) the contractor shall be supplied with 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 or deducted from any sum then deposited, or the proceeds of sale thereof, if the deposit is held in govt. securities, the same or a sufficient portion thereof shall, in that case be sold for the purpose. All materials supplied to the contractor shall remain the absolute property of Govt. and shall on account be removed from the site of the work and shall at all time, be open to inspection by the Engineer-in-charge. Any such materials, unused and in perfectly good condition at the time of completion or termination of the contract, shall be returned to the Departmental 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 the consent in writing of the Engineer-in-charge and he shall have no claim for compensation on account of any such material except with the consent in writing of the Engineer-in-charge and he shall have no claim for compensation on account of any such material supplied to him as aforesaid but remaining unused by him or for any wastage in or damage thereto.

For materials provided in Schedule-A and consumed in excess quantities, the rates provided in Schedule A shall be increased/ decreased corresponding to the increased/ decreases in the new rate payable for excess quantity as compared to date of issue of such quantity of materials.

**(CLAUSE-12A): Consumption and return of materials supplied by the department.**

The contractor shall be entitled to use the material supplied by the Department only to the extent of quantities of such materials required for execution of the work as per theoretical calculation. The Engineer-in-charge may however, on being satisfied that a large quantity of such materials is required for the execution of the work permit the contractor to use such large quantity of the materials. Such permission shall be given in writing.

The contractor is bound to return in good condition such materials issued in excess of the requirements so worked out or in excess of the quantities so permitted to be used by the Engineer-in-charge. If the contractor fails to return such extra materials within a period of 15 days from the date of the demand in writing of such materials being made by the Engineer-in-charge, he shall be charged for the excess materials at double the issue rate for materials specified in Schedule A of contract Agreement.

**(CLAUSE-12B): -Safe custody of materials supplied by the department**

All stores and materials supplied by the department shall be in safe custody. The store shall be accessible to the Engineer-in-charge or his agent at all times, no materials shall be allowed to remove from the site of the work and any material required for the execution of the work shall be taken out form the store only in the presence of a duly authorized agent of the Engineer-in-charge.

**(CLAUSE-13): Drawings, designs, instructions of the engineer-in-charge and specifications, order of precedence in case of discrepancies**

- (1) The contactor shall execute the whole and every part of the work in the most substantial and workmen-like manner and both as regards materials and in other respects in strict accordance with specifications.

The contractor shall also conform exactly, full and faithfully to the design, drawings and instructions in writing for the work signed by the Engineer-in-charge. The design and the drawings shall be lodged in the office of the site engineer-in-charge to which the contractor shall be entitled to have access or the purpose of inspection at such office during office hours.

Where the instructions referred to above are not contained in separate letters addressed to the contractor the same shall be recorded in the work order book, which shall be maintained and kept on the site of the work. The contractor shall be required to sign such entries in the work -order book in token of having noted the instruction. However, if the contractor fails to sign the work- order book for any reason whatsoever, the entry of the instructions in the work order book shall be deemed to be the due notice to him of the said instructors. The work-order book shall be open for inspections to the contractor on the site or the work during office hours.

- (2) The contractor will be entitled to receive one copy of the accepted tender along with the work order free of cost.
- (3) The several documents forming the contract are essential parts of the contract and requirements' occurring in one is binding as through occurring in all. They are intended to be mutually explanatory and complimentary and to describe and provide for a complete work.

In the event of any discrepancy in the several documents forming the contract or in any one document, the following order of precedence should apply:

- (a) Dimension and quantities: (i) Drawings (ii) Schedule-B of the Tender form (iii) specifications.

On drawings, figures dimensions, unless obviously incorrect, will be followed in preference to scaled dimensions.

- (b) Description: (i) Schedule-B of the Tender form: (ii) Drawings (iii) specifications.

In the case of defective description or ambiguity, the Engineer-in-charge is entitled to issue further instructions directing in what manner the work is to be carried out. The contractor cannot take any advantage of any apparent error or omission in



drawings or specification and the Engineer-in-charge shall be entitled to makes corrections and interpretations as necessary to fulfil the plans and specifications.

**(CLAUSE-14) Excess over Tender Quantities, Extra Items and Variations**

The Engineer-in-charge shall have power to make any alterations in or addition 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 wok in accordance with any instructions in this connection which may be given to him in writing signed by the Engineer-in-charge and such alternation 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 work shall be carried out by the contractor on the same conditions in all respects on which he agreed to do the main work and at the same rate as are specified in the tender for the main work.

(14.1) Except that when the quantity of any item exceeds the quantity as in the tender by more than 10 % the contractor will be paid for the quantity in excess of 10 % at the rate entered in the S.O.R. of the year during which the excess in quantity is first executed or tender rate whichever is less.

(14.2) If the additional or altered work includes any class or work for work of which no rate is specified in this contract, then such class of work shall be carried out.

(i) At the rate derived from the item within the contract which is comparable to the one involving additional or altered class of work where there is more than one comparable item, the item of the contract which is nearest in comparison with regard to class or classes of the work involved, shall be selected and the decision of board shall be final and binding to the contractor.

(ii) If the rate cannot be derived in accordance with (i) above, such class of works shall be carried out at the rate entered in the Schedule for the year in which the tender was received, increased or decreased by the percentage by which the tender amount is more or less as compared to the amount arrived at the rates in the in "Schedule of Rates" of the Division in the year in which the tender was received. If the Schedule of rates does not contain all the items, the percentage increase or decrease of the tender shall be calculated considering such items which ware included in the "Schedule of Rates" of the Division for the year and for materials consumed on such item the rate to be charged would be the basic rate taken into account for fixing the rate in S.O.R. referred to above, instead of the rate stipulated in Schedule 'A'.

(iii) If it is not possible to arrive at the rate from (i) and (ii) above, such class or work shall be carried out at the rate decided by the competent authorities on the basis of detailed rate analysis after hearing the contractor before a Committee of two superintending Engineers stationed at the same place or the nearest place.

(14.3) If the additional or altered work, for which no rate is entered in the "Schedule of Rates" is ordered to be carried out before the rate is agreed upon, then the contractor shall within seven days of the date of receipt by him of the order

to carry out the work inform the Engineer-in-charge of the rate, which it is his intention to charge for such class of work and if the Engineer in charge does not agree to this rates, he shall be intimated 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 it advisable, provided always that if the contractor shall commence work or incur any expenditure in regard thereof before the rates shall have been determined as lastly herein before mentioned, then in such cases he shall only be entitled to be paid in respect of the work carried out of 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 the dispute, the decision of the Superintending Engineer of the Circle shall be final.

Where, however the work is to be executed according to the designs, drawings and specifications recommended by the contractor and accepted by the competent authority, the alternation above referred to shall be within the scope of such designs, drawings and specifications appended to the tenders.

The time limit for the completion of the work shall be extended in the proportion that the increase in the cost occasioned by alternations bears to the cost of the original contract work and the certificate of the engineer-in-charge as to such proportion shall be final and conclusive.

**(CLAUSE-15) No. Claim to any payment or compensation for alterations or for restrictions of work**

If at any time after the execution of the contract documents the Engineer-in-charge shall for any reason whatsoever, require the whole or 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, stating the fact to the Contractor who shall thereupon suspend or stop the work totally or partially, as the case may be. In any such case, except as provided hereunder, the Contractor shall have no claim to any payment or compensation whatsoever except as provided hereunder 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 not having been out, or on account of any loss that he may be put to on account of materials purchased or agreed to be purchased or unemployment of labour required by him, He shall not have also any claim for compensation by reason of any alterations having been made in the original specifications, drawings, designs and instructions which may involve any curtailment of the work as originally contemplated.

The Contractor shall not be entitled for loss of any expected profit of such work.

**(CLAUSE 16 :) Claims under the contract**

Time limit for unforeseen claims: The contractor shall not be entitled to any compensation from Government on any account unless where allowed by the conditions of his this contract.

**(CLAUSE-17) Remedies for inferior or bad work, materials of workmanship and maintenance clause:**

If, at any time before the expiry of Defects Liability period as detailed in Clause 17-A. It shall appear to the Engineer-in-charge or his sub-ordinate in charge of the work that/any work has been executed unsound, imperfect or unskilled workmanship or with materials or 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 are 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 passed, certified and paid or 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 in whole or in part 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 or percent on the amount of the estimate of the rectification for every day not exceeding ten days during which the failure so continues, and in the event of any such failure as aforesaid continuing beyond ten days, the Engineer-in-charge may rectify or remove, and re-execute the work or remove and replace the materials complained of as the case may be at the risk and expense in all respects of the contractor. Should the Engineer -in-charge consider that any such inferior work or materials as described above may be accepted or made use of, it shall be within his discretion to accept the same at such reduced rates as he may fix therefore.

However, the contractor shall be responsible for normal maintenance of the work till the final bill for the work is prepared by the Departmental Officer.

**(CLAUSE-17A) Defect liability clause:**

The contractor shall be responsible to make good and remedy at his own expense any defect in works (Items) carried out by the contractor including surface worn out which may develop or may be noticed or may be noticed before the period mentioned hereunder from the certified date of completion. The Engineer-in-charge shall give the contractor a notice in Writing about the defects and the contractor shall make good the same within 15 days of receipt of the notice. In the case of failure on the contractor, the Engineer- in charge may rectify or remove or re-execute the work at the risk & cost of the contractor. The Engineer-in-charge shall be entitled to appropriate the whole or any part of the amount of security deposit towards the expenses, if any, incurred by him in rectification, removal or re-execution. The Defect Liability Period shall be 3 (Three) year from the certified date of completion of work.

**(CLAUSE-18) Work to be open to inspections- Contractor or responsible agent to be present:**

All works under or in course of execution or executed in pursuance of the contract shall, at all times 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 all other times for which reasonable notice of the intimation of the Engineer -in-charge or his

subordinate to visit the works shall have been given to the contractor, either himself be present to receive orders and instruction or have a responsible agent duly accredited in writing present for the present for the purpose. Orders given to the contractor's duly authorized agent shall be considered to have the same force and effect as if they had been given to the contractor himself.

**Employment of a qualified site Engineer by the Contract.** As per tender document clause 3.0 of qualifying criteria

**(CLAUSE-19) Notice to be given before work is covered up:**

The contractor shall give not less than five days' 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 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 which the same was executed.

**(CLAUSE-20) Damage to contract work-in-progress and damages to surrounding properties.**

If the contractor or workmen, or servants shall break, deface, injure or destroy any part of the building or the work in question in/on which they may be working or any building, road, fence, enclosure or grass- land or cultivated ground contiguous to the premises on which the work or any part thereof is being executed or if any damage shall be done to the work from any cause whatever before damage occurred /caused due to normal flood or rain or if any imperfections become apparent in it within three months from the grant of a certificate of completion, final or otherwise by the Engineer-in-charge, the contractor shall make good the same at own expenses or in default, the Engineer-in-charge may cause the same to be made good by other contractor, and deduct the expenses (of which the certificate of the Engineer-in-charge shall be final) from any sums that may thereafter become due to the contractor or from his security deposit or the proceeds of sale thereof or a sufficient portion thereof of a sufficient portion thereof,

**(CLAUSE-20-A) Damages due to acts of God and unprecedented floods.**

Neither party shall be liable. to the other for any loss of damage occasioned by or arising out of acts of God, such as unprecedented flood, Volcanic eruption, earthquake of other convulsion of nature and other acts such as but not restricted to general strike, invasion, the acts of foreign countries, hostilities, or war like operations before or after declaration or war, rebellion, military or Usurped power which prevent performance of the contract and which could not have been foreseen or avoided by a prudent person.

**Note:** "Unprecedented flood" means the flood crossing the High Flood Level of the past 10 year(s) which is on the available record.

(Modified Vide R.& B.D.G.R. No. TNC- TNC-1096-IB-143-(16)-C dated 11-1-99)

**(CLAUSE-21) Contractor to supply plant, ladders, scaffolding etc. and is liable for damage arising from non- provision of lights, fencing etc-:**

The contractor shall supply at his own cost all material (except such special materials if any, as may, in accordance with the contract to be supplied from the Public Works Department Store), plant, tools, appliances, implements, ladders, cordage, tackle, scaffolding, and any temporary works which may be required for the proper execution of the work whether in the original, altered or substituted form and whether included in the specifications. or other documents forming part of the contract or referred to in these conditions of not and which may be necessary for the purpose of satisfying or complying with requirements of the Engineer-in-charge as to any matter or to which under these conditions he is entitled to be satisfied or which he is entitled to require together with carriage therefore 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 settings out works and counting, weighing and assisting in the measurement of examination at any time and from time to time, of the work or the materials, failing this, the same may be provided by the Engineer - in-charge at the expense of the Contractor and the expenses may be deducted from any money due to the Contractor under the contract or from his security deposit, or proceed of sale thereof or of a sufficient portion thereof. The contractor shall provide all necessary fencing and lights required to protect the public from accident and shall also be bound to bear expenses of defences of every suit, action or other legal proceeding at law that may be brought by any person for injury sustained owing to neglect of the above precautions and to pay any damages and costs which may be awarded in any such suit, action or proceedings to any such person, or which may, with consent of the Contractor, be paid in compromising any claim by any such person.

**(CLAUSE-21A) Regulations for scaffolds, working platforms, gangways and stairways**

The Contractor shall provide suitable scaffolds and working platforms. Gangways and stairways, and shall comply with the following regulations in connection therewith,

- (a) Suitable scaffolds shall be provided for workmen for all works that cannot be safely done from a ladder or by other means.
- (b) A scaffold shall not be constructed, taken down or substantially altered except-
  - (i) Under the supervision of a competent and responsible person.
  - (ii) Appointed by contractor and by competent workers possessing adequate experience in this kind of work.
- (c) All scaffolds and appliances connected therewith and all ladders shall-
  - (i) be of sound material
  - (ii) be of adequate strength having regard to the loads and strains to which they will be subjected, and,
  - (iii) be maintained proper condition.
- (d) Scaffolds shall be so constructed that on part thereof can be displaced in consequence of normal use.
- (e) Scaffolds shall not be overloaded and so far, as practicable the load shall be evenly distributed.

- (f) Before installing the lifting gear on scaffolds, special precaution shall be taken to ensure the strength and stability of the scaffolds.
- (g) Scaffolds shall be periodically inspected by a competent person.
- (h) Before allowing a scaffold to be used by his workmen, the Contractor shall, whether the scaffold has been erected by his workmen or not, take steps to ensure that it complies fully with the regulation herein specified.
  - (i) Working platforms, gangways shall-
    - (i) be so constructed that no part thereof can sag unduly or unevenly.
    - (ii) be so constructed and maintained having regard to the prevailing conditions as to reduce as far as practicable risks of persons tripping or slipping and-
    - (iii) be kept free from any unnecessary obstruction.
  - (i) In the case of working platforms, gangways working places and stairways at a height exceeding 2.00 metre (to be specified)
  - (i) Every working platform and every gangway shall be closely boarded unless other adequate measures are taken to ensure safety.
  - (ii) Every working platform, gangway, working place and stairway shall be suitably fenced.
- (k) Every opening in the floor of a building or in a working platform shall, except for the time and to the extent required to allow the access of person or the transport or shifting of materials be provided with suitable means to prevent the fall of persons or material.
- (l) When persons are employed on a roof where there is danger of falling from a height exceeding 3.00 (to be specified) meters suitable precaution shall be taken to prevent the fall of persons or material.
- (m) Suitable precautions shall be taken to prevent persons being struck by articles which might fall from scaffold or other working places.
- (n) Safe means of access shall be provided to all working platform and other working places.

**(CLAUSE-21B) Regulations for hoisting appliance**

The contractor shall comply with the following regulations as regards the hoisting appliances to be used by him-

- (a) Hoisting Machines and tackle including their attachments, anchorages and supports shall-
  - (i) be of good mechanical construction sound material and adequate strength and free from patent defect, and
  - (ii) be kept in good repair and in working order.
- (b) Every rope used in hoisting or lowering materials or as a means of suspension shall be of suitable quality and adequate strength and free from patent defect.

- (c) Hoisting machines and tackles shall be examined and adequately tested after erection on the site and before use and be re-examined in position at intervals to be prescribed by Engineer-in-charge.
- (d) Every chain, ring, hook, shackle, swivel and pulley block used in hoisting or lowering materials or as a means of suspension shall be periodically examined.
- (e) Every crane driver or hoisting- appliance operator shall be properly qualified.
- (f) No. person who is below age of 15 years shall be in control of any hoisting machine, including any scaffolds, nor shall give signals to the operator.
- (g) In the case of every hoisting machine and of every chain, ring hook, shackle, swivel and pulley block used in hoisting of lowering or as a means of suspension the safe working load shall be ascertained by adequate means.
- (h) Every hoisting machine and all gears referred to in preceding regulation shall be plainly marked with the safe working load.
- (i) In the case of hosting machine having a variable safe working load, each safe working load and conditions under which it is applicable shall be clearly indicated.
- (j) No part of any hoisting machine or gear referred to in regulation 'g' above shall be loaded beyond the safe working load except for the purpose of testing.
- (k) Motors, gears, transmissions, electric wiring and other dangerous parts of hoisting appliances shall be provided with sufficient safeguards.
- (l) Hoisting applications shall be provided with such means as will reduce to a minimum the risk of the accidental decent of the load.
- (m) Adequate precautions shall be taken to reduce to minimum the risk or any part of a suspended load becoming accidentally displaced.

**(CLAUSE-22) Measures for prevention of fire:**

The contractor shall not set fire to any standing jungle, trees, bush wood or grass without a written permit from the engineer-in-charge.

When such permit is given, and also in all cases when destroying cut or dug up tress, bush wood, grass etc, by fire, the contractor shall take necessary measures to prevent such fire spreading to or otherwise damaging surrounding property. When such permit is given, and also in all cases when destroying cut or dug up tress, bush wood, grass etc by fire, the contractor shall take necessary measures to prevent such fire spreading to or other-wise damaging surrounding property.

**(CLAUSE-23) Liability of contractors for damages done in or outside work area:**

Compensation for all damage done intentionally or unintentionally by Contractor's labourers whether in or beyond limits of Government property including any damages caused by the spreading of fire mentioned in the clause 22, shall be estimated by the Engineer-in - charge, or such other Officer as he may appoint and the estimates of the Engineer-in-charge, subject to the decision of the Superintending Engineer, on appeal, shall 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 damages in the manner prescribed in clause 1 or deducted by the Engineer-in-charge from any sums that may be due or become due from Government to the contractor under this contract or otherwise.

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

**(CLAUSE 24) Risk & Cost**

The Engineer-in-charge or the Competent Authority defined under rules may, without prejudice to his rights against the Contractor, in respect of any delay or inferior workmanship or otherwise, or any claims for damages in respect of any breaches of the contract and without prejudice to any rights or remedies under any of the provisions of this Contract or otherwise, and whether the date for completion has or has not elapsed, by notice in writing, absolutely determine the Contract in any of the following cases:

- (i) If the Contractor having been given by the Engineer-in-charge, a notice in writing to rectify, reconstruct or replace any defective work or that the work is being performed in any inefficient or otherwise improper or un-workman like manner shall omit to comply with the requirements of such notice for a period of seven days, thereafter, or if the Contractor shall delay or suspend the execution of the work so that either in the judgment of the Engineer-in-charge (which shall be final and binding) he will be unable to secure completion of the work by the date for completion or he has already failed to complete the work by that date,
- (ii) If the Contractor, being a company, shall pass a resolution or the court shall make an order that the company shall be wound up or if a receiver or a manager, on behalf of a creditor, shall be appointed or if circumstances shall arise, which entitle the court or creditor to appoint a receiver or a manager or which entitle the court to make a winding up order,
- (iii) If the contractor commits breach of any of the terms and conditions of this Contract,
- (iv) If the contractor commits any acts mentioned in, clause 26 thereof. When the Contractor has made himself liable for action under any of the cases aforesaid, the Engineer-in charge on behalf of the Governor of Gujarat shall have powers: -
  - a) To determine or rescind the contract, as aforesaid (of which determination or rescission notice in writing to the Contractor under the hand of the Engineer-in-charge shall be conclusive evidence), upon such determination or rescission, the earnest money, full security deposit of the contract shall be liable to be forfeited and shall be absolutely at the disposal of Government.
  - b) To employ labour paid by the Department and to supply materials to carry out the work or any part of the work, debiting the Contractor with the cost of the labour and the price of the materials (of the amount of which cost and price certified by 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 this Contract. The certificate of the Engineer-in-charge, as to the value of the work done, shall be final and conclusive evidence against the Contractor provided always that action under the sub-clause shall only be taken after giving notice in writing to the Contractor. Provided also that; if the expenses incurred by the Department are less than the amount payable to the Contractor at his agreement rates, the difference shall not be paid to the Contractor.

- c) After giving notice to the contractor to measure up the work of the contractor and to take such part thereof, as shall be unexecuted out of his hands, and to give it to another contractor to complete, in which case any expenses which may be incurred in excess of the sum which would have been paid to the original contractor, if the whole work had been executed by him (of the amount of which excess, the certificate in writing of the Engineer-in-charge shall be final and conclusive) shall be borne and paid by the original Contractor and may be deducted from any money due to him by Government under this contract or on any other account whatsoever, or from his Earnest Money, Security Deposit, Enlistment Security or the proceeds of sales thereof, or a sufficient part thereof, as the case may be. In the event of any one or more of the above courses being adopted by the Engineer-in-charge, the Contractor shall have no claim to compensation for any loss sustained by him by reason of his having purchased or procured any materials or entered into any engagements or made any advances on account or with a view to the execution of the work or the performance of contract. And, in case action is taken under any of provisions aforesaid, the Contractor shall not be entitled to recover or be paid, any sum for any work thereof or actually performed under this contract unless and until the Engineer-in-charge has certified, in writing, the performance of such work and the value payable in respect thereof, and he shall only be entitled to be paid the value so certified. No interest shall be payable to the Contractor on any payment due or awarded by any authority.

**(CLAUSE 25) Recovery from Contractors**

Whenever any claim against the Contractor for the payment arises under the contract, the Department may be entitled to recover such sum by:

- a) Appropriating, in part or whole of the Performance Guarantee and/or Security Deposit and / or any sums payable under the contract to the contractor.
- b) If the amount recovered in accordance with (a) above is not sufficient, the balance sum may be recovered from any payment due to the contractor under any other contract of the department, including the securities which become due for release.

The department shall, further have an additional right to effect recoveries as arrears of land revenue under the Gujarat Land Revenue Code.

**(CLAUSE 26) Work not to be sublet; consequences for unauthorised subletting, bribing and becoming insolvent.**

The Contractor shall not sublet the entire work under the contract or any part thereof under any circumstances, except the specialised work which is permitted as described in following clauses.

The contractor shall be permitted to sublet the specialised work of Railway Crossings, by the Box Pushing technique. The contractor to which the subletting is proposed to be done, shall be an experienced contractor, who has successfully carried out similar crossing works in the Western Railway region. The contractor shall propose the name of specialised agency to the Engineer In Charge, along with the details of work completed by the specialised agency, proposed time schedule, equipment to be deployed for the proposed crossing works, arrangement for seeking approval from Railway authorities etc, to the Engineer In Charge for his approval to the agency.

The actual work on site shall start only on approval from the Engineer In Charge. The extent of the work allocated to the specialised agency shall be only for the Box structure to be pushed under the railway track. All the approaches, pipe laying and other auxiliary works related to the crossing shall be responsibility of the Contractor.

The contractor shall be responsible for the safety of work and labour and other laws for the sublet work to be carried out by the specialised agency. All the safety, insurance and legal requirement of this contract shall be applicable mutatis mutandis to the work sublet to the specialised agency.

The payments to such approved specialised agency shall be directly made by the Contractor. However, Competent Authority will have a right to recover from any amount due to the Contractor, any amount payable by the contractor to the engaged specialised agency. A tripartite agreement shall be signed between the Contractor, Specialised Agency and Competent Authority to that effect.

Contract may be rescinded and security deposit forfeited for subletting the work without approval or for bribing a public officer or if contractor becomes insolvent.

**(CLAUSE-27) Sums payable by way of compensation to be considered as reasonable compensation without reference to actual loss:**

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

**(CLAUSE-28) Change in the constitution of firm to be notified:**

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

**(CLAUSE-29) Works to be under directions of Executive Engineer:**

All works to be executed under the contract shall be executed under the direction and subject to the approval in all respects of Engineer-in-charge of the Division for the time being, 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-30) Settlement of Disputes & Arbitration:**

**A) SETTLEMENTS OF DISPUTES:**

- i) If any dispute of any kind whatsoever may arise between the Employer and the Contractor in connection with or arising out of the Contract, including without prejudice to the generality of the foregoing any question regarding its existence validity or termination, or the execution of the works whether during the progress of the work or before or after the termination, abandonment or breach of the contract, the either parties shall have to raise/ refer their disputes/ differences / claims in writing to the other party, within a period of 30 days on occurrence of such events, to resolve any such dispute or difference.
- ii) The contractor shall have to refer their disputes to the concerned Engineer-in-charge. After receipt of the dispute from the contractor under this clause, the Engineer-in-charge of works shall have to submit their report to the Competent Authority within a period of 90 (Ninety) days. The Competent Authority shall offer an opportunity to the contractor to be heard and to furnish evidence in support of their disputes within 30 (Thirty) days after the receipt of the disputes duly compiled by Engineer-in-charge. After hearing the contractor regarding their disputes along with their documentary support and the concern Engineer-in-charge in charge of the work, the Competent Authority shall give decision within a period of 120 (One Hundred Twenty) days or the contractor is dissatisfied with the decision within 120 (One Hundred Twenty) days after the contractor has been heard. If The Competent Authority does not give decision within 120 (One Hundred Twenty) days or the contractor is dissatisfied with the decision of the Competent Authority, the contractor shall within 30 (thirty) days after receiving the instruction or decision, appeal to the Competent Authority. After hearing both the parties the Competent Authority will give reasonable decision within 180 (One Hundred Eighty) days from the date of receipt of appeal by the contractor. The decision of the Competent Authority shall be final and binding on both the parties. If the Competent Authority does not give decision within 180 (One Hundred Eighty) days after the date of appeal by the contractor, the contractor will have right to refer the dispute to arbitration tribunal as per provision of clause "Arbitration".

**B) ARBITRATION:**

- i) Subject to Clause (A) mentioned above and in the event of any dispute or difference arising out of or in any way relating to all concerning these contracts or the construction or effect of these contracts shall on the initiative of either party to the contract be referred to "The Arbitration Tribunal Constituted Under the Provision Of Gujarat Public Work Contract Dispute Arbitration Tribunal Act, 1992".
- ii) The arbitration shall be conducted in accordance with the provisions of the "Gujarat Public Work Contract Dispute Arbitration Tribunal Act, 1992" or statutory modifications there on. The Arbitration shall be held at such place and time as the Tribunal may determine.

- iii) The decision of the tribunal shall be final and binding upon both the parties. The expenses of the arbitration shall be paid as may be determined by the Tribunal.
- iv) Performance of the contractor under the contract shall if reasonably be possible, continue during the arbitration proceedings and payments due to the contractors by the owner shall not be withheld, unless they are the subject matter of the arbitration proceedings.
- v) The dispute is deemed to have arisen on the date, on which Competent Authority shall not give his decision as mentioned above in Clause (A) or in the case of intimation of any decision, the contractor intimates in writing that he has finally refused to accept the offer made by the authority.
- vi) Where any dispute arises between the parties to the work contract either party shall irrespective of whether such works contract provides for any arbitration or not, refer, within one year from the date that Competent Authority has not given the decision as per Clause (A) such dispute in writing to the Tribunal for arbitration in such form and accompanied by such documents or other evidence any by such fees, as may be prescribed.
- vii) Legal jurisdiction: All question relating to this Tender shall be governed by the law of India and shall be subject to jurisdiction of court at Gandhinagar, Gujarat.

**(CLAUSE-31) Deleted.**

**(CLAUSE-32) Lump sum in estimates:**

When the estimate on which a tender is made includes lump sum in respect of part of the contractor shall be entitled to payment in respect of the items of works involved of the part of the work in question at the same rates as are payable under this contract for 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, as his discretion, pay the lump sum amount entered in the estimate in the estimate and the certificate in writing or the Engineer-in-charge shall be final and conclusive against the contractor with regard to any sum or sums payable to him, under the provisions of this clause.

**(CLAUSE-33) Action where no specifications:**

In the case of work for which there is no such specification, such work shall be carried out in accordance with the Divisional Specification and in the event of there being no Divisional Specifications, then, in such case the work shall be carried out in all respects in accordance with the instructions and requirements of the Engineer-in-charge.

**(CLAUSE-34) Definition of work:**

The expression 'work' or 'works' 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, of the works, contracted to be executed under or in virtue of the contract, whether temporary or permanent and whether original, altered, substituted or additional.

**(CLAUSE-35) Non refund of quarry fees & Royalties:**

The contractor shall pay the royalty to the competent authority/ local body as per rules. The contractor shall furnish quarterly the statement showing quarterly or quarried materials, from whom purchased (with full address of the seller) and copies of bills for purchase to the District Officer of the Mining and Geology Department or authority competent to levy royalty in the area of work. Contractor shall also furnish such additional information as regards royalty payment to the Royalty authority. The royalty charges paid shall be borne by the Contractor and shall not be reimbursed by the Engineer-in-charge (Authority: R & BD Circular No. TNC-2286-UO-39(19)-C, dtd,23/10/1989)

**(CLAUSE-36) Compensation under the workmen's compensation Act:**

The contractor shall be responsible for and shall pay compensation to his workman payable under the Workmen's Compensation Act. 1923 (VII of 1923) hereinafter called the said Act) for injuries caused to the workmen. If such compensation is paid by Government as principal under sub- section 12(1) of the said Act on behalf of the Contractor it shall be recoverable by Government from the contractor under sub-section 12(2) of the said section. Such compensation shall be recovered in the manner laid down in clause-1 above.

**(CLAUSE-36A) Liability of the contractor in case of accidents**

The contractor shall be responsible for and shall pay the expenses of providing medical aid to any workmen who may suffer a bodily injury as a result of an accident. If such expenses are incurred by Government, the same shall be recoverable from the contractor for with and be deducted, without prejudice to any other remedy of Government from amount due or that may become due to the contractor.

**(CLAUSE-36B) Arrangements for personal safety requirements and first aid**

The contractor shall provide all necessary personal safety equipment and first aid apparatus available for the use of the person employed on the site and shall maintain the same in suitable condition for immediate use at any time and shall comply with the following regulations in connection therewith.

- (a) The workers shall be required to use the equipment so provide be the Contractor and Contractor shall take adequate steps to ensure proper use of the equipment by those concerned.
- (b) When work is carried on in approximately to any place where there is a risk of drowning all necessary equipment shall be provided and kept for use and all necessary steps shall be taken for the prompt rescue of any person, in danger.
- (c) Adequate provision shall be made for prompt first aid treatment of all injuries to be sustained during the course of the work.

**(CLAUSE-37) Quantities in the tender to be considered approximate and they are subject to variations.**

The quantities shown in the tender are approximate and no claim shall be entertained for quantities of work executed being less than those entered in the tender. In the case of increase in the quantities by more than10% the new rate will be paid to the contractor for

the quantities in excess of 10% as per schedule of rates of GWSSB/ R&B. The rates for the increased quantities as aforesaid will be fixed in the manner specified in Clause-14.

**(CLAUSE-38) Employment of famine or other labour:**

The contractor shall employ any famine, convict or other labour of particular kind or class, if ordered in writing to do so by the Engineer-in-charge.

**(CLAUSE -39) Claim for compensation for delay in starting the work**

No compensation shall be allowed for any delay caused in the starting of the work on account of delay in making available the full site of land at a time.

**(CLAUSE-40) Claim for compensation for delay in the execution of work**

No claim for compensation shall be allowed for any delay in execution of the work on account of water standing in borrows pits or compartment. The rates are inclusive of 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 -41) Entering upon or commencing any portion or work:**

The contractor shall not enter upon or commence any portion or work except with the written authority and instruction of the Engineer-in-charge or of his subordinate in charge of the work. Failing such authority, the contractor shall be no claim to ask measurement of or payment for work.

**(CLAUSE-42) Minimum age of person employed:**

(i) No contractor shall employ any person who is under the age of 18 years.

**(CLAUSE -43) Method of Payment:** Payment shall be made by cheques or RTGS directly into account of the contractor

**(CLAUSE -43-A) Set off Clause**

Any sum of money due and payable to the contractor (including the security deposit returnable to the contractor) executing and Government work or work of any District Panchayat wholly financed as grant-in-aid under this contract shall be appropriated by any District Panchayat/ Government and shall be set off against any claim of the Government/ District Panchayat of Gujarat State by the District Panchayat of Gujarat State/ Government for the payment of a sum of money arising out or under any other contract made by the contractor with the Government/ District Panchayat of Gujarat State for the work wholly financed as grant-in-aid by Government of Gujarat State. When no such amount for purpose of the recovery from the contractor against any claim of the Government / District Panchayat of Gujarat State is available, such a recovery shall be made from the contractor as arrears of land revenue.

**(CLAUSE -44) Check Measurements**

44.1. The department reserves to itself the right to prescribe a scale of check measurement of work in general or specific scale for specific works or by other special orders.

- 44.2. Checking of measurement by superior officer shall supersede measurements by subordinate officer(s), and the former will become the basis of the payment.
- 44.3. Any over/excess payments detected, as a result of such check measurement or otherwise at any stage up to the date of completion of the defect liability period specified in this contract, shall be recoverable from the Contractor, as per clause 24 above.

**(CLAUSE -45) Termination by Engineer in Charge**

If the Contractor fails to carry out any obligation under the Contract, the Engineer in Charge may by notice require the Contractor to make good the failure and to remedy it within a specified reasonable time.

- 45.1. The Engineer in Charge shall be entitled to terminate the Contract if the Contractor:
- a. abandons the Works or otherwise plainly demonstrates the intention not to continue performance of his obligations under the Contract,
  - b. the Contractor is declared as bankrupt or goes into liquidation other than for approved reconstruction or amalgamation;
  - c. without reasonable excuse fails to comply with the notice to correct a particular defect within a reasonable period of time as specified in Clause-3, Clause 20, Clause 21 and Clause 23.
  - d. the Contractor does not maintain a valid instrument of financial security as prescribed;
  - e. the Contractor has delayed the completion of the Works by such duration for which the maximum amount of liquidated damages is recoverable;
  - f. If the Contractor fails to deploy machinery and equipment or personnel or set up a field laboratory as specified in the contract document.
  - g. If the contractor, in the judgment of the Engineer in charge has engaged in corrupt or fraudulent practices in competing for or in executing the contract as specified in clause 26.
  - h. Any other fundamental breaches as specified in the Contract.
- 45.2. In any of these events or circumstances, the Engineer in Charge may, upon giving 14 days' notice to the Contractor, terminate the Contract and expel the Contractor from the Site. However, in the case of sub-paragraph (c) or (g), the Engineer in Charge may terminate the Contract immediately.
- 45.3. Notwithstanding the above, the Engineer-in-Charge may terminate the Contract for convenience by giving notice to the Contractor.

**(CLAUSE -46) Payment upon Termination**

If the contract is terminated under clause 45.2, the Engineer shall issue a certificate for value of the work done less liquidated damages, if any, less recoverable advance payments received up to the date of the issue of the certificate and less the percentage to apply to the

value of the work not completed as indicated in the Contract. The amount so arrived at shall be determined by the Engineer-in-Charge and shall be final and binding on both the parties.

**46.1. Payment on termination under clause 45.3 above -**

If the Contract is terminated under clause 44.3 above, the Engineer shall issue a certificate for the value of the work done, the reasonable cost of removal of Equipment, repatriation of the Contractor's personnel employed solely on the Works, and the Contractor's costs of protecting and securing the Works and less advance payments received up to the date of the certificate, less other recoveries due in terms of the contract and less taxes due to be deducted at source as per applicable law.

**46.2.** If the total amount due to the Employer exceeds any payment due to the Contractor, the difference shall be recovered as per clause 25 above.

**(CLAUSE-47) Rates are exclusive of GST but inclusive of all other taxes**

The rates to be quoted by the contractor must be exclusive of GST but inclusive of all other taxes and applicable Cess, levies on such taxes. GST shall be paid extra on the admissible payment as per the approved tender rates and condition of price variation; GST shall be paid as per prevailing rates at the time of payment

**(CLAUSE-47A) Income tax: -**

Deduction will be made at source on the contractor's bill towards Income tax by the employers as per prevailing rules of the Income tax authority.

**(CLAUSE -48) Employment through Employment Exchange and local labour**

The contractor should as far as possible, obtain his requirement of labourers skilled and unskilled, from the nearest Employment Exchange so as to utilize the local employment potential. If there are no local Employment Exchange or such Exchanges are not able to provide the required labour locally, suitable labourers should be utilized to the maximum extent possible.

**(CLAUSE -49) Fair Wages:**

If a Contractor fails to pay within '7' (Seven) days to the labourer(s)/ worker(s) the minimum wages prescribed by the Government under the Minimum Wages Act-1948 as in force from time to time, the Engineer-in-charge shall be at liberty to deduct the amount payable to the labourers/ workers from his (Contractor's) bills or deposit(s) payable by the contractor after making due inquiries and establishing the claim(s) of the labourer(s)/ worker(s).

The contractor shall not be entitled to any payment of compensation on account of any loss that the contractor may have to incur on amount of the action as aforesaid. Before the action as aforesaid, is enforced, a notice in writing to the contractor shall be issued by the Engineer-in-charge to pay the wages as per

Minimum Wages Act in force at the relevant time. If contractor does not act as afore said within seven days, then the action contemplated as above shall be taken against him.

**(CLAUSE -50) Deleted**

**(CLAUSE -51) List of Machinery:**



The contractors shall also give a list of machineries in his possession and which they propose to use in the work.

**(CLAUSE -52) Deleted**

**(CLAUSE -53) Local labour on normal rates:**

The contractor shall have to engage local labour and person seeking employment where available on current minimum wage rate of Gujarat Government and revision if any.

**(CLAUSE -54) Land on Hire and rental charges**

Rent will be recovered from the contractor for the land (if available) given to them for stacking materials as well as for construction of temporary hutments etc.

**Land Measuring Charges**

As per latest prevailing Government rates applicable from time to time.

**(CLAUSE -55) Vaccination to labourers**

The contractor shall employ only such labour who shall produce a valid certificate of having been vaccinated against small pox within a period of last three years.

**(CLAUSE -56) Camp Facilities to Workers.**

**1. Huts:**

The contractor shall build sufficient number of huts on a suitable of land for the use of the labourers according to the following specifications:

- (1) Huts of bamboos and grass may be constructed.
- (2) A good site shall be selected. High ground removed from jungle but well provided with trees shall be chosen wherever it is available. The neighbourhood of rank jungle, grass or weeds should particularly be avoided. Camps should not be established close to large cuttings of earth-work.
- (3) The lines of huts shall have open spaces of at least 10 m. between rows. When a good natural site cannot be procured, particular attention should be given to the Water supply works.
- (4) There should be no over-crowding. Floor spaces at the rate of 2.8 Sq. m. per head shall be provided. Care should be taken to see that the huts are kept clean and in good order.
- (5) The contractor must find out his own land. If he wants Government land, he should apply for it and pay assessment for it.

**2. Drinking Water:**

The contractor shall as far as possible, provide an adequate supply of chlorinated pure potable drinking water for the use of labourers.

**3. The contractor shall construct semi-permanent latrines for the use of labourers on the following scale, namely:**

- (a) Where female is employed, there shall be at least one latrine for every 25 females.
- (b) Where males are employed, there shall be at least one latrine for every 25 males.

Provided that where the number of males or female exceed 100, it shall be sufficient if there is one latrine for every 25 males or females, as the case may be up to the first 100 and one for every 50 thereafter.

4. **Privacy in latrines:** Every latrine shall be under cover and so partitioned off as to secure privacy and shall have a proper door and fastenings.

5. **Notice to be displayed outside latrines and urinals:**

(1) Where workers of both sexes are employed, there shall be displayed outside each block of latrine and urinal a notice in the language understood by the majority of the workers for Men Only or For Women Only: as the case may be.

(2) The notice shall also bear the figures of a man or of a woman, as the case may be.

6. **Urinals:** There shall be at least one urinal for male/ female workers upto 50 employed at a time. Provided that where the number of male or female workmen, as the case may be, exceeds 500, it shall be sufficient if there is one urinal for every 50 males or females up to first 500 and one for every 100 males or females or part thereof.

7. **Latrines and Urinals to be accessible:**

(1) The latrines and urinals shall be conveniently situated and accessible to workers at all times at the establishment.

(2)(i) The latrines and urinals shall be adequately lighted and shall be maintained in a clean and sanitary condition at all times.

(2)(ii) Latrines and urinals other than those connected with a flush sewage system shall comply with the requirements of the Public Health Authorities.

8. **Water for latrines and urinals:**

Water shall be provided by means of pipes or tanks or their wise, so also be conveniently accessible in or near the latrines and urinals.

9. **Bathing and washing places:**

(1) The contractor shall construct sufficient number of bathing places; every unit of 20 persons being provided with a separate bathing place.

(2) Washing places should also be provided for the purpose of washing clothes. Every unit of 30 persons shall have at least one washing place.

(3) Such bathing and washing places should be suitably screened and separate places provided for male and female workers.

- (4) Such facilities shall be conveniently accessible and shall be kept in clean and hygienic condition.

**10. Medical Facilities:**

The contractor shall engage a medical officer with a travelling dispensary for a camp having 500 or more persons if there is no Government or other private dispensary situated within 6 km from the camp.

**11. Conservancy and cleanliness:**

The contractor shall provide the necessary staff for effecting the satisfactory conservancy and cleanliness of the camp to the satisfaction of the Engineer-in-charge. At least one sweeper per 200 persons should be engaged. Conservancy staff should dump refuse in compost pit, away from the labour camp.

**12. Health Provisions:**

The District Health Officer of the District or the Deputy Director of Health services shall be consulted before opening a labour camp and his instructions on matters such as water supply, sanitary convenience, the camp-site accommodation and food supply shall be followed by the contractor.

**13. Precaution against epidemic:**

- (a) The authorities in charge of the colonies should get the labourers inoculated against cholera and plague and vaccinated against smallpox at the time of recruitment, if they are not inoculated or vaccinated within 6 months or 3 years respectively prior to the date of recruitment.
- (b) When, in any labour camp there is an epidemic disease or is threatened with such an outbreak, the authorized in charge of the labour camps should ensure that all the inmates of the labour colonies are inoculated or vaccinated as the case may be depending on the diseases, within 72 hours after the outbreak.
- (c) The authorities in charge of the labour colony should arrange to communicate by wire regarding the outbreak of the epidemic disease on the very day of the outbreak, to the Mamlatdar of the Taluka, the District Health officer or to the Deputy Director of the above officers in the prescribed form regarding the progress of the epidemic disease.
- (d) When the authorities in charge of the labour colony suspect or have reason to believe that any inmate of the labour colony is suffering from the infectious or contagious disease, they shall forthwith arrange for the segregation of such persons to isolated huts to be specifically provided for the purpose and also for their treatment.
- (e) As regional malaria epidemic outbreaks are likely to occur in such project areas, the authorities in charge of the labour colonies should report promptly the occurrence of unusual incidence of cases of malaria and also inform the District Health Officers of the District Deputy Director of Public Health (Malaria) and the Director of Public Health and also arrange to institute all

necessary ant malarial measures as may be advised by the officials of the Public Health Department.

- (f) The authorities in charge of the colonies should also arrange to carry out any other measures that may be recommended by the officials of the Public Health Department necessary to prevent or control the spread of disease.

#### **14. Rest Rooms**

- (1) In every place where in contract labour is required to halt at night in connection with the contract works and in which employment of contract labour is likely to continue for three months or more, the contractor shall provide and maintain rest rooms or other suitable alternative accommodation within fifteen days of the employment of contract labour.
- (2) If the amenity referred to in sub rule is not provided by the contractor within the period prescribed the employer shall provide the same within a period of fifteen days of the expiry of the period laid down in the sub-rule (1).
- (3) Separate rooms shall be provided for women employees.
- (4) Effective and suitable provision shall be made in every room for securing and maintaining adequate ventilation for the circulation of fresh air and there shall also be provided and maintained sufficient and suitable natural or artificial lighting.
- (5) The rest room or other suitable alternative accommodation shall be of such dimensions as to provide at least a floor area of 1 sq. mt. for each person making use of rest rooms.
- (6) The rest rooms or other suitable alternative accommodation shall be so constructed as to afford adequate protection against heat, wind, rain and shall have smooth, hard and impervious surface.
- (7) The rest rooms or other suitable alternative accommodation shall be a convenient distance from the establishment and shall have adequate supply of wholesome drinking water.

#### **15. Canteen Facilities:**

- (1) In every establishment of contract work and wherein work regarding the employment of contract labour is likely to continue for six months and wherein contract labour numbering one hundred or more are ordinarily employed, the adequate canteen facilities shall be provided by the contractor for the use of such contract labour within sixty days of the commencement of the employment of contract labour.
- (2) If the contractor fails to provide the canteen facilities within the time laid down the same shall be provided by the principal employer within sixty days of the time allowed to the contractor.
- (3) The Canteen shall be maintained by the contractor or principal employees as the case may be in an efficient manner.

#### **16. Accommodation in canteen:**

- (1) The canteen shall consist of at least dining hall, kitchen, storeroom, pantry and washing place separately for workers and for utensils.
- (2)(i) The canteen shall be sufficiently lighted at all times where any person has access to it.

- (ii) The floor shall be made of smooth and impervious materials and inside walls shall be lime-washed or colour-washed at least once in each year, provided that the inside walls of the kitchen shall be lime-washed every four months/
- (3)(i) The premises of the canteen shall be maintained on clean and sanitary condition.
- (ii) Waste water shall be carried away in suitable covered drains and shall not be allowed to accumulate so as cause nuisance.
- (ii) Suitable arrangements shall be made for the collection and disposal of garbage.

**17. Accommodation in dining hall:**

- (1) The dining hall shall accommodate at a time, at least 30% of the contract labour working at a time.
- (2) The floor area of the dining hall excluding the area occupied per dinner to be accommodated shall as prescribed in sub-rule (1).
- (3) (i) A portion of the dining hall and service counter shall be partitioned and reserved for women workers, in proportion to their numbers (ii) Washing places for women shall be separate and screened to secure privacy.
- (4) Sufficient table, stools, chairs or benches shall be available of the number of dinners to be accommodated as prescribed in sub-rule-1.

**18. Equipment in canteen:**

- (1)(i) There shall be provided and maintained sufficient utensils, crockery, cutlery, furniture and any other equipment necessary for the efficient running of the canteen.
- (ii) The furniture utensils and other equipment shall be maintained in a clean and hygienic conditions.
- (2)(i) Suitable clean clothes for the employees serving in the canteen shall also be provided and maintained.
- (ii) A service counter, if provided, shall have a top of smooth and impervious materials.
- (i) Suitable facilities including an adequate supply of hot water shall be provided for the cleaning of utensils and equipment.

**19. Food stuff to be served:**

The food stuff and other items to be served in the canteen shall be in conformity with the normal food habits of the contract labour.

**20. Prices to be displayed:**

The charges of food stuffs, beverages and any other item served in the canteen shall be based on 'no profit, no loss' and shall be conspicuously displayed in the canteen.

**21. Canteen to be run on 'No profit no loss' basis:**

In deriving the prices of food stuffs and other articles served in the canteen, the following items shall not be taken into consideration as expenditure namely.

- (a) The rent for the land and building.
- (b) The depreciation and maintenance charges for the building and equipment provided for in the canteen.
- (c) The cost of purchase, repairs, and replacement of equipment including furniture, crockery, cutlery and utensils.
- (d) The water charges and other charges incurred for lighting and ventilation.
- (e) The interest on the amount spent on the provisions and maintenance of furniture and equipment provided for in the canteen.

The local officers should check up whether, facilities as offered and which are admissible under the existing rules and orders are made available to the workers and enforce upon the contractors the necessary of adhering the instructions for promotion of welfare of the workers according to the terms of the contract.

**22. Books of accounts and registers of the canteen:**

The books of accounts and registers and other documents used in connection with the running of the canteen shall be produced on demand to an inspector.

**23. Audit of the Account of the Canteen:**

The accounts pertaining to the canteen shall be audited once every 12 months by registered accountants and auditors; provided that the Labour Commissioner may approve of any other person to audit the accounts, if he is satisfied that it is not feasible to appoint a registered accountant and auditor in view of the size or the location of the canteen.

**(CLAUSE -57) Gum boots, hand gloves, masks etc, to labourers**

Contractor shall have to arrange for the supply of gumboot, Hand gloves, and mask etc. invariably the labourers / workers engaged by the contractor on asphalt work.

**(CLAUSE -58) No distinction between harijans and other workers**

The contractor shall not show any distinction between Harijan and other class of labourers/ workers employed in carry out the Government work.

**(CLAUSE -60) Price Variation (Deleted)**

**(CLAUSE -60) Fencing and lighting:**

- (a) The contractor shall, unless otherwise specified, be responsible for the proper fencing, lighting grading and taking of the necessary safety measures for all works comprised in the contract and for the proper provision of temporary road, ay, foot-way, guards, fences, caution notice etc. as far as the same may be rendered necessary by reasons of the work for the accommodation of workmen, foot passengers

or other traffic and of owners and occupiers of adjacent property and the public and shall remain responsible for any accidents that may occur on account of his failure to take proper & timely precautions.

- (b) All the arrangements made for fencing and lighting shall be maintained by the contractor through the currency of the contract till the physical taking over of the work by department.

**(CLAUSE -61) Liability of Accidents to Persons:**

Responsibilities and liabilities of the contractor under workmen's compensation act are give in clause-37 in addition following shall also apply: (a) On the occurrence of an accident, which result in death of workmen employed by the contractor or which is so serious as is likely to result in death of any such workmen, the contractor, shall within 24 hours of happening of such accident(s) intimate, in writing to the Engineer-in-charge the fact of such accident(s). The contractor shall indemnify Government against all loss or damage sustained by the Government resulting directly or indirectly from his failure to give intimation in the manner aforesaid including the penalties or fines, if any, payable by the Government as a consequence of Government's failure to give notice under the workmen's compensation act or otherwise to conform to the provisions of the said act in regard to such accident(s) (b) in the case of an accident, in respect of which compensation may become payable under workmen's compensation Act, whether by the contractor or by the Government as principal Employer, it shall be lawful for the Engineer-in-charge to retain out of money due and payable to the contractor, such sum or sum 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.

**(CLAUSE -62) Access to site and work on site:**

The Engineer may, if he considers fit from the time, enter upon any land(s) which may be in possession of the contractor his contract for the purpose of executing any work not included in this contract and may execute such works not included in this contract by agents or by other contractors, at his opinion and the contractor shall, in accordance with the requirements of the Engineer-in-charge, afford all reasonable facilities for execution of the work including occupation of lands by structure or otherwise for any other contractor employed by the Government and his workmen or for the workmen of the Government who may be employed in the execution on or near the site of the work not included in the contract or of any contract in connection with or ancillary to the work and in default, the contractor shall be liable to the Government for any delay or expense incurred by reason of such default. Provided always that if damage arising, make a statement of the same of the Engineer-in-charge who shall from time to time, assess the value in his judgment of such damage and the Government shall from time to time pay to the contractor the amount (if any) accepted as justified by the Engineer-in-charge.

**(CLAUSE -63) Reports Regarding Labour:**

The contractor shall submit the following reports to the Engineer-in-charge:

- (i) A daily report in the suitable format of the strength of labour, both skilled and unskilled employed by him on the work(s). The contractor shall increase or decrease the strength both skilled and unskilled. If directed by the Engineer-in-charge. The submission of such reports shall not, however, relieve the contractor of his responsibilities and duties regarding progress or any other obligation under the contract.
- (ii) A classified weekly return in the suitable form of the number of person employed on the works during the preceding week.
- (iii) A weekly return in the suitable form showing the health of the contractor's camp, the number of person's ill of in capacities and the nature of their illness.
- (iv) A report of any accident, which may have occurred, to be sent within 24 hours of the occurrence.
- (v) Such other report as may be prescribed.

**(CLAUSE -64) Treasure Trove:**

In the event of discovery by the contractor or his employees, during the progress of work of any gold, silver, oil or other minerals of any description and precious stones, treasures, coins, antiques, relic, fossils or other articles or value of interest whether geological, archaeological or any other such treasure & other things shall be deemed to be the absolute property of the Government and the contractor shall duly preserve the same to the satisfaction of the Engineer-in-charge from time to time, and relive the same to such persons as the Engineer-in-charge may appoint.

The contract shall take all reasonable precautions to prevent his workmen or any other person from removing or damaging any such articles or things, immediately after the discovery thereof the before removal acquaint the Engineer-in-charge with such discovery and carry out his orders for the disposal of the same.

**(CLAUSE -65) Indemnity:**

The contractor shall indemnify the Government against all actions, suits, claims and demands through or made against the department in respect of work of this contractor against any loss damage to Department in consequence of any action or suit being brought against the contractor for anything done or omitted to be done in execution of the work of this contract.

**(CLAUSE -66) Insurance of Labourers:**

The contractor shall be responsible to arrange for insurance of all labourers, skilled and unskilled workers, supervisors etc. employed by him as per labour regulation of the state.

**(CLAUSE -67) Setting out:**



The contractor shall be responsible for the true and proper setting out of the works and the correctness of positions, levels, dimensions and alignments of all parts of the work and for the provisions of all necessary instruments, appliance and labour in connection therewith. If, at any time, during the progress of the work, any errors, appear or arise in the position, levels, dimensions or alignments or any part of the work, the contractor, on being required to rectify such errors by the Engineer-in-charge shall at his own expense do so to the satisfaction of the Engineer-in-charge. If however, such error is based on incorrect data supplied in writing by the Engineer-in-charge, the expenses of rectifying the same shall be borne by the Department. The checking of and setting out of any line or level by the Engineer-in-charge or his representative shall not in any way, relieve the contractor of his responsibilities for the correctness of the error. The contractor shall carefully protect and observe all bench-marks, site-nails, page and other things used in setting out of the work(s).

**(CLAUSE -68) Cement Register:**

A register in the prescribed form showing day-to-day receipt, consumption and balance of cement on site of work will be maintained by the Department, which shall invariably be signed daily by the contractor or his authorized representative in token of its correctness.

**(CLAUSE -69) Materials and Works Test Register:**

A register in the prescribed form showing day to day receipt, consumption and balance of cement on site of work by the Department, which shall invariably be signed by the Contractor or his authorized representative in token of its correctness.

**(CLAUSE -70) Progress Schedule:**

- (a) The contractor shall furnish within one month (unless extended by the Engineer-in-charge) of the order to start the work, the progress schedule in quadruplicate indicating the date of starting, the monthly expected to be achieved and the anticipated completion date of each major item of work to be done by him, also indicating dates of procurement and setting up the materials, plants and machinery. the schedule should include a statement of proposed general and detailed arrangements for carrying out works, and of item, order and manner in which it is proposed general and detailed arrangements for carrying out works, and of item, order and manner in which it is proposed general and detailed arrangements for carrying out works, and of item, order and manner in which it is proposed that these shall be executed. The schedule should be framed keeping requirement of the clause-2 of tender form in view and be such as in practice to the achievement towards completion of the work in the time limit and of the particular items on the dates specified in the contract and shall have to approval of the Engineer-in-charge. Further, the dates for the progress, as in this schedule shall be adhered to.
- (a) In case it is found necessary, at any stage to alter the schedule the contractor shall submit in good, time a revised schedule incorporating necessary modification proposed and get the same approved from the Engineer-in-charge. No revised schedule shall be operative without such acceptance in writing. The Engineer-in-charge is further empowered to ask for more detailed schedule or schedules, any week by week for any item or items and the contractor shall supply the same as and when asked for.

- (b) The Engineer-in-charge shall have at all times the right without in any way vitiating this contract forming grounds for any claim, to alter the order of the work of any part thereof and the contractor shall after receiving such direction, proceed in the order directed. The contractor shall also revise the progress, schedules accordingly and submit four copies of the revised schedule to the Engineer-in-charge within seven days of the said Engineer's direction to alter the order of works.
- (c) The contractor shall furnish sufficient plant, equipment and labour and shall work such hours and shifts as may be necessary to maintain the progress of the work as per approved progress-schedule. The working and shift hours shall comply with all the Government regulations in force and shall be such, as may be approved by the Engineer-in-charge and the same not be varied without the prior approval of Engineer-in-charge.
- (d) The contractor shall from time to time, as may be required by the Engineer-in-charge, furnish the Engineer-in-charge with a statement in writing of the arrangements he proposes to adopt for the execution of this contract and the Engineer-in-charge may, if he considers necessary at any time advice alternation in the same, which the contractor shall adopt on notice thereof.
- (e) The progress schedule(s) shall be in the form of progress chart, forms, statements, and/ or reports as may be approved by the Engineer-in-charge.  
The contractor shall submit four copies showing the progress of the work in the form of a chart etc., at periodically intervals as may be specified by Engineer-in-charge.
- (f) The Approval of the progress schedules by the Engineer-in-charge shall not relieve the contractor of schedule require by the Engineer-in-charge shall not entitle the contractor to any extra payment.

<b>(CLAUSE -71)</b>	<b>Secured Advance</b>	<b>:</b>	<b>Deleted</b>
<b>(CLAUSE -72)</b>	<b>Advance Payment</b>	<b>:</b>	<b>Deleted</b>
<b>(CLAUSE -73)</b>	<b>Advance against Machineries</b>	<b>:</b>	<b>Deleted</b>
<b>(CLAUSE -74)</b>	<b>Mobilization Advance</b>	<b>:</b>	<b>Deleted</b>
<b>(CLAUSE -75)</b>	<b>License for contract labour</b>		

Before, starting the work, the contractor will have to obtain the license from the District Assistant Labour Commissioner under the Contract Labour (Regulation and Abolition) Act, 1970 and contract Labour (regulation and Abolition) Gujarat Rules 1972 after paying necessary fees and deposit on the basis of the number of labourers to be employed on the work and will have to supply two true copies of the said licence to the Deputy Executive Engineer before the work is started.

**(CLAUSE -76): Recovery of Testing Charges and handing over empty cement bags**

All testing charges such as steel, cement, cubes, destructive tests of pipe weld joints etc shall be paid by the contractor. All inspection charges payable to the third-party inspection agency shall be paid by BMC.

The contractor shall have to carry out testing of material at his own cost. Testing of material including the mix design shall be carried out at laboratories of GERI, Engineering Colleges, Polytechnics, Engineers India Ltd., DGTD and other NABL and R & B approved laboratories\_or

Water Resources Department or Industries Department approved laboratory. However, 10% of total testing of all material shall be carried out at any of GERI laboratory. The test results of these Laboratories will be binding to the Contractor about suitability of use of materials.

However, in respect of works involving use of mass concrete, the contractor will set up the site testing Laboratory and will provide testing instruments etc. as under:

**Laboratory**

The contractor will construct permanent structure of minimum 25 square meter area duly connected with water and electric supply to house site testing Laboratory including a curing pond as per requirement.

**Instruments:**

The contractor will provide and install the instruments as I.S. Standard to carry out the test prescribed therein.

1. Hydraulic Compression Testing Machine, hand operated 100 tonnes capacity. Conform to the requirements of IS: 516-1959, IS :14858-2000 calibrated to an accuracy of  $\pm 1\%$  indicated load within range.
2. Test sieve set IS: 460-1972, 30 cm dia frame of size 40mm, 20mm, 12.5mm and 10 mm and 20 cm dia frame of size 4.75mm, 3.35 mm, 2.36mm, 1.18mm, 600-micron, 300-micron, 150-micron, 90 micron and 75 micron.
3. Slump apparatus conforming to IS: 7320.
4. Cube moulds 150x150x150 mm size conforming to IS: 516-1959, IS : 10086-1982
5. Thickness and length gauge as per IS: 2386 (Part-I)- 1963.
6. Electronic Balances of 5 Kg, 50 kg capacity.
7. Le-chatelier apparatus as per IS : 4031.
8. Vicat apparatus as per IS : 4031

Frequency of tests will be as indicated in I.S. standards and as referred in R. & B. D. G.R. No. SSR-1099-IB/91(9)-c, dated 26-7-1999 or latest circular of R & B / GWSSB

**(Clause: 77): Recover of Sales Tax**

One percent of estimated cost put to tender for this work after deducting the cost of materials as per Schedule 'A' valued at basic rate in the sanctioned estimate shall be deducted from the running account bills of the contractor for testing the quality of materials and workmanship, no additional testing charges in addition to the above shall be recovered from the contractor (Applicable to R & B Works only) (G.R.No. R & B TNC-1085-4-C, Dated 20-12-91)

**(Clause: 78): Building and other construction works welfare cess (Labour cess)**

As per Building and other construction works welfare cess act and the provision under Rule No.5 of the rules of 1998 of Gujarat State, the 1% cess shall be recovered from the running account bill of the contractor.

**(Clause 79):**

“કોન્ટ્રાક્ટરના માર્ગદર્શન માટેની સુચના૧૯ મુજબ ઇજારદારશ્રી નિયત સ્થળે બોર્ડ લગાવીને ફોટોગ્રાફ સહિતનો અહેવાલ આ કામ સંબંધિત ઇજનેરશ્રી ની જાણ હેઠળ વર્કઓર્ડર ઇસ્યુ કર્યાની તારીખથી એક મહિનામાં કરશે .જો તેમ કરવામાં વિલંબ થાય તો વિલંબિત સમયમાં ચુકવવાના રનીંગ બીલ માંથી ટેન્ડરની રકમના ૦.૨૫ %થી ૧% જેટલી રકમ રોકવામાં આવશે. (મા.મ.વિ.ના તા. ૨૬-૪-૭૮ ના પરિપત્ર તથા તા.૨૭-૧૧-૯૦,૧૮-૧૧-૯૧,૨૨-૭-૯૮તથાતા:૫-૩-૨૦૧૧ના ઠરાવ ક્રમાંક ઇએલસી-૧૦૯૦-૨૪-સ,આધારીત)

## **SPECIAL CONDITIONS OF CONTRACT**

### **(A) ROYALTIES**

The Contractor shall be liable to pay the royalty of the quarried materials /minerals used in the construction of works at the rates specified in the Narmada Water Resources, Water Supply & Kalpsar Dept. Resolution No. GEN-2010-595-(6) - M.I cell (k-1) Dtd.29/4/11 (Gujarati version, copy enclosed) and shall be recovered from the running bills of the work from time to time and remaining amount if any shall be recovered from the final bill before releasing the security deposit of the work.

The contractor shall furnish the statement showing the quantity of quarried materials / minerals from whom purchased (with full address of the seller) and copies of the bills for purchase to the Executive Engineer of the in charge of the work. The contractor shall also furnish such additional information as regards royalty payments to the competent authority.

### **(B) GENERAL DESIGN OBLIGATIONS:**

The contractor shall be deemed to have scrutinized, the employer's requirements (including design criteria and calculations, if any). The contractor shall be responsible for the design of the works and for the accuracy of such employer's requirements (including design criteria and calculation). The employer shall not be responsible for any error, inaccuracy or omission of any kind in the employer's requirements as originally included in the contract and shall not be deemed to have given any representation of accuracy or completeness of the any data or information. Any data or information received by the contractor, from the employer or otherwise, shall not relieve the contractor from his responsibility for the design and execution of the works.

Technical Standards and Regulations: The design, the contractor's documents, the execution and the completed works shall comply with the Country's technical standards wherever available or with international standards, building construction and environmental Laws, Laws applicable to the product being produced from the works and other standards specified in the employer's requirements applicable to the works or defined by the applicable Laws.

### **(C) Additional security to be withheld for unbalance rates:**

Payments for the items where contractor has quoted rate higher than 10% over estimated rates in the item:

If the contractor has quoted unbalanced rates for items i.e., more than 10 (ten) percent of the overall percentage of accepted tender. The payment of such items in the running bills will be made at estimated rate of that item plus or minus overall variation percentage of the accepted tender plus five percent of the estimated rate of that item, the balance amount as per accepted tender rate will be withheld from running bills and will be released as per R&B Department Circular no PARCH/102008/(61)C dated 03-05-2013. No interest will be payable for such

withheld amount (R&B Department Circular no. PARCH/102008/ (61) dated 27-11-2008).

**(D) Implementation of Gujarat State Purchase Policy - 2016:**

All the Equipment/Instrument/Pipes etc. should be manufactured in India, as per "MAKE IN INDIA" policy of Government of India and Gujarat state Purchase Policy-2016 Resolution No. SPO/102015/691093/Ch dated 03-06-2016 (issued by Government of Gujarat, Industries and Mines department). (Gujarati version, Copy enclosed as Annexure-6)

**(E)** Total Value of Change in scope of work shall not exceed Twenty-Five Percent (25%) of approved Contract amount. The increase beyond this limit may need administrative approval by tendering authority.

**(F) Safety requirements:** Contractor should follow IS Safety Manuals, Codes and Labour Regulations for safe working at site.

**(G) Construction of the Work:**

The Contractor shall construct the works as specified, and in conformity with the Specifications and Standards set forth in the contract. The Contractor shall be responsible for the correct positioning of all parts of work, and shall rectify any error in the positions, levels, dimensions, or alignment of work. and the Contractor agrees and undertakes that the construction shall be completed on or before the scheduled Completion Date, including any extension thereof.

The total price of the works shall be initially the price as indicated in the offer acceptance letter unless the same is modified or changed by Gujarat Urban Development Company in view of any modification or change brought about after final approval of drawing, and actual execution of the work. It is clearly understood that the payment will be based on actual work done quantities

**(H) Construction Programme:**

The contractor shall submit a detailed programme in MS projects software within 15 days after receiving the letter of acceptance. 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 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.

The Contractor shall establish a quality control mechanism to ensure compliance with the provisions of this Agreement (the "Quality Assurance Plan" or "QAP").

**QUALITY ASSURANCE, MONITORING AND SUPERVISION-**

**(I)** Quality of Materials and workmanship:

The Contractor shall ensure that the Construction, Materials and workmanship are in accordance with the requirements specified in this Agreement, Specifications and Standards and Good Industry Practice.

#### Quality control system

The Contractor shall establish a quality control mechanism to ensure compliance with the provisions of this Agreement (the “Quality Assurance Plan” or “QAP”).

The Contractor shall, within 30 (thirty) days of the commencement Date, submit to the EIC its Quality Assurance Plan which shall include the following:

- a) organization, duties and responsibilities, procedures, inspections, and documentation.
- b) quality control mechanism including sampling and testing of Materials, test frequencies, standards, acceptance Criteria, testing facilities, reporting, recording and interpretation of test results, approvals, check list for site activities, and proforma for testing and calibration in accordance with Good Industry Practice; and
- c) Internal quality audit system.

The BMC shall convey its comments to the Contractor, if any, required, and the Contractor shall incorporate those in the QAP to the extent required for conforming with the provisions in the contract.

The Contractor shall procure all documents, apparatus and instruments, fuel, consumables, water, electricity, labour, Materials, samples, and qualified personnel as are necessary for examining and testing the Project Assets and workmanship in accordance with the Quality Assurance Plan.

The cost of testing of Construction, Materials and workmanship shall be borne by the Contractor

#### (J) Methodology:

The Contractor shall, at least 15 (fifteen) days prior to the commencement of the construction, submit to the BMC for review the methodology proposed to be adopted for executing work, giving details of equipment to be deployed, traffic management and measures for ensuring safety. The BMC shall review and convey its comments to the Contractor, if any.

#### (K) Inspection and technical audit by the BMC:

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

#### (L) Road cutting & Restoration

The Contractor shall take a timely action in accordance to the Approved Implementation Plan for obtaining the necessary permissions for road cutting from GMC/BMC/PWD / CPWD. A comprehensive list of locations with respective time schedules shall be provided to BMC who intern shall assist the Contractor in obtaining the permissions. The Operator shall adhere to the standards, specifications and all requirements in compliance to the prevailing Dig and Restore Protocols prescribed by BMC/PWD / CPWD from time to time. On completion of work on pipelines, the Operator shall ensure standard refilling of the trench and

inform BMC for timely restoration of the road for minimizing inconvenience to the users and residents.

While Road Restoration Following guidelines should be followed:

1. The contractor shall have to restore the road up as per BMC norms including refilling trench in layers, watering, rolling and compacting to within 10days after trenching is completed in a particular street/reach.
2. Contractor shall erect informatory board at his own cost showing type of work, inconvenience expected and timeline for various construction activities going to take place in a particular street or a particular reach of road as per direction of Employer's Representative in charge.
3. The contractor shall have to do the sequencing of activities as per direction of Employer's Representative in charge to synchronize sewer work and water pipe line work to minimize the road excavation and restoration in the street which will have both pipe lines.
4. The Contractor should ensure that House service connections and hydrostatic testing shall be conducted before the road is restored and opened to the traffic. Employer will not pay for any rework in this regard. Penalty of ₹10,000.00 will be applicable for each day of delay in restoration to normal condition over the permitted time.

**(M) Shifting of obstructing utilities**

The Contractor shall, in accordance with Applicable Laws cause shifting of utility (including electric lines, water pipes and telephone cables) to an approved location or alignment. Contractor shall not be paid separately for the same. The Contractor shall ascertain, determine and verify the locations of all utility services and co-ordinate with utility agencies for the diversion of affected services and the laying of new services. The Contractor shall support and protect services that need not be diverted or pending diversion and remove all abandoned services. Contractor shall be responsible for relocation, reconstruction, reconfiguration of driveways, site accesses, temporary and permanent drains, pipe conduits and necessary connections for public lighting and traffic lighting, earth works, environmental safeguards, necessary safety measures and protection works etc

The Contractor's responsibility for the execution of works includes the submissions to relevant government authorities / technical departments for obtaining all necessary clearances /approvals.

The Contractor shall co-ordinate and interfaces his works with that of all other contractors, subcontractors, utility service agencies, statutory authorities, etc. and achieve the completion of the Works to the satisfaction of the Engineer-in-charge.

**Shifting of Existing Utilities:**

Contractor is required to liaison with concerned department for identifying exact location of the existing utility services. Any damages by the contractor to the existing utilities while carrying out work shall be repaired/reinstated by contractor at his own cost.

Deposits / Supervision charges levied by Govt. dept. & paid by the contractor for the purpose of shifting of utilities shall be reimbursable after due assessment, verification and scrutiny except for street light poles, set of signal poles, road signs/sign boards & consumer connection for water connections (Domestic/commercial).

The Bidder shall coordinate with utility service Providers for proper Shifting/ Relocating of the Utilities. The work shall be carried as per approval of Utility service Provider. All the Charges required for Shifting / relocating of Utilities shall be included in the Quoted Rate and the Contractor shall not be paid extra for the same.



Electric & street Light Poles - Contractor is required to remove electric & street light poles including uprooting underground part with due co-ordination with concerned utility owners.

Electric cables - Contractor is required to remove electric cables with due co-ordination with concerned utility owners.

Transformer stations - Contractor is required to remove transformer station poles if asked for including uprooting underground part.

Water supply lines - Water supply lines if encountered during construction of utility Conduits & storm water drains cross work etc shall be removed only after new water supply line is operational.

Sewer lines - Sewer lines if encountered during construction of utility conduits and storm water drains cross work etc shall be removed only after new alternative sewer line is operational.

- (N) The guideline issued by CPWD through OM No. DG/MAN/382 dated 06.02.2019 for approval of TMT bars will be applicable in this contract
- (O) Emulsion and Bitumen should be procured from government refinery and should be indigenous product. No imported product is allowed in this contract.

SR .No	Type for Utility including but not limited to	Maximum Size of Utility (Without additional shifting charges)	Remark
1.	Concrete/Brick Storm Water Drain	Any size	Will be in the scope of the Contractor as specified above
2.	Water Supply – House Service Consumer Connection (Domestic & Commercial)	Any size	Damage caused to the existing House Service connections and water supply services shall be restored within 24 Hours with no additional cost to the Employer.
3.	Power Supply – House Service Consumer Connection (Domestic & Commercial)	Any size	Damage caused to the existing underground Household Power Supply connections and Power supply services shall be restored within 24 Hours with no additional cost to the Employer.
4.	Electrical Street Light Poles	Any size	Will be in the scope of the Contractor as specified above
5.	Electric cables	Any size	Will be in the scope of the Contractor as specified above
6.	Transformer stations	Any size	Will be in the scope of the Contractor as specified above
7.	Existing Water Supply Service Pipes	Any size	<p>Dismantling/Refurbishment of existing Water Supply service pipeline of any size is in the scope of the contractor with no additional cost implication to the Employer</p> <p>Damage caused to the existing Water Supply Service pipes and consumer connections shall be rectified within 24 Hours with no additional cost to the Employer.</p> <p>Payment shall be made after discarding existing services in only exceptional case for which the prior permission is granted by the Employer.</p>

SR .No	Type for Utility including but not limited to	Maximum Size of Utility (Without additional shifting charges)	Remark
8.	Sewer Lines	Any size	Will be in the scope of the Contractor as specified above
9.	Cable ducts/ Lines (Internet and Telecommunication)	Any size	Will be in the scope of the Contractor as specified above
10.	Street Furniture, Solar Poles, and other street infrastructure	Any Size	Shifting/ Dismantling/ Demolition and reconstruction of existing infrastructure will be paid extra.
11.	Fire and Gas Pipelines	Any size	Will be in the scope of the Contractor as specified above
12.	Traffic Signal poles, Road Signage Boards & Poles	Any Size	Will be in the scope of the Contractor as specified above
13.	The cost incurred for rectification of damages caused to the existing service lines of any category will be recovered from RA bill of the Contractor if not rectified within 24 Hours from the date of issuance of notice by the Employer.		
14.	Shifting of Utilities shall be done in coordination with concerned utility owners.		
15.	The charges for shifting will be paid after due assessment, verification, and scrutiny by the EIC. It shall be measured as additional work after approval of quantities.		
16.	Delay caused due to improper coordination of the Contractor with the concerned utility owner in shifting of respective Utility shall not be the reason for request to time extension and Contractor is liable to penalty for such delay.		

**Note:** In addition to the contract conditions as mentioned above, the following circulars/letters issued by Gujarat government are also to be followed:

- a. AB/C May 1.2/2010-11, File No. 25/3095/2011-3959, Dated: 16.06.2011 issued by GWSSB "Jal Seva Bhavan" Sctor-10-A, Gandhinagar, Gujarat.
- b. Gen. 2010-595 (6) MIL (K-1), Dated: 29.04.2011, issued by NWRWS & Kalpsar Division, Gujarat.
- c. No: Material: cell/L/C/General/34, Dated: 21.01.2010 issued by GWSSB "Jal Seva Bhavan" Sctor-10-A, Gandhinagar, Gujarat.
- d. **Annexure 1**-Integrity pact to be signed by the contractor.
- e. **Annexure 2**-Insurance of work to be taken during execution of the contract if awarded.
- f. **Annexure 3**- Corrigendum GR. No FD/MSM/e-file/4/2023/0057/DMO Date:21.04.2023 (Enclosed) mentioning the list of banks from which the SD/EMD shall be accepted.
- g. **Annexure 4**- R&B Department Circular no. PARCH/102008/ (61) dated 27-11-2008 and R&B Department Circular no. PARCH/102008/ (61) dated 03-05-2013.
- h. **Annexure 5** - Circular no. vigilance cell/inspection note/188 dated 19/3/2012 of Member Secretary, GWSSB, Gandhinagar (copy of circular in Gujarati version is attached)
- i. **Annexure 6**- Gujarat state Purchase Policy-2016 Resolution No. SPO/102015/691093/Ch dated 03-06-2016
- j. **Annexure 7**- Board office, Gandhinagar circular No. AB/CM1-2/covid-19/F.No.98/2020/167 dt: 21/06/2021
- k. **Annexure 8**- Board office, Gandhinagar circular No. Tech Cell/makan & Bandhkam Shramyogi/2021/571 dated 17/03/2021 of chief engineer, GWSSB, Gandhinagar (copy of circular in Gujarati version is attached)
- l. **Annexure 9**- Board office, Gandhinagar circular No. Tech Cell/GST/Circular/ 351 dated 18/04/2022 of chief engineer, GWSSB, Gandhinagar

Annexure 1

Integrity pact to be signed by the contractor.

**INTEGRITY PACT**

**OUR COMITMENT**

We commit ourselves to trust, transparency and setting ethical standards in implementation of various works for ultimate long-term benefits for society. We also reiterate our commitment to development to mutual respect and best practices for setting very high-quality standards in works and attitude.

**OUR CONDUCT**

We abide to accomplish our work with

- Integrity and trust
- Ethics and courtesy
- Transparency and quality.

<b>BMC Commitment</b>	<b>Party's Commitment</b>
<ul style="list-style-type: none"> <li>• To maintain high ethical standards</li> <li>• To ensure transparency in transactions</li> <li>• To ensure to abide by the terms of agreement of contract and to consider the views of parties objectively.</li> <li>• To try to ensure timely payments for work done.</li> <li>• To ensure that no improper demand is made by employees or by anyone on their behalf.</li> <li>• To provide maximum possible help to all contractors/ vendors/suppliers and any other party working with us so that the contracted assignment is completed in time.</li> </ul>	<ul style="list-style-type: none"> <li>• Not to bring pressure/recommendation from outside to influence decision.</li> <li>• To abide by general discipline to be maintained in our dealings.</li> <li>• To be prompt and reasonable in fulfilling the terms of agreement of contract and legal obligations.</li> <li>• To ensure high standards are set for quality of work or supplies at lowest possible cost.</li> <li>• Not to use any pressure, threat, intimidation or inducement of any kind of any of the employees.</li> <li>• To be true and honest in furnishing specification and information and make all efforts for completing the contracted assignment well in time.</li> </ul>
BMC	Signature of Contractor
<b><i>Building Ethical Partnership and Working Together</i></b>	

## Annexure-2

### Insurance

The contractor shall without limiting his or the employer obligations and responsibilities insure:

- a) The works, together with materials and plants for incorporation therein, to the full replacement cost (Term "Cost" in this context shall include profit)
- b) The contractor equipments and other things brought onto the site by the contractor, for a sum sufficient to provide for their replacement at site.
- c) The insurance detailed above shall be in the joint names of the contractor and the employer at the contractor's cost and shall cover the employer and the contractor against all loss or damage from whatsoever cause arising from the start of date of work to the completion of operation and maintenance period as per the scope of work.
- d) Contractor All Risk Policy (CAR) should be submitted by the Contractor clearly defining the terms and conditions of the risk covered under the policy and to be submitted within 30 days after the issuance of work order. The CAR policy should remain valid for the entire period of contract including Operation and Maintenance period.

Any amount not insured or not recovered from the insurer shall be borne by the Employer or the contractor in accordance with their responsibilities under Clause-1.

The contractor shall except if and so far as the contractor provides otherwise, indemnify the Employer against all losses and claims in respect of,

- a) Death or injury to any person, or
- b) Loss of or damage to any property (other than the works) which may arise out of in consequent of the Operation and maintenance of the facility and the remedying of any defects therein, and against all claims proceedings, costs, charges, and expenses whatsoever in respect thereof or in relation thereto.

The "Expectations" referred to are:

- a) The permanent use or occupation of land by the works, or any part thereof,
- b) The right of then Employer to execute the works , or any part thereof on, under in or through any land
- c) Damage to property which is the unavoidable result of the execution and completion of the works or remedying of any defects therein, in accordance with the contract and
- d) Death of or injury to persons or loss of or damage to the property resulting from any act or neglect the Employer ,his agent, servant or other contractor not being employed by the Contractor or in respect of any claims proceedings, damages, cost, charges and expenses in respect thereof or in relation , where the injury or damages was contributed to by the contractor, his servant or agents, such part of said injury or damages as may be just and equitable having regards to the extent of responsibility of the Employer, his servants or agents or other contractor for injury or damage

The Employer shall indemnify the contractor against all claims, proceeding, damages, cost, charge and expenses.

The contractor shall without limiting his or the employer's obligations and responsibilities issue, joint name of the contractor and responsibilities, insure in the joint name of the contractor and the employer, against liabilities for death or injury to any person or loss of damages to any properties (Other than the facility) arising out of the operation and maintenance of the project other than the exceptions defined.

The insurance policy should include a cross liability clauses such that the insurance shall apply to the contractor and to the employer as separate insurer.

The employer shall not liable for or in respect of any damages or compensation payable to any workman or other person in the employment of the contractor or any

Subcontractor, other than death or injury resulting from any act or default of the employer, his agent or servants. the contractor shall indemnify and keep indemnified the employer against all such damages and compensations, other than those for which the employer is liable as aforesaid, and against all claims ,proceeding, damages, costs, charges, and expenses what so ever in respect there of or in relation thereto.

The contractor shall insure against such liability and shall continue such insurance during the whole of the tie that any persons are employed by him or the facility provided that in respect of any person, employed by any subcontractor, the contractors obligation to insure as aforesaid under this sub clauses shall be satisfied if the subcontractor shall have insured against the liability in respect of such person in such manner that the employer is indemnified under the policy, but the contractor shall require such sub-contractor to produce to the employer, when required such policy of insurance and receipt for the payment of the current premium.

In the event that the contractor or the employer fails to comply with the condition imposed by the insurance policy affected pursuant to the contract, each will indemnify the other against all loses and claims arising from such failure according to the contract conditions.

In view of circular no. vigilance cell/inspection note/188 dated 19/3/2012 of Member Secretary, GWSSB, Gandhinagar (copy of circular in Gujarati version is attached at **Annexure-5**)

1. Agency shall have to take insurance policy and intimate to GWIL along with the evidence within time limit. In case of noncompliance entire responsibility shall be rest with the agency and required amount shall be recovered from any due amount of the agency.
2. BMC can recover penalty amount from the agency for not taking the insurance. Though the penalty amount is recovered, responsibilities of the agency for taking insurance shall be continued and will not be escaped from this responsibility.

સજયમાં બાંધકામ માટે વપરાતા ગૌણ  
ખનિજોની રોયલ્ટીની વસુલાત અંતિમ  
વપરાશકાર પાસેથી કરવા બાબત

**ગુજરાત પાણી પુરવઠા અને ગટર વ્યવસ્થા બોર્ડ**

"જલસેવા ભવન" શ્રે.૧૦-એ ગાંધીનગર.

પરિપત્ર નં. એવી/સીમે-૧-૨/૨૦૧૦-૧૧/ફા.નં.૨૫/૩૦૯૫/સને ૨૦૧૧ ૩૬૫૮  
તા. ૧૬/૬/૨૦૧૧

વંચાણે લીધા :- (૧) ગુજરાત પા.પુ. અને ગ.વ્ય.બોર્ડ ગાંધીનગરનો પરિપત્ર નં.

P.H.W.Dn. MOJASA
Inward No. ૨૬૬૬
Date: ૨૦/૬/૧૧
E.E.:
D.A.:
H.C.:
Marking

એવી/ સીમે-૧-૨/૨૦૧૦-૧૧/ફા.નં.૨૫/૩૦૯૫/સને ૨૦૧૧  
તા. ૧૨-૫-૨૦૧૧

(૨) ગુજરાત સરકારના નર્મદા, જળસંપત્તિ, પા.પુ. અને કલ્પસર  
વિભાગ, સચિવાલય, ગાંધીનગરના ઠરાવ ક્રમાંક જીઇએન-  
૨૦૧૦-૫૯૫-(૬)એમઆઇસેલ (ક-૧) તા. ૨૯-૪-૨૦૧૧

ગુજરાત પાણી પુરવઠા અને ગટર વ્યવસ્થા બોર્ડ ગાંધીનગરના સંદર્ભ-૧  
હેઠળના પરિપત્રથી બાંધકામ માટે વપરાતા ગૌણ ખનિજોની રોયલ્ટી બાબતે  
કાર્યવાહી કરવા સુચનાઓ પરિપત્રિત કરવામાં આવેલ છે.

ત્યારબાદ ગુજરાત સરકારના નર્મદા, જળસંપત્તિ, પા.પુ. અને કલ્પસર  
વિભાગ, સચિવાલય, ગાંધીનગરના સંદર્ભ-૨ હેઠળના ઠરાવથી (નકલ સામેલ છે)  
બાંધકામમાં વપરાતા ગૌણ ખનિજોની રોયલ્ટીની વસુલાત અંતિમ વપરાશકાર  
પાસેથી કરવા બાબતે કાર્યપધ્ધતિ ઠરાવવામાં આવેલ છે જે મુજબ બોર્ડ ફ્સ્ટકની  
ક્ષેત્રિય કચેરીઓમાં અમલ કરવા નક્કી થયેલ છે. નીચે મુજબની કાર્યપધ્ધતિનો  
અમલ કરવાનો રહે છે.

(૧) કાલમાં બાંધકામમાં વપરાતા નીચેના ખનિજો માટે આ કામે પધ્ધતિનો  
અમલ કરવાનો રહેશે.

- સાદી રેતી/માટી/કંકર/ગ્રેવલ
- બ્લોક ટ્રેપ (કપચી, ગ્રીટ, મેટલ, રબલ, વિગેરે)
- બિલ્ડીંગ સ્ટોન/લાઇમ સ્ટોન/સેન્ડ સ્ટોન/ક્વાર્ટઝાઇટ

As per Municipal Plan



- સોફ્ટ મુરમ/હાર્ડ મુરમ
- ઇટ માટી/ઇટ

(૨) રોયલ્ટીની વસુલાત માટેની કાર્યપદ્ધતિ

સરકારી બાંધકામાં વપરાતા ગૌણ ખનિજોની રોયલ્ટી વખતો વખત ચુકવાતા રનીંગ બીલમાંથી કપાત કરવાની રહેશે અને આખરી બીલમાંથી બાકી રહેતી તમામ રોયલ્ટીની રકમની વસુલાત જે તે ઠેકેદારની સીકવોરીટી ડીપોઝીટ છુટી કરતા પહેલાં જે તે સંલગ્ન વિભાગે વસુલવાની રહેશે સરકારશ્રીને બાંધકામમાં વપરાયેલ ખનિજોની પુરેપુરી રોયલ્ટી મળી રહે તે માટે પરિશિષ્ટ-૧ માં જણાવેલ દર અનુસાર મુજબ કપાત કરવાની રહેશે.

ઉપરોક્ત વસુલાત કરેલ રોયલ્ટીની રકમ નીચેના સદરે સમય મર્યાદામાં સબમિટ વિભાગે જમા કરાવવાની રહેશે.

૦૮૫૩-નોન ફેરસ માઇનીંગ એન્ડ મેટલર્જીકલ ઇન્ડસ્ટ્રીઝ

૧૦૨- મીનરલ કન્સેશન ફી, રેન્ટ એન્ડ રોયલ્ટી

૦૧ - રીસીપ્ટ અન્ડર ગુજરાત માઇનોર મીનરલ રૂલ્સ-૧૯૬૬

- (૩) બાંધકામમાં વપરાતા ગૌણ ખનિજોના પ્રવર્તમાન રોયલ્ટી દર પરિશિષ્ટ-૧ માં દર્શાવેલ છે.
- (૪) રાજ્ય સરકાર દ્વારા ગૌણ ખનિજોના રોયલ્ટી દરોની જ્યારે જ્યારે ફેરવિચારણા થશે ત્યારે તે મજબૂત દરે રોયલ્ટી વસુલ/કપાત કરવાની રહેશે.
- (૫) સરકારી, અર્ધસરકારી કામોમાં વપરાયેલ ગૌણ ખનિજોની કપાત કરેલ રોયલ્ટીની વિગત પરિશિષ્ટ-૨ માં દર માસે ૧૦ તારીખ સુધીમાં જે તે સબમિટ કચેરીએ ભૂસ્તર વિજ્ઞાન અને ખનિજ ખાતાની સંલગ્ન જીલ્લા કચેરીને મોકલી આપવાની રહેશે.
- (૬) આ કાર્યપદ્ધતિની તા. ૧-૪-૨૦૧૧ પછીના ડ્રાફ્ટ ટેન્ડર પેપર્સમાં જોગવાઈ કરવાની રહેશે અને તે પહેલાંના કામોને લાગુ પડશે નહીં અને આવા કામોમાં હાલની એડવાન્સ પ્રથા મુજબ નિયમોનુસાર ખનિજો મેળવી ઉપયોગ કરવાનો રહેશે.

ઉક્ત પરિપત્રનો અમલ બોર્ડ હસ્તકની સર્વે ક્ષેત્રિય કચેરીઓ દ્વારા અચૂક કરવાનો રહેશે.

બિડાણ : ઉપર મુજબ

*કેમ*  
(ડી.જયપાલસિંહ)  
સભ્ય સચિવ

પ્રતિ,

- મુખ્ય ઇજનેરશ્રી ઝોન-૧/૨/૩/૪, વડોદરા/અમદાવાદ/રાજકોટ/ભુજ
- મુખ્ય ઇજનેરશ્રી મટીરીયલ સેલ/યાંત્રિક
- પ્રોજેક્ટ ડાયરેક્ટરશ્રી એડીબી/અબેન સેલ ગાંધીનગર.
- નિયામકશ્રી ગુજરાત જલસેવા તાલીમ સંસ્થા ગાંધીનગર
- અધિક્ષક ઇજનેરશ્રી (સર્વે)
- કાર્યપાલકશ્રી (સર્વે)
- સીનીયર મેનેજરશ્રી (નાણાં-હિસાબ) સર્વે
- નાયબ મેનેજરશ્રી (નાણાં-હિસાબ) સર્વે
- સીસ્ટમ મેનેજરશ્રી, પ્રોગ્રામર સેલ, વડી કચેરી, ગાંધીનગર.

નકલ રવાના

- માન. અધ્યક્ષશ્રીના કાર્યકારી, સચિવશ્રી, બોર્ડ કચેરી, ગાંધીનગર.
- સભ્ય સચિવશ્રી, અંગત મદદનીશશ્રી, બોર્ડ કચેરી, ગાંધીનગર.
- નાણાં નિયંત્રકશ્રી, બોર્ડ કચેરી, ગાંધીનગર.
- મુખ્ય વહીવટી અધિકારીશ્રી, બોર્ડ કચેરી, ગાંધીનગર.

જનકા નં. ૨૧૦૧/૧૮૩૦ ૧૨-૧૧ ૧૧-૨૦૧૩

આજના તારીખે મુજબ નાણાં મહાવિભાગ રાજકોટ, જિલ્લા  
ગણતંત્ર મંત્રાલય (વિભાગ-આવકીર્ણ/આવકીર્ણ)  
મિલિટરી માર્ગ નં. ૨૨૦૦ રાજકોટ-૨૧૧૩.

*કેમ*  
કાર્યપાલક ઇજનેર  
જા.આ.બાંધકામ વિભાગ  
ગુ.પા.પુ. અને મ.વ્ય. બોર્ડ  
વડોદરા.



1. 1. 11  
2. 1. 11

ખનિજોની રોયલ્ટીની વસુલાત અંતિમ  
વપરાશકાર પાસેથી કરવા બાબત"

ગુજરાત સરકાર,  
નર્મદા, જળસંપત્તિ, પાણી પુરવઠા અને કલ્પસર વિભાગ,  
કરાવ ક્રમાંક-જીઈએન-૨૦૧૦-૫૯૫-૬)-એમઆઈસેલ (ક-૧),  
સચિવાલય, ગાંધીનગર.

તા. ૧૪/૨૦૧૧.

29 APR 2011

વંચાણે લીધા:-

Shri  
U.S.S.  
M. S. S.

- (૧) ઉદ્યોગ અને ખાણ વિભાગ, સચિવાલય, ગાંધીનગર પરિપત્ર ન. એનસીઆર-૧૦૯૦-૩૦૮૩-ક  
તા.૧૨-૧-૧૯૯૪.  
(૨) ઉદ્યોગ અને ખાણ વિભાગ, સચિવાલય, ગાંધીનગર પરિપત્ર ન. એનસીઆર-૧૦૯૦-૩૦૮૩-ક  
તા.૯-૫-૧૯૯૪.

કરાવ:-

U.S.S.

U.S.S.

U.S.S.

રાજ્ય સરકારે સપ્ટેમ્બર-૨૦૦૩ માં જાહેર કરેલ ખનિજ નીતિ અનુસાર ખનિજ જથ્થાની  
રોયલ્ટી પુરપુરી મળી રહે તે માટે રસ્તા અને મકાન, સિયાઈ, પંચાયત, નિગમો વિગેરેના  
હેક્ટેદારોના કામોના બિલોમાંથી સીધી કપાત કરવાની પ્રથા અમલમાં મૂકવાની જાહેરાત કરાવેલ  
છે. રાજ્ય સરકારશ્રીના પરિપત્ર તા.૯-૫-૧૯૯૪ મુજબ હેક્ટેદારોએ વપરાશ કરેલ ખનિજ જથ્થા  
મુજબના રોયલ્ટીના આધાર/પુરાવાની ચકાસણી કરી સંલગ્ન ભૂસ્તર વિજ્ઞાન અને ખનિજ  
ખાતાની જિલ્લા કચેરીઓ દ્વારા "નો ડયુ" પ્રમાણપત્ર આપવાની પ્રથા અમલમાં છે. હેક્ટેદારો દ્વારા  
નો ડયુ સર્ટીફિકેટ રજુ થયા બાદજ સિક્યોરીટી ડીપોઝીટ છૂટી કરવામાં આવે છે. ઉપરોક્ત  
પદ્ધતિમાં વિલંબ થતો નિવારવા હાલમાં પરિપત્ર તા.૧૮-૮-૨૦૦૯થી ઝડપી ચકાસણી કરી  
તાત્કાલિક આવું પ્રમાણપત્ર આપવાની જોગવાઈઓ કરેલ છે.

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હાલની પદ્ધતિ પારદર્શક અને સરળ બનાવવા અને બાંધકામમાં વપરાતા ગૌણ  
ખનિજની રોયલ્ટી પૂરેપૂરી મળી રહે તે માટે તા.૧-૭-૨૦૧૦ ના રોજ માન. મુખ્ય મંત્રીશ્રીના  
અધ્યક્ષસ્થાને મળેલ બેઠકમાં થયેલ સૂચન મુજબ સજયમાં મળી આવતાં ગૌણ ખનિજોની રોયલ્ટી  
લીઝ ધારક પાસેથી ન લેતાં અંતિમ વપરાશકાર (End user) પાસેથી લેવામાં આવે તો

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બાંધકામના ઠેકેદારો વિગેરેને કામમાં સરળતા રહેશે. સરકારી બાંધકામોમાં રોયલ્ટી, વખતો વખત ચુકવાતા બિલોમાંથી કપાત કરી (At source) વસુલાત કરવાનું નક્કી કરવામાં આવેલ હતું. જે ધ્યાને લઈ સરકાર દ્વારા પુખ્ત વિચારણાને અંતે નીચે મુજબની કાર્યપદ્ધતિનો અમલ કરવા ઠરાવવામાં આવે છે.

૧. ફાલમાં બાંધકામમાં વપરાતા નીચેના ખનિજો માટે આ કાર્યપદ્ધતિનો અમલ કરવાનો રહેશે.

- સાદી રેતી/ માટી/ કંકર/ ગ્રેવલ
- બ્લેકટ્રેપ (કપચી, ગ્રીટ, મેટલ, રબલ, વિગેરે)
- બિલ્ડીંગ સ્ટોન/ લાઈમસ્ટોન/ સેન્ડસ્ટોન/ક્વાર્ટઝાઈટ
- સોફ્ટ મુરમ/ હાર્ડ મુરમ
- ઈંટ માટી/ ઈંટ

૨. રોયલ્ટી વસુલાત માટેની કાર્યપદ્ધતિ:-

સરકારી બાંધકામમાં વપરાતા ગૌણ ખનિજોની રોયલ્ટી વખતો વખત ચુકવાતા રનીંગ બીલમાંથી કપાત કરવાની રહેશે અને આખરી બીલમાંથી બાકી રહેતી તમામ રોયલ્ટીની રકમની વસુલાત જે તે ઠેકેદારની સીક્યોરીટી ડિપોઝીટ છુટી કરતાં પહેલાં જે તે સંલગ્ન વિભાગે વસુલવાની રહેશે. સરકારીને બાંધકામમાં વપરાયેલ ખનિજોની પુરેપુરી રોયલ્ટી મળી રહે તે માટે પરિશિષ્ટ-૧માં જણાવેલ દર અનુસાર મુજબ કપાત કરવાની રહેશે. ઉપરોક્ત વસુલાત કરેલ રોયલ્ટીની રકમ નીચેના સદરે સમય મર્યાદામાં સબંધિત વિભાગે જમા કરાવવાની રહેશે.

૦૮૫૩ - નોન ફેરસ માઈનીંગ એન્ડ મેટલર્જીકલ ઈન્ડસ્ટ્રીઝ

૧૦૨ - મીનરલ કન્સેશન ફી, રેન્ટ એન્ડ રોયલ્ટી

૦૧ - રીસીપ્ટ અન્ડર ગુજરાત માઈનોર મીનરલ રૂલ્સ-૧૯૬૬

૩. બાંધકામમાં વપરાતા ગૌણ ખનિજોના પ્રવર્તમાન રોયલ્ટી દર પરિશિષ્ટ-૧ માં દર્શાવેલ છે.
૪. રાજ્ય સરકાર દ્વારા ગૌણ ખનિજોના રોયલ્ટી દરોની જયારે જયારે ફેરવિચારણા થશે ત્યારે તે મુજબના દરે રોયલ્ટી વસુલ/ કપાત કરવાની રહેશે.
૫. સરકારી, અર્ધસરકારી કામોમાં વપરાયેલ ગૌણ ખનિજોની કપાત કરેલ રોયલ્ટીની વિગત પરિશિષ્ટ-૨ માં દર માસે ૧૦ તારીખ સુધીમાં જે તે સબંધિત કચેરીએ ભુસ્તર વિજ્ઞાન અને ખનિજ ખાતાની સંલગ્ન જીલ્લા કચેરીને મોકલી આપવાની રહેશે.



परिशिष्ट - १

बिंधकाममा वपराता गौ प्रनीशेला शेयल्टीना दर-(ता.१५-१-२०१० नी असरथी)

अ.नं.	प्रनिशुं नाम	शेयल्टी दर प्रति मे. टन
१	जौल प्रनिशु लाहंमस्टोन (अ) ड्रेस ब्लोक (ब) रबल (क) मेटल	३०
२	ब्लेक ट्रेप (अ) रबल (ब) कपची (क) मेटल (द) जीट	२५
३	सेन्ड स्टोन (अ) ड्रेस ब्लोक (ब) रबल (क) मेटल	३०
४	क्वार्टाईज	२०
५	सामान्य रेली	१२
६	कंकर	१२
७	सामान्य माटी	१२
८	सोफ्ट मुरम	१२
९	सर्ड मुरम	२०
१०	ग्रेवल	१५
११	बिल्डींग स्टोन (अ) सफुल्ल बिल्डींग स्टोन (ब) प्रांगघा सेन्ड स्टोन(बिल्डींग स्टोन तरीके उपयोग) (क) रायोलैट (बिंधकाम माटे उपयोगी)	३०
१२	अन्य बिंधकामना प्रनिशु	३०

સરકારી/ અર્ધસરકારી બાંધકામમાં વપરાયેલ ગૌણ ખર્ચોની દર માસે રોયલ્ટીની વિગત દર્શાવતું પત્રક-

૧. કચેરીનું નામ:.....

૨. માસ/ વર્ષ.....

અ.નં.	કોન્ટ્રાક્ટરનું નામ અને સરનામું	કામનું નામ	વર્ક ઓર્ડર નંબર તારીખ અને કામની વિગત	વપરાયેલ ખર્ચોની રોયલ્ટી/ ખર્ચો કિંમતની વિગત						નોંધ
				ખર્ચોનું નામ	જથ્થો મે. ટન	રોયલ્ટી નો દર	રોયલ્ટી/ ખર્ચો કિંમતની રકમ રૂ. માં	ચલાણ નંબર	તારીખ	
૧	૨	૩	૪	૫	૬	૭	૮	૯	૧૦	૧૧

કુલ રૂ.....

ઓડિટ અધિકારીની સહી અને હેતો

નંબર

તારીખ

સંબંધિત અધિકારીની સહી/ હેતો

પ્રતિ,

મદદનીશ ભુસ્તરશાસ્ત્રીશ્રી/ ભુસ્તરશાસ્ત્રીશ્રી,

ભુસ્તર વિભાગ અને ખર્ચો ખાતું,

જીલ્લા કચેરી.....ની જાણ તથા સંબંધિત ચલાણની નકલ સામેલ છે.





## ગુજરાત પાણી પુરવઠા અને ગટર વ્યવસ્થા બોર્ડ,

"જલ ભવન", સેક્ટર - ૧૦-એ,  
એરફોર્સ સ્ટેશનની સામે, ગાંધીનગર - ૩૮૨૦૧૦.  
ફોન : (૦૭૯) ૨૩૨ ૫૧૦૯૨  
ફેક્સ : (૦૭૯) ૨૩૨ ૫૧૦૯૪ / ૨૩૨ ૨૫૯૭૯

૭૧  
૭/૧૫

જા. નં. મટી. સેલ/સી/જનરલ/૩૪

તા. ૨૨/૦૧/૨૦૧૦

પ્રતિ,  
મુખ્ય ઈજનેરે શ્રી / પ્રોજેક્ટ ડાયરેક્ટર શ્રી,  
ઝોન - ૧/૨/૩/૪/પાંચત્રિક / અર્બન સેલ  
વડોદરા/અમદાવાદ/રાજકોટ/કચ્છ-ભુજ/ગાંધીનગર.

P.H.W.Dn. MODASA	
Drawn No.	૪૭૩
Date	૨૨/૧/૧૦
E.E.	(H)
B.A.	
M.T.	
Signature	SK

વિષય :- ભારત સરકારશ્રીના સેન્ટ્રલ એક્સાઈઝના નોટીફિકેશન નં. : ૨૬/૨૦૦૯,  
તા. ૪-૧૨-૨૦૦૯ ની જોગવાઈઓને અનુલક્ષીને મળવાપાત્ર એક્સાઈઝ  
એક્ઝમ્પ્શનનો લાભ લેવા બાબત.

- સંદર્ભ :- (૧) ભારત સરકારશ્રીના સેન્ટ્રલ એક્સાઈઝના નોટીફિકેશન નં. ૬/૨૦૦૬ તા. ૧-૩-૨૦૦૬  
(૨) ભારત સરકારશ્રીના સેન્ટ્રલ એક્સાઈઝના નોટીફિકેશન નં. ૬/૨૦૦૭ તા. ૧-૩-૨૦૦૭  
(૩) બોર્ડ કચેરીના મટી. સેલ(સિ.) ના પત્ર જા. નં. મટી. સેલ/સિ/આરસી/૨૧૯  
તા. ૨૬-૩-૨૦૦૭  
(૪) ભારત સરકારશ્રીના સેન્ટ્રલ એક્સાઈઝના નોટીફિકેશન નં. ૧૬/૨૦૦૯ તા. ૭-૭-૨૦૦૯

ઉપરોક્ત વિષયના અનુસંધાને ભારત સરકારશ્રી ના સેન્ટ્રલ એક્સાઈઝ ડીપાર્ટમેન્ટ દ્વારા  
તાજેતરમાં બહાર માડવામાં આવેલ નોટીફિકેશન નં. ૨૬/૨૦૦૯, તા. ૪-૧૨-૦૯ ની નકલ  
આ સાથે સામેલ છે.

આ નોટીફિકેશનમાં પીવાના પાણીની યોજનાના અમલીકરણ માટે ઉપયોગમાં લેવામાં  
આવતી કઈ પાઈપોને એક્સાઈઝ એક્ઝમ્પ્શનનો લાભ મળવાપાત્ર થાય તે અંગેની જોગવાઈઓ  
સ્વયંસ્પષ્ટ છે. જે મુજબ પ્રવર્તમાન જોગવાઈઓને અનુલક્ષીને પીવાના પાણીની યોજનાઓમાં  
ઉપયોગમાં લેવામાં આવતી નીચે મુજબની પાઈપોને એક્સાઈઝ એક્ઝમ્પ્શનનો લાભ  
મળવાપાત્ર થાય છે.

- (i) " Pipes needed for delivery of water from its source to  
the plant (including the clear tender water reservoir if  
any, there of), & from there to the first storage point."





CC  
2/13

TO BE PUBLISHED IN THE GAZETTE OF INDIA, EXTRAORDINARY, PART II, SECTION 3, SUB-SECTION (i)

GOVERNMENT OF INDIA  
MINISTRY OF FINANCE  
(DEPARTMENT OF REVENUE)

New Delhi, the 4<sup>th</sup> December, 2009

**Notification No. 26/2009-Central Excise**

G.S.R. (E) - In exercise of the powers conferred by sub-section (1) of section 5A of the Central Excise Act, 1944 (1 of 1944), the Central Government, on being satisfied that it is necessary in the public interest so to do, hereby makes the following further amendment in the notification of the Government of India, in the Ministry of Finance (Department of Revenue), No. 6/2006-Central Excise, dated the 1st March, 2006 which was published in the Gazette of India, Extraordinary, vide number-G.S.R.96(E), dated the 1st March, 2006, namely:-

In the said notification, in the Table, against S. No. 7, in column (3), in item (3), for the figure and letters "20 cm", the figure and letters "10 cm" shall be substituted.

[F.No.354/34/2008-TRU]

(Prashant Kumar)  
Under Secretary to the Government of India

Note: The principal notification was published in the Gazette of India, Extraordinary, vide number G.S.R.96(E), dated the 1st March, 2006, and was last amended by notification No. 16/2009-Central Excise, dated the 7<sup>th</sup> July, 2009 and published vide number G.S.R. 474(E), dated the 7<sup>th</sup> July, 2009.

ક્રમાંક: શ્ર.આ.૬/૧/કોન્ટ્ર/ભથ્થા/ ૨૦૧૮/૩૩૦૫  
શ્રમ આયુક્તની કચેરી, ગુજરાત રાજ્ય,  
ઉદ્યોગ ભવન, બ્લોક નં. ૧૧, ૧૨ અને ૧૪,  
બીજો માળ, સેક્ટર-૧૧, ગાંધીનગર.  
તારીખ:-૩૧/૩/૨૦૧૮

## પરિપત્ર

કોન્ટ્રાક્ટ મજૂર (નિયમન અને નાબુદી) અધિનિયમ, ૧૯૭૦ હેઠળ ખાસ ભથ્થુ બહાર પાડવા બાબત.

આથી સર્વે સરકારી શ્રમ અધિકારીશ્રીઓને જણાવવામાં આવે છે કે, કોન્ટ્રાક્ટ મજૂર (નિયમન અને નાબુદી) અધિનિયમ, ૧૯૭૦ અને ગુજરાત નિયમો, ૧૯૭૨ હેઠળ કોન્ટ્રાક્ટરોને આપવામાં આવતા લાયસન્સની શરત નં(૪)માં સ્પષ્ટ જણાવ્યા મુજબ લઘુતમ વેતન અધિનિયમ, ૧૯૪૮ હેઠળ જે અનુસુચિત વ્યવસાયો માટે સરકારશ્રીએ લઘુતમ વેતન નક્કી કરેલ છે. તેવા વ્યવસાયોમાં કામે રાખતા કોન્ટ્રાક્ટરોએ તેમના શ્રમયોગીઓને જે તે અનુસૂચિમાં સરકારે નક્કી કરેલ લઘુતમ વેતન દરે પગાર તથા વખતો વખત જાહેર થતું જીવનનિર્વાહ ભથ્થું ચૂકવવાનું રહે છે પરંતુ જે વ્યવસાયોનો લઘુતમ વેતન હેઠળની અનુસૂચિમાં સમાવેશ થતો ન હોય તેવા વ્યવસાયોમાં સંકળાયેલ કોન્ટ્રાક્ટ શ્રમયોગીઓને આ પરિપત્રથી નક્કી થયા મુજબનું વેતન ચૂકવવાનું રહેશે.

લઘુતમ વેતન અધિનિયમ, ૧૯૪૮ હેઠળ જાહેર થયેલ અનુસુચિત વ્યવસાય સિવાયના વ્યવસાયમાં કોન્ટ્રાક્ટ મજૂર (નિયમન અને નાબુદી) અધિનિયમ, ૧૯૭૦ અને ગુજરાત નિયમો, ૧૯૭૨ના નિયમ-૨૩ અન્વયે આપવામાં આવતા લાયસન્સની શરત નં(૬) થી મળેલ સત્તાની રૂએ, શ્રમ આયુક્તશ્રી, ગુજરાત રાજ્ય, ગાંધીનગરે શ્રમયોગીઓને ચૂકવવાની થતી મજૂરીના દર નીચે મુજબ નક્કી કરેલ છે. જે તા.૧-૩-૨૦૧૫થી અમલમાં આવેલ છે.

અ.નં	શ્રમયોગીઓનો વર્ગ	દૈનિક લઘુતમ વેતન દર	
		ઝોન-૧	ઝોન-૨
૧	કુશળ	૨૯૩	૨૮૪
૨	અર્ધકુશળ	૨૮૪	૨૭૬
૩	બીનકુશળ	૨૭૬	૨૬૮

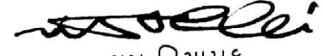
આ જાહેરનામાના હેતુ માટે સ્પષ્ટીકરણ

(ક) ઝોન-૧ ગુજરાત રાજ્યમાં, ગુજરાત પ્રોવિશિયલ મ્યુનિસિપલ કોર્પોરેશન અધિનિયમ, ૧૯૪૯ હેઠળ રચાયા પ્રમાણેના મ્યુનિસિપલ કોર્પોરેશનની હદોની અંદરના વિસ્તારોનો અને ગુજરાત નગરપાલિકા અધિનિયમ, ૧૯૬૩ હેઠળ રચાયા પ્રમાણેની નગરપાલિકા હદોની અંદરના વિસ્તારોમાં અને સંબંધિત શહેરી વિકાસ સત્તામંડળોની હકુમતની અંદર આવતા વિસ્તારોના સમાવેશ થશે.

૨...

(ખ) ઝોન-૨ માં, ઝોન-૧ માં સમાવિષ્ટ હોય તે વિસ્તારો સિવાયના ગુજરાત રાજ્યના તમામ વિસ્તારોનો સમાવેશ થશે.

ઉક્ત નક્કી કરવામાં આવેલ વેતનદરો ઉપરાંત કોન્ટ્રાક્ટરોએ કોન્ટ્રાક્ટ શ્રમયોગીઓને જીવન-નિર્વાહ ખર્ચ આંક સાથે સંકળાયેલ ખાસ ભથ્થું આપવાનું રહે છે. આથી નિયત કરેલ મૂળ વેતનના દરો ઉપરાંત જીવન નિર્વાહના આંક ઉપર આધારિત આપવાનું ખાસ ભથ્થું તા.૧-૦૪-૨૦૧૮ થી તા.૩૦-૦૯-૨૦૧૮ સુધીના ૬(છ) માસના સમય માટે દૈનિક રૂ. ૩૬.૨૦ પૈસા (અંકે રૂપિયા છત્રીસ અને વીસ પૈસા પૂરા) લેખે લાયસન્સની શરત નં.૬ હેઠળ મળેલ સત્તાની રૂએ નક્કી કરવામાં આવે છે. જે ઠરાવેલ વેતનના દરની રકમ ઉપરાંત કોન્ટ્રાક્ટરોએ કોન્ટ્રાક્ટ શ્રમયોગીઓને ચૂકવવાના રહેશે. આ હુકમનો સંબંધિત કોન્ટ્રાક્ટરો અમલ કરે તે જોવા આથી જણાવવામાં આવે છે.



શ્રમ નિયામક

ગુજરાત રાજ્ય, ગાંધીનગર.

નકલ રવાના:

- (૧) અધિક શ્રમ આયુક્તશ્રી, ગુજરાત રાજ્ય, ગાંધીનગર.
- (૨) નાયબ શ્રમ આયુક્તશ્રી,
- (૩) સર્વે મદદનીશ શ્રમ આયુક્તશ્રી,
- (૪) સર્વે સરકારી શ્રમ અધિકારીશ્રી,
- (૫) કચેરીની સર્વે શાખાઓ, ૧, ૨, ૩, ૪, ૫, ૬, ૭, ૮, ૯, ૧૦, ૧૧, ૧૨, ખાસ સેલ અને આઇ.ટી. સેલ
- (૬) શાખાની સીલેક્ટ ફાઇલ/પરિપત્ર ફાઇલ

ક્રમાંક:શ્ર.આ.૬/૧/ ૨૦૧૮ / ૪૪૩૫ ૫૩૨  
શ્રમ આયુક્તની કચેરી, ગુજરાત રાજ્ય,  
ઉદ્યોગ ભવન, બ્લોક નં. ૧૧, ૧૨ અને ૧૪,  
બીજો માળ, સેક્ટર-૧૧, ગાંધીનગર.

તા.૩૧-૦૩-૨૦૧૮

પ્રતિ,

- (૧) નાયબ શ્રમ આયુક્તશ્રી, અમદાવાદ, વડોદરા, સુરત, રાજકોટ
- (૨) મદદનીશ શ્રમ આયુક્તશ્રી (તમામ)
- (૩) સરકારી શ્રમ અધિકારીશ્રી (તમામ)


શ્રમ આયુક્ત,  
ગુજરાત રાજ્ય, ગાંધીનગર


લઘુતમ વેતન અધિનિયમ, ૧૯૪૮ હેઠળના ખાસ ભથ્થાની જાહેરાત.

લઘુતમ વેતન અધિનિયમ, ૧૯૪૮ હેઠળ સરકારશ્રીએ જે તે વ્યવસાય માટે નિયત કરેલ મૂળ પગારના દર ઉપરાંત જીવન નિર્વાહ આંક ઉપર આધારીત આપવાના ખાસ ભથ્થાના દૈનિક દર હવે તા.૧-૦૪-૨૦૧૮ થી તા. ૩૦-૦૯-૨૦૧૮ સુધીના સમય માટે નીચે મુજબ રહેશે.

ક્રમ	અનુસુચિત રોજગારી/વ્યવસાય	ખાસ ભથ્થાના દૈનિક દર (રૂ. પૈસા )
૧	૨	૩
૧	શીપ બ્રેકીંગ તથા સ્વીપીંગ અને કલ્પીનીંગકામની રોજગારી(વ્યવસાય)	રૂ.૪૧.૫૦ પૈસા
૨	ઇંટ ઉત્પાદન, જરી ઉદ્યોગ, (અખાડેદાર સિવાય), રેડીમેડ ગારમેન્ટ અને દરજીકામનો વ્યવસાય, રેડીમેડ ગારમેન્ટમાં પીસ રેટથી કામ કરતા શ્રમયોગીઓ માટે, મીઠા ઉદ્યોગ અને તમાકુ અને બીડી બનાવવાના કામ અંગેની રોજગારી(વ્યવસાય)	રૂ.૧૨૩.૭૦ પૈસા
૩	અનુ. નં ૧, ૨ અને અગરબત્તી બનાવવાની રોજગારી સિવાયની દરેક રોજગારી (વ્યવસાય)	રૂ.૩૬.૨૦ પૈસા

અનુ. નં ૧, ૨ અને ૩ ની સામે દર્શાવેલ વ્યવસાયમાં ઉપરોક્ત સમય દરમિયાનના ખાસ ભથ્થાના દૈનિક દર જાહેર કરવામાં આવે છે

  
નાયબ શ્રમ આયુક્ત  
અને લઘુતમ વેતન અધિનિયમ, ૧૯૪૮  
અન્વયેના સક્ષમ અધિકારી, ગાંધીનગર

  
રવાના કરવા પ્રમાણિત કર્યું.  
મદદનીશ શ્રમ આયુક્ત  
ગાંધીનગર

Special Allowance. birencontractor



# ગુજરાત પાણી પુરવઠા અને ગટર વ્યવસ્થા બોર્ડ

(ગુજરાત સરકારનું સાહસ)

"જવસવા ભવન", ૬૧ સી. ૧, અરકાસ સ્ટેશન સામે, સેક્ટર-૧૦-એ, માંધીનગર.

ફોન : (૦૭૯) ૨૩૨૫૧૦૮૬

ફોન નં. : ૯૧-૦૭૯-૨૩૨૫૧૦૮૬, ૨૩૨૨૨૪૧૭

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એમ. ધોળકિયા, આઈ.એ.એસ.  
સભ્ય સચિવ

ક્રમાંક: એમએસ/પીએ/ ૩૩ /૨૦૧૮

તા. ૨૬.૧૨.૨૦૧૮

પ્રતિ,

મુખ્ય ઈજનેરશ્રી

ઝોન-૧/૨/૩/૪/૫

વડોદરા/અમદાવાદ/રાજકોટ/ભુજ/જૂનાગઢ

પ્રોજેક્ટ ડાયરેક્ટર(અર્બન સેલ)

માંધીનગર

વિષય : ખોદાણની કામગીરીમાં હાર્ડ રોકની આઈટમ બાબતે અગત્યની સુચનાઓ

અત્રેની કચેરીમાં રજૂ થતી વિવિધ ટેન્ડર મંજુરીઓ તેમજ એકસેસ- સેવીંગ તથા એકસ્ટ્રા આઈટમની દરખાસ્તની ચકાસણી કરતાં માલૂમ પડેલ છે કે, ટેન્ડર અંતર્ગત થયેલ / થનાર હાર્ડ રોક ખોદાણની આઈટમ BOQ માં હોવા બાબતે તથા ખોદાણમાં જો હાર્ડ રોકનો જથ્થો એકસેસ કવોન્ટીટી અથવા એકસ્ટ્રા આઈટમ તરીકે ગણતરીમાં લેવાનો થાય તેવા કિસ્સામાં દરખાસ્તમાં સરકારશ્રીના ધારાધોરણો અનુસાર નીચે મુજબની વિગતો રજૂ કરવાની રહેશે.

- (૧) સર્વે દરમ્યાન/યોજનાકીય કામગીરી દરમ્યાન પાઈપલાઈન એલાઈનમેન્ટની આજુબાજુના વિસ્તારમાં આવેલ હયાત કૂવા/બોરના સ્ટ્રેટાની વિગતો
- (૨) એલાઈનમેન્ટ પર ટ્રાયલપીટ/ટ્રાયલબોર કરી મળેલ સ્ટ્રેટાની વિગતો
- (૩) હાર્ડ રોક બાબતે પ્રથમ ભૂસ્તરશાસ્ત્રીનો અહેવાલ મેળવી રજૂ કરવાનો રહેશે.
- (૪) હાર્ડ રોક બાબતે સરકાર માન્ય લેબોરેટરી કે " ગેરી" માં પેટ્રોગ્રાફિક ટેસ્ટના (Petrographic Test for Mineralogy of the Rock) પરિણામો આધારે હાર્ડ રોકનો પ્રકાર તથા પથ્થરની વિવિધ એન્જીનીયરીંગ પ્રોપર્ટી અંગે કરાયેલ પરિક્ષણો જેવા કે- કોમ્પ્રેસીવ સ્ટ્રેન્થ, ક્ષર્ણિગ સ્ટ્રેન્થ, વોટર એબશોર્પશન, ડ્યુરેબીલીટી, વેધરીંગ ટેસ્ટના પરિણામો સામેલ રાખવાના રહેશે.
- (૫) હાર્ડ રોકના ખોદાણમાંથી નીકળેલ જથ્થાનું સાઈઝ તેમજ એન્જીનીયરીંગ પ્રોપર્ટી આધારિત ઉપયોગી અને બિનઉપયોગી જથ્થામાં વર્ગીકરણ ( Classification ) કરાવવાનું રહેશે અને તે અંગેનો નિયત રેકર્ડ નિભાવવાનો રહેશે.
- (૬) ઉપયોગી જથ્થા માટે સાઈટ ઉપર તેનો અલગથી સ્ટેક (Stack) કરી યોજનાકીય કામમાં મેશનરી-રબ્બલ, સોલીંગ, કોંક્રીટ-એગ્રીગેટ, રોડ મેટલ તરીકે ઉપયોગ થઈ શકે તે મુજબ ઈસ્યુ કરી તેનો રેકર્ડ નિભાવવાનો રહેશે. આ અંગેની નિયમાનુસાર વસૂલાત કરવાની રહેશે.

- (૭) બીનઉપયોગી તેમજ ઉપયોગી પૈકી ફાજલ થયેલ હાર્ડ રોક જથ્થાની હરાજી કરી નિકાલ કરવાનો રહેશે.
- (૮) જો હરાજી કરવામાં ન આવે તો ઉપયોગી જથ્થાની કિંમત જેટલી રકમની કપાત એજન્સીને ચૂકવવાના થતાં નાણાંમાંથી કરવાની રહેશે.
- (૯) હાર્ડ રોક ખોદાણ માટે ઉપયોગમાં લેવાયેલ બ્લાસ્ટીંગ મટીરીયલની નિયમોનુસાર મંજૂરી/સાયવણી કરવાની રહેશે. ઉપયોગમાં લેવાયેલ જથ્થાની વિગતોનો રેકર્ડ નિભાવવાનો રહેશે.
- (૧૦) જો ઉક્ત તમામ મુદ્દાની પૂર્તતા સાધનિક રેકર્ડ /પરિણામોની નકલ સહ કરવામાં આવેલ ન હોય તો હાર્ડ રોકની આઈટમને સોફ્ટ રોક તરીકે ગણી તે મુજબના દરે ચૂકવણું કરવાનું રહેશે. આ માટે એજન્સી પાસેથી જરૂરી સંમતિ મેળવી લેવાની રહેશે જેથી ભવિષ્યમાં કોઈ કાનૂની બાબતો ઉપસ્થિત ન થાય.

ઉક્ત મુદ્દાઓની પૂર્તતા કર્યા બાદ જ દરખાસ્ત બોર્ડ કચેરીમાં મંજૂરી અર્થે રજૂ કરવાની રહેશે.

*M. S. G. G.*  
( તુષાર ધોળકિયા )

નકલ સવિનય રવાના પ્રતિ:

- (૧) માનનીય અધ્યક્ષશ્રી, ગુજરાત પાણી પુરવઠા અને ગટર વ્યવસ્થા બોર્ડ, ગાંધીનગર  
(૨) વહીવટી સંચાલકશ્રી, ગુજરાત વોટર ઈન્ફ્રાસ્ટ્રક્ચર લીમિટેડ, ગાંધીનગર  
(૩) મુખ્ય કારોબારી અધિકારીશ્રી, વાસ્મો, ગાંધીનગર

નકલ રવાના પ્રતિ:

- (૧) મુખ્ય ઈજનેરશ્રી (ટેકનીકલ સેલ) ને જાણ તથા રજૂ થતી દરખાસ્તોમાં ઉપરોક્ત મુદ્દાઓની ચકાસણી થવા સારું.
- (૨) મુખ્ય ઈજનેરશ્રી (યાંત્રિક) બોર્ડ કચેરી, ગાંધીનગરને જાણ તથા જરૂરી કાર્યવાહી સારું થવા સારું.
- (૩) નાણાં નિયંત્રકશ્રી, બોર્ડ કચેરી, ગાંધીનગરને જાણ તથા ઉપરોક્ત મુદ્દાઓની ચકાસણી થવા સારું.
- (૪) માસ્ટર કાઉન્સિલ



ટેન્ડરમાં ભરેલ અસામાન્ય ઉંચા ભાવોના સંદર્ભે કામ પર પડતા ખર્ચ પર નિયંત્રણ રાખવા તથા કામની નાણાંકીય પ્રગતિ ભૌતિક પ્રગતિ સાથે સુમેળમાં રહે તે માટે જરૂરી જોગવાઈ કરવા બાબત.

ગુજરાત સરકાર  
માર્ગ અને મકાન વિભાગ  
પરિપત્ર ક્ર. પરચ/૧૦૨૦૦૮/(૬૧)/સ  
તા.૨૭-૧૧-૨૦૦૮.

### પરિપત્ર :

ટેન્ડરમાં અસામાન્ય ઉંચા કે નીચા ભાવો ડિજિટાઇઝેશન દ્વારા ઘણી વાર ભરાતા હોવાનું સરકારશ્રીના ધ્યાન પર આવેલ છે. આવા કિસ્સાઓમાં કામની નાણાંકીય પ્રગતિ અને ભૌતિક પ્રગતિનો સુમેળ ન રહેવાની સંભાવના રહેલી છે. આથી કામની ભૌતિક પ્રગતિ પ્રમાણે નાણાંકીય પ્રગતિ રહે કે જેથી સરકારશ્રી પર સમય વહેલાં અયોગ્ય નાણાંકીય બોજ ન પડે તે માટે નીચે મુજબની જોગવાઈ ટેન્ડરમાં કરવાનો નિર્ણય કરવામાં આવેલ છે. આ જોગવાઈ તમામ કામોના આ પરિપત્રની તારીખ પછી મંજૂર થતાં ડી.ટી.પી. માં અચૂક પણ કરવાની રહેશે.

### જોગવાઈ :

જે કોઈ આઈટમનો ભરેલ ભાવ તે આઈટમના ટેન્ડરમાં મૂકેલ અંદાજ ભાવ કરતાં ટેન્ડરમાં મૂકેલ અંદાજ રકમથી સમગ્ર ટેન્ડર જેટલા ટકા ઉંચુ કે નીચું મંજૂર થયું હોય તે ટકાવારીથી ૧૦% થી વધુ ઉંચો રહેતો હોય તેવી આઈટમનું ચૂકવણું રેન્જ બીલ વખતે જે તે આઈટમના અંદાજ ભાવ +/- મંજૂર ટેન્ડરની ટકાવારી + તે આઈટમના અંદાજ ભાવની ૫% ની મર્યાદામાં કરવામાં આવશે. આ રીતે વીથહેલ રાખેલ કામ સંતોષકારક રીતે પૂર્ણ થયે ફાઇનલ બિલ મંજૂર કરતી વખતે વ્યાજભારણ વગર છૂટી કરવામાં આવશે.

ઉક્ત જોગવાઈની સ્પષ્ટ સમજણ માટે આ સાથે આપેલ ઉદાહરણ ધ્યાને લેવું.

અનું.....૨



(૨)

૧.	ટેન્ડરમાં મૂકેલ અંદાજી રકમ	રૂ. ૧૦૦/-
૨.	મંજૂર થયેલ ટેન્ડરની રકમ	રૂ. ૧૧૦/-
૩.	ટેન્ડરમાં મૂકેલ અંદાજી રકમ સામે ખરેખર મંજૂર થયેલ ટેન્ડરની ટકાવારી	રૂ. ૧૦%
૪.	ટેન્ડરની એક આઈટમનો ટેન્ડરમાં મૂકેલ અંદાજી ભાવ	રૂ. ૧૦/-
૫.	તે આઈટમનો ભરેલ ભાવ	રૂ. ૧૪/-
૬.	તે આઈટમમાં ભરેલ ઊંચા ભાવની ટકાવારી	૪૦%
૭.	તે આઈટમ માટે રનીંગ બીલ વખતે ચૂકવવાપાત્ર ભાવ	રૂ. ૧૦ + કોલમ-૩ પ્રમાણે ૧૦% ઊંચા + અંદાજી ભાવના ૫% = રૂ. ૧૧.૫૦
૮.	ફાઇનલ બિલ વખતે વ્યાજ ભારણા વગર ચૂકવવાપાત્ર થતો વીશ હેલ રાખેલ ભાવ.	રૂ. ૧૪.૦૦ - રૂ. ૧૧.૫૦ રૂ. ૨.૫૦

જો સંદર આઈટમના ભાવ રૂ. ૧૨/- કે તેથી નીચે ભરેલ હોત તો રનીંગ બિલમાં ભાવ કપાત આ જોગવાઈ મુજબ કરવાની રહેતી નથી.

સર્વિ/-

(આર.કે ચૌહાણ)  
ખાસ ફરજ પરના અધિકારી  
માર્ગ અને મકાન વિભાગ

પ્રતિ,  
તમામ અધિકારક ઈજનેરશ્રીઓ, માર્ગ અને મકાન વિભાગ,  
તમામ કાર્યપાલક ઈજનેરશ્રીઓ, મા.મ. વિભાગ

નકલ રવાના :

૧. સચિવશ્રીના અંગત મદદનીશશ્રી, મા.મ. વિભાગ.
૨. તમામ મુખ્ય ઈજનેરશ્રી અને અ.સે.શ્રી મા.મ. વિભાગ.
૩. તમામ તાંત્રિક ઉપસચિવશ્રીઓ, મા.મ. વિભાગ
૪. ના.કા.ઈ.શ્રીઓ, મા.મ. વિભાગ પ્રે.પર
૫. નાણા શાખા, મા.મ. વિભાગ
૬. ના.સે.અ. સિલેક્ટ ફાઇલ
૭. શાખા સિલેક્ટ ફાઇલ.

ટેન્ડરમાં ભરેલ અસામાન્ય ઉંચા ભાવોના સંદર્ભે કામ પર  
પડતા ખર્ચ પર નિયંત્રણ રાખવા તથા કામની નાણાકીય પ્રગતિ  
સાથે મુમેળમાં રહે તે માટે જરૂરી જોગવાઈ કરવા બાબત.

ગુજરાત સરકાર

માર્ગ અને મહાનિ વહીવટ,

પરિપત્ર ક્ર : ૫૨૨ / ૧૦૨૦૦૮ / (૬૧) / સી

તારીખ : ૦૩/૦૫/૧૩

વેબસાઇટ લીંક :- પરિપત્ર ક્રમાંક :- ૫૨૨ / ૧૦૨૦૦૮ / (૬૧) / સી તા. ૨૭/૧૧/૨૦૦૮

**આમુખ :-**

ટેન્ડરમાં ઈજારદારશ્રીઓ દ્વારા ભરતા Imbalance ભાવો વાળા ટેન્ડરના કિસ્તાઓમાં ઈજારદારશ્રીઓ દ્વારા ઉંચા ભાવની આઈટમોની કામગીરી ક્યાં બાદ નીચા ભાવની આઈટમોની કામગીરી ન કરવામાં આવે તેવી પરિસ્થિતિ પર નિયંત્રણ રાખવા માટે તા. ૨૭-૧૧-૨૦૦૮ નો પરિપત્ર જરૂરી જોગવાઈ સાથે બહાર ઘાડવામાં આવેલ. આ પરિપત્ર અંગે વિવિધ સ્તરોએ થયેલ રજૂઆતોને ધ્યાને લેતાં અને તેના પર પુનઃ વિચારણાના અને આ પરિપત્રના ભીજા કરવાની છેલ્લી તીતી " આ રીતે વીધવેલ રાખેલ રકમ કામ સંતોષકારક રીતે પુર્ણ થયે કામગીરી બીલ મેટુર કરતી વખતે વ્યાજબી વગર છુટી કરવામાં આવશે" તેની જગ્યાએ નીચે મુજબનો સુધારો કરવામાં આવે છે.

**સુધારો :-**

" આ રીતે વીધવેલ રાખેલ રકમ અસાધારણ નીચા ભાવ ભરેલ હોય તેવી આઈટમની નાણાકીય પ્રગતિના પ્રમાણસર રનીગ બીલમાંથી છુટી કરવાની રહેશે. જે કિસ્તામાં અસાધારણ નીચા ભાવ ભરેલ કોઈપણ આઈટમ ન હોય તેવા કિસ્તામાં અસાધારણ ભાવો ભરેલ આઈટમની સામે વીધવેલ રાખેલ રકમ બાકી રહેતી કામગીરી ચાલુ તેના પ્રમાણસર રનીગ બીલમાંથી છુટી કરવાની રહેશે."

વધુમાં વેબસાઇટ લીંક પરિપત્ર ના ઉદાહરણમાં દર્શાવેલ ક્રમાંક - ૮ ૨૬ કરવામાં આવે છે.

ઉપરોક્ત સુધારાનો અમલ આ પરિપત્રની તારીખ પાછી મેટુર થતા ડી.ટી.પી.માં અવકાશ કરવાનો રહેશે.

(આર.કે.સી.સી.સી.)  
આસ કચેરા પરના અધિકારી(વિ.પો.)  
માર્ગ અને મકાન વિભાગ.

પ્રતિ,  
સર્વે અધિકારક ઈજનેરશ્રીઓ, મા.મ. વિભાગ (પાટનગર પોલીસ વર્તુલ, નેસાનન ડાઈવે વર્તુલ સહિત)  
સર્વે અધિકારક ઈજનેરશ્રીઓ, (પંચાયત)મા.મ. વિભાગ  
સર્વે કાર્યપાલક ઈજનેરશ્રીઓ, મા.મ. વિભાગ.  
સર્વે કાર્યપાલક ઈજનેરશ્રીઓ, (પંચાયત) મા.મ. વિભાગ.

નકલ રવાના :

1. અગ્રસચિવશ્રીના અંગત મદદનીશશ્રી, મા.મ. વિભાગ, સચિવાલય, ગાંધીનગર
2. સર્વે મુખ્ય ઈજનેરી અને અ.સ.શ્રીઓ, મા.મ.વિભાગ.
3. સર્વે તાંત્રિક ઉપસચિવશ્રીઓ, મા.મ. વિભાગ.

કચ્છના સર્કલમાં  
પરિષદના સભ્યોના સમક્ષ  
નાણાકીય પ્રવૃત્તિ સહી સુમેળમાં રહે તે માટે જરૂરી  
પગલાઈ કરવા બાબતે.

મુજબત સરકાર  
માર્ગ અને મકાન વિભાગ  
પરિષદ ક્રમાંક: પર.પ. ૧૦૨૦૦૮-૧૬૧) સી  
તા. ૦૩-૦૫-૨૦૧૩

વંચાણે લીધા: પરિષદ ક્રમાંક: પર.પ. ૧૦૨૦૦૮-૧૬૧) સી તા. ૨૦-૧૧-૨૦૦૮

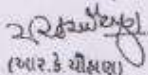
આમુખ:

ટેન્ડર માં ઈજનેરશ્રીઓ દ્વારા ભરાતા Imbalance ભાવો ગણા કેન્ડરના કિસ્સાઓમાં ઈજનેરશ્રીઓ  
દ્વારા લીધા ભાવની આઈટમોની કામગીરી ક્યા બાદ નીચા ભાવની આઈટમોની કામગીરી ન કરવામાં આવે  
તેવી પરિસ્થિતિ પર નિયંત્રણ સખવા માટે તા. ૨૦-૧૧-૨૦૦૮ નો પરિષદ જરૂરી જોગવાઈ સાથે બહાર  
પાડવામાં આવેલ. આ પરિષદ અંગે વિવિધ સ્તરોએ થયેલ સુચનાતોને ધ્યાને લેતાં અને તેના પર પુખ્ત  
વિચારણાના અંતે આ પરિષદના બીજા કક્ષાની છેલ્લી લીટી "આ રીતે વીથહેલ સખેલ રકમ કામ  
કાંતોષકરક રીતે પુર્ણ થયે કાર્યનલ બીલ મંજૂર કરતી વખતે વ્યાજસરણ વગર છૂટી કરવામાં આવશે"  
તેની જરૂરો નીચે મુજબનો સુધારો કરવામાં આવે છે.

સુધારો:

"આ રીતે વીથહેલ સખેલ રકમ અસાધારણ નીચા ભાવ ભરેલ હોય તેવી આઈટમની નાણાકીય  
પગલિનાં પ્રમાણસર, રનીજ બીલમાંથી છૂટી કરવાની રહેશે. જ કિસ્સામાં અસાધારણ નીચા ભાવ ભરેલ  
કોઈપણ આઈટમ ન હોય તેવા કિસ્સામાં અસાધારણ ભાવો ભરેલ આઈટમોની સામે વીથહેલ સખેલ રકમ  
બાકી રહેતી કામગીરી સાથે તેના પ્રમાણસર રનીજ બીલમાંથી છૂટી કરવાની રહેશે."

વધુમાં વંચાણે લીધેલ પરિષદ ના ઉદ્દેશ્યોમાં દર્શાવેલ ક્રમાંક ૨૯ કરવામાં આવે છે.  
ઉપરોક્ત સુધારાનો અમલ આ પરિષદની તારીખ પછી મંજૂર થતા ડીટી.પી માં અચૂકપણે  
કરવાનો રહેશે.

  
(આર.કે.ચૌહાણ)  
માસ ફરજ પરના અધિકારી(વિ.વો)  
માર્ગ અને મકાન વિભાગ

- પ્રતિ,  
૧. સર્વે અધિકાર ઈજનેરશ્રીઓ, મા.મ. વિભાગ (પાટનગર ચોજના વર્તુલ, નેરુનલ હાઈવે વર્તુલ સહિત).  
૨. સર્વે અધિકાર ઈજનેરશ્રીઓ (પંચાયત) મા.મ. વિભાગ.  
૩. સર્વે કાર્યપાલક ઈજનેરશ્રીઓ, મા.મ. વિભાગ.  
૪. સર્વે કાર્યપાલક ઈજનેરશ્રીઓ (પંચાયત), મા.મ. વિભાગ.

- નકલ રવાના:  
૧. અગ્ર સચિવશ્રીના અંગત મદદનીશશ્રી મા.મ. વિભાગ, સચિવાલય, ગાંધીનગર  
૨. સર્વે મુખ્ય ઈજનેર અને અશ્રીઓ, મા.મ. વિભાગ.  
૩. સર્વે તંત્રિક ઉપ સચિવશ્રીઓ, મા.મ. વિભાગ.  
૪. ના.હ.ઈ.શ્રીઓ, મા.મ. વિભાગ.  
૫. નાણાં શાખા, મા.મ. વિભાગ.  
૬. ના.સે.અ., સી શાખા, મા.મ. વિભાગ., સિલેક્ટ ફાઇલ  
૭. શાખા સિલેક્ટ ફાઇલ - ૨૦૧૩

ટેન્ડરમાં ભરેલ અસામાન્ય ઉચા ભાવોના સંદર્ભે કામ પર પડતા ખર્ચ પર નિયંત્રણ રાખવા તથા કામની નાણાકીય પ્રગતિ સાથે સુમેળમાં રહે તે માટે જરૂરી જોગવાઈ કરવા બાબત.

ગુજરાત સરકાર

માર્ગ અને મકાન વિભાગ,

પરિપત્ર ક્ર : પરચ / ૧૦૨૦૦૮ / (૬૧) / સી

તારીખ : ૦૩/૦૫/૧૩

વંચાણે લીધા:- પરિપત્ર ક્રમાંક :- પરચ / ૧૦૨૦૦૮ / (૬૧) / સી તા. ૨૭/૧૧/૨૦૦૮

**આમુખ :-**

ટેન્ડરમાં ઈજારદારશ્રીઓ દ્વારા ભરાતા Imbalance ભાવો વાળા ટેન્ડરના કિસ્સાઓમાં ઈજારદારશ્રીઓ દ્વારા ઉચા ભાવની આઈટમોની કામગીરી કર્યા બાદ નીચા ભાવની આઈટમોની કામગીરી ન કરવામાં આવે તેવી પરિસ્થિતિ પર નિયંત્રણ રાખવા માટે તા. ૨૭-૧૧-૨૦૦૮ નો પરિપત્ર જરૂરી જોગવાઈ સાથે બહાર પાડવામાં આવેલ. આ પરિપત્ર અંગે વિવિધ સ્તરોએ થયેલ રજૂઆતોને ધ્યાને લેતાં અને તેના પર પુખ્ત વિચારણાના અંતે આ પરિપત્રના બીજા કકરાની છેલ્લી લીટી " આ રીતે વીથહેલ રાખેલ રકમ કામ સંતોષકારક રીતે પુર્ણ થયે કાયમલ બીલ મંજૂર કરતી વખતે વ્યાજભારણ વગર છૂટી કરવામાં આવશે" તેની જગ્યાએ નીચે મુજબનો સુધારો કરવામાં આવે છે.

**સુધારો :-**

" આ રીતે વીથહેલ રાખેલ રકમ અસાધારણ નીચા ભાવ ભરેલ હોય તેવી આઈટમની નાણાકીય પ્રગતિના પ્રમાણસર રનીંગ બીલમાંથી છૂટી કરવાની રહેશે. જે કિસ્સામાં અસાધારણ નીચા ભાવ ભરેલ કોઈપણ આઈટમ ન હોય તેવા કિસ્સામાં અસાધારણ ભાવો ભરેલ આઈટમની સામે વીથહેલ રાખેલ રકમ બાકી રહેતી કામગીરી થાય તેના પ્રમાણસર રનીંગ બીલમાંથી છૂટી કરવાની રહેશે."

વધુમાં વંચાણે લીધેલ પરિપત્ર ના ઉદાહરણમાં દર્શાવેલ ક્રમાંક - ૮ રદ કરવામાં આવે છે.

ઉપરોક્ત સુધારાનો અમલ આ પરિપત્રની તારીખ પછી મંજૂર થતા ડી.ટી.પી.માં અચુકપણે કરવાનો રહેશે.

(આર.કે.ચૌહાણ)

ખાસ ફરજ પરના અધિકારી(વિ.યો.)

માર્ગ અને મકાન વિભાગ.

પ્રતિ,

સર્વે અધિક્ષક ઈજનેરશ્રીઓ, મા.મ. વિભાગ (પાટનગર યોજના વર્તુળ, નેશનલ હાઈવે વર્તુળ સહિત)

સર્વે અધિક્ષક ઈજનેરશ્રીઓ, (પંચાયત)મા.મ. વિભાગ

સર્વે કાર્યપાલક ઈજનેરશ્રીઓ, મા.મ. વિભાગ.

સર્વે કાર્યપાલક ઈજનેરશ્રીઓ, (પંચાયત) મા.મ. વિભાગ.

નકલ રવાના :

૧. અગ્રસચિવશ્રીના અંગત મદદનીશશ્રી, મા.મ. વિભાગ, સચિવાલય, ગાંધીનગર
૨. સર્વે મુખ્ય ઈજનેરી અને અ.સ.શ્રીઓ, મા.મ.વિભાગ.
૩. સર્વે તાંત્રિક ઉપસચિવશ્રીઓ, મા.મ. વિભાગ.
૪. ના.કા.ઈ.શ્રીઓ, મા.મ. વિભાગ
૫. નાણાં શાખા, મા.મ. વિભાગ.
૬. ના.સે.અ. સી શાખા, મા.મ. વિભાગ,સિલેક્ટ ફાઈલ.
૭. શાખા સિલેક્ટ ફાઈલ ૨૦૧૩.



બાંધકામ મટીરીયલ્સ એન કોમ્પોનેન્ટ્સ સેમ્પલની  
ગુણવત્તા માટેના પરીક્ષણ પૈકીના ૮૦% પરીક્ષણ  
સ્થળ પર તથા ૧૦% પરીક્ષણ સરકાર માન્ય  
લેબોરેટરીમાં કરાવવા બાબત.

ગુજરાત સરકાર  
માર્ગ અને મકાન વિભાગ  
પરિપત્ર ક્રમાંક :- પરચ/૧૦૨૦૦૭/૨૮/ સી  
સચિવાલય, ગાંધીનગર  
તા.૧૭/૦૫/૨૦૧૯

વંચાણે લીધા :- મા.મ. વિ.નો પરીપત્રનો ક્રમાંક :- પરચ / ૧૦૨૦૦૭ / ૨૮ / સી, તા.૩૧/૧૨/૨૦૦૯

**આમુખ :-**

માર્ગ અને મકાન વિભાગના બાંધકામના માલસામાનને પરીક્ષણો માટે સંદર્ભમાં દર્શાવેલ પરિપત્ર બહાર પાડવામાં આવેલ હતો. આ પરિપત્રમાં દર્શાવેલ માલસામાન માટે પરીક્ષણોની સંખ્યાનાં ૧૦% નમુનાના પરીક્ષણ ઓછામાં ઓછુ એક પરીક્ષણ ગેરીમાં કરાવવા, ૧૦% નમુનાનાં પરીક્ષણો સરકાર માન્ય લેબોરેટરીનો તથા ૮૦ % નમુનાના પરીક્ષણો પ્લાન્ટ સાઈટ પર કરવાની સુચના આપેલ હતી. સમય જતા ગેરીમાંથી સમયસર પરીક્ષણોના પરીક્ષણમાં કામના ભારણને કારણે સમયમર્યાદામાં મળતા ન હતા. તેમજ જિલ્લા કક્ષાની ગેરી લેબોરેટરીમાં મર્યાદિત મટીરીયલના પરીક્ષણો થતા હોય, કેટલાંક મટીરીયલના પરીક્ષણો ગેરીની અન્ય જિલ્લાની લેબોરેટરીમાં આપવાના થાય છે. ક્ષેત્રિય કચેરીની રજૂઆત અન્વયે આ પરિપત્રમાં સુધારા કરવાની બાબત વિચારણા હેઠળ હતી. ઉક્ત વિચારણાને અંતે પ્રસ્તુત પરિપત્રમાં નીચે મુજબ ફેરફાર કરવામાં આવે છે. જે આ પરિપત્ર કર્યાની તારીખથી અમલમાં મુકવાનો રહેશે.

**પરિપત્ર :-**

બાંધકામના માલસામાનનાં કરવા પાત્ર પરીક્ષણો પૈકી ૮૦ % પરીક્ષણો પ્લાન્ટ સાઈટ પર, ૧૦ % પરીક્ષણો સરકાર માન્ય લેબોરેટરી અને ૧૦ % પરીક્ષણો ગેરી / સરકારી ઈજનેર કોલેજ / સરકારી પોલીટેકનીક કોલેજમાં કરાવવાના રહેશે. દરેક માલસામાનનું ઓછામાં ઓછુ એક પરીક્ષણ ગેરીમાં કરાવવાનું રહેશે.

ઉક્ત જોગવાઈઓ સિવાય મા.મ. વિભાગના તા.૩૧/૧૨/૨૦૦૯ ના પરિપત્રની અન્ય જોગવાઈ / શરતો યથાવત રહેશે.

(એ. એન. મિસ્ત્રી)

ખાસ ફરજ પરના અધિકારી (વિ.યો.)

માર્ગ અને મકાન વિભાગ



ટેન્ડર માટેની વાટાઘાટોની નિતી  
નક્કી કરવા બાબત.

ગુજરાત સરકાર,  
માર્ગ અનેમકાનવિભાગ,  
બ્લોક નં. ૧૪/૨, સરદારભવન,  
સચિવાલય, ગાંધીનગર  
ક્રમાંક : એસ/૨૨/૨૦૧૭/૬૩૯/૩  
તા.૦૮/૦૬/૨૦૧૮


**આમુખ:-**

માર્ગ અને મકાનવિભાગનાવિવિધકામોમાટે જાહેર નિવિદાથી ટેન્ડર માંગવામાં આવે છે. ક્યારેક ઈજારદારે ભરેલ ટેન્ડરનાભાવ જે તે વિસ્તારમાં ટેન્ડર મંજૂરીના નિર્ણય કરવાના સમયે જે તે ટેન્ડરના કામના વિસ્તારમાં મંજૂર થયેલ અન્ય ટેન્ડરની સરખામણીમાં ઉચા જણાય તેવા સંજોગોમાં ઈજારદારશ્રીને વાટાઘાટ માટે બોલાવવામાં આવે છે. ક્યારેક જે તે ટેન્ડરભરનાર ઈજારદાર વારંવાર વાટાઘાટની તારીખ અને સમય ફાળવ્યા બાદ સક્ષમ અધિકારી પાસે વાટાઘાટ માટે આવતા નથી / વેલીડીટી લંબાવી આપતા નથી. તેમજ વેલીડીટી પીરીયડ પુરો થાય ત્યાં સુધી પોતે વાટાઘાટ કરવા માંગતા નથી તે પ્રકારનો પત્ર પણ આપતા નથી. તે કારણોસર ટેન્ડરની વેલીડીટી પૂર્ણ થવાથી ટેન્ડર ફરીવાર માંગવાની જરૂરીયાત ઉપસ્થિત થાય છે. જેના કારણે પ્રજાલક્ષી કામોમાં વિલંબ પણ થાય છે. પુખ્ત વિચારણાને અંતે નીચે મુજબનો પરિપત્ર કરવામાં આવે છે.

**પરિપત્ર :-**

ટેન્ડર મંજૂરીની દરખાસ્ત કરતી સમયે જે તે ક્ષેત્રિય કચેરીમાંથી જે તે વિસ્તારનાં સમાનપ્રકારનાં છેલ્લા છ માસમાં મંજૂર થયેલ કામોની વિગતો સાથે કેટલી રકમ સુધીનું ટેન્ડર મંજૂર કરવાપાત્ર રહે છે. તે વિગત સાથે દરખાસ્ત કરવાની રહેશે. ઈજારદારશ્રીને ટેન્ડર વેલીડીટી તેમજ ટેન્ડર મંજૂરીનો સમયગાળો ધ્યાનમાં લઈ વધુમાં વધુ ત્રણ વખત વાટાઘાટ માટે જાણ કરવામાં આવશે. જો ઈજારદારવાટાઘાટકરવા માંગતા ન હોય તો તેમણે વાટાઘાટની સુચના મળ્યાબાદ તરતજ તેઓ વાટાઘાટ કરવા માંગતા નથી તે મુજબનો પત્ર પાઠવવાનો રહેશે. જો ઈજારદાર ટેન્ડરની વેલીડીટી પૂર્ણ થવાના સમયવાળા સુધીમાં પણ આ પ્રકારનો પત્ર પાઠવશે નહીં અથવા વાટાઘાટ કરશે નહીં તો તેમનું ટેન્ડર રદ ગણવામાં આવશે અને તેમની બાનાની રકમ જપ્ત કરવામાં આવશે તેમજ ઈજારદાર પર શિક્ષાત્મક કાર્યવાહી હાથ ધરવામાં આવશે. આ પરિપત્રની તારીખથી Notice Inviting Tenders માં નીચે મુજબની વધારાની વિગત ઉમેરવાની રહેશે.

If found necessary contractor will be intimated for negotiation. He will be intimated maximum three times within validity period for negotiation. If contractor does respond in time, his earnest money will be forfeited and his tender will be rejected. Punitive action will be taken on such contractor.

  
(એ. એન. મિસ્ત્રી)  
ઉપસચિવ (રા.ર.)  
માર્ગ અનેમકાનવિભાગ  
ગાંધીનગર

ઇજારદારશ્રીને કરેલ કામનું ચૂકવણું  
RTGS/NEFT પદ્ધતિએ કરવા બાબત

ગુજરાત સરકાર  
માર્ગ અને મકાન વિભાગ  
બ્લોક નં.૧૪/૨, સરદાર ભવન,  
સચિવાલય, ગાંધીનગર  
પરિપત્ર ક્રમાંક:SSR-૧૦૨૦૧૭-૫૭-સી  
તા.૩૦/૦૪/૨૦૧૮

આમુખ:-


ભારત સરકાર દ્વારા ડીઝીટલ ટ્રાન્ઝેક્શનનો વ્યાપક ઉપયોગ થાય અને બેંકો દ્વારા ઉપલબ્ધ વિવિધ ઓનલાઇન બેંકીંગ સેવાઓનો ઉપયોગ વ્યાપક થાય તે માટે દરેક રાજ્યને સુચનાઓ આપેલ છે અને રાજ્યોને સક્રીય સહયોગ આપવા જણાવેલ છે. ગુજરાત સરકાર દ્વારા પણ વિવિધ સરકારી કચેરીઓમાં કેશલેશ ટ્રાન્ઝેક્શન થાય એ મુજબની વ્યવસ્થા ગોઠવવા માટે વખતોવખત સૂચના આપવામાં આવેલ છે. ઇજારદારશ્રીઓના કરેલ કામનું ચૂકવણું RTGS/NEFTથી કરવાની પદ્ધતિથી ઇજારદારશ્રીઓને ઝડપથી નાણા મળી રહે છે. આ નેટ બેંકીંગ પદ્ધતિ ખૂબ જ અસરકારક અને હકારાત્મક પુરવાર થયેલ છે. ઇજારદારશ્રીએ કરેલ કામનું ચૂકવણું આજના આધુનિક બેંકીંગ પ્રમાણે RTGS/NEFTથી કરવા અંગે મળેલ વિવિધ રજૂઆતો અન્વયે પ્રસ્તુત બાબત સરકારશ્રીની વિચારણા હેઠળ હતી.

પરિપત્ર:-

ગુજરાત તિજોરી નિયમો, ૨૦૦૦ના નિયમ-૩૩૭ (પ્રકરણ-૧૪) અનુસાર જે તિજોરીઓની રોકડ લેવડ-દેવડ બેંક મારફતે થતી હોય ત્યાં શાખપત્ર અંગેના નિયમો પ્રકરણ-૧૩ની જોગવાઈને આધિન રહીને લાગુ પડે છે તેમજ માર્ગ અને મકાન વિભાગના કાર્યપાલક ઇજનેરશ્રીઓ ઉપાડ અને વહેંચણી અધિકારી તરીકે Cheque Drawingના Power ધરાવતા હોઇ, વિભાગીય કચેરી હસ્તકના ઇજારદારશ્રી દ્વારા કરેલ કામોના ચૂકવણાં માટે જીલ્લા તિજોરી ખાતેથી LC એડવાઇઝ મંજૂર કરાવી, LCનો ચેક કાઢી, બેંક મારફતે જે તે ઇજારદારશ્રીને RTGS/NEFTહેઠળ ચૂકવણું કરવાનું રહેશે.

ઉપરોક્ત તમામ સુચનાનો અમલ યુસ્તપણે તાત્કાલિક અસરથી કરવાનો રહેશે.

આ પરિપત્ર સરખાકમાંકની ડાઇલ ઉપર તા.૦૬/૧૨/૨૦૧૭થી મળેલ નાણાં વિભાગની સંમતિથી બહાર પાડવામાં આવે છે.

  
(એ.એન.મિસ્ત્રી)  
ખાસ કરજ પરના અધિકારી (વિ.થી.)  
માર્ગ અને મકાન વિભાગ  
ગાંધીનગર

પ્રતિ.

૧. સચિવશ્રીના અંગત સચિવશ્રી.માર્ગ અને મકાન વિભાગ, સચિવાલય, ગાંધીનગર
૨. સર્વે મુખ્ય ઇજનેરશ્રીઓ. માર્ગ અને મકાન વિભાગ, સચિવાલય, ગાંધીનગર
૩. સર્વે મુખ્ય ઇજનેરશ્રીઓ, નર્મદા, જળસંપત્તિ પાણી પુરવઠા અને કલ્પસર વિભાગ, સચિવાલય, ગાંધીનગર
૪. મેનેજીંગ ડીરેક્ટરશ્રી. ગુજરાત રાજ્ય માર્ગ વિકાસ નિગમ, નિર્માણલવન, ગાંધીનગર
૫. મુખ્ય ઇજનેરશ્રી અને ડાયરેક્ટરશ્રી, સ્ટાક ટ્રેનીંગ કોલેજ, ગાંધીનગર
૬. ડાયરેક્ટરશ્રી, ગુજરાત એન્જીનીયરીંગ રીસર્ચ ઇન્સ્ટીટ્યુટ (ગેરી), વડોદરા
૭. નાણાં સલાહકારશ્રી, માર્ગ અને મકાન વિભાગ, સચિવાલય, ગાંધીનગર
૮. સર્વે અધિક્ષક ઇજનેરશ્રીઓ, માર્ગ અને મકાન વિભાગ (રાજ્ય, પંચાયત, ને.હા., પાટનગર યોજના વર્તુળ, વિદ્યુત વર્તુળ સહીત)
૯. એકાઉન્ટન્ટ જનરલશ્રી, રાજકોટ/અમદાવાદ
૧૦. સર્વે કાર્યપાલક ઇજનેરશ્રીઓ (ઉક્ત વર્તુળ હેઠળના)
૧૧. સર્વે તાંત્રિક અધિકારીશ્રીઓ, માર્ગ અને મકાન વિભાગ, સચિવાલય, ગાંધીનગર
૧૨. સર્વે તાંત્રિક શાખાઓ, માર્ગ અને મકાન વિભાગ, સચિવાલય, ગાંધીનગર
૧૩. પ્રમુખશ્રી, ગુજરાત કોન્ક્રીટર્સ એસોસીએશન, ગજ્જર હોલ, લો ગાર્ડન, લો કોલેજ રોડ, અમદાવાદ.
૧૪. શાખા સીલેક્ટ કાઇલ-૨૦૧૮



ગુજરાત સરકાર  
માર્ગ અને મકાન વિભાગ  
બ્લોક નં.૧૪/૨, સરદાર ભવન,  
સચિવાલય, ગાંધીનગર  
ઠરાવ ક્રમાંક TNC-10-2017-01-C  
તા.૧૧/૦૭/૨૦૧૭

### ઠરાવ

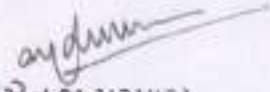
ટેન્ડરમાં જથ્થાવધારા તથા જથ્થાવધારાના ભાવના માપદંડ બાબતે બી-૧ અને બી-૨ ટેન્ડરના કલોઝ-૧૪.૨ માં જણાવ્યા મુજબ જથ્થાવધારા માટે ૩૦ ટકા સુધીનો જથ્થો ટેન્ડરના ભાવથી અને ૩૦ ટકાથી વધુ જથ્થામાં વધારો હોય તો જે તે વર્ષમાં કામગીરી કરેલ હોય તે વર્ષના એસ.ઓ.આર.થી કરવાની જોગવાઈ છે.

સદરહુ જોગવાઈમાં સુધારણા કરવા બાબતે સરકારશ્રીમાં ઘણા લાંબા સમયથી વિચારણા હેઠળ હતું. જે અન્વયે નીચે મુજબનો સુધારો કરવામાં આવે છે.

EXISTING CLAUSE	AMENDMENT
<b>Form B-1 Clause- 14.2</b> <b>Form B-2 Clause- 14.2</b> Except that when the quantity of any item exceeds the quantity as in the tender by more than 30% the contractor will be paid for the quantity in excess of 30% at the rate entered in the SOR of the year during which the excess in quantity is first executed and for the material consumed in excess quantity the rate for the material to be charged would be basic rate taken into account for fixing the rate for the SOR above instead of the rate stipulated in Schedule-A.	<b>Form B-1 Clause- 14.2</b> <b>Form B-2 Clause- 14.2</b> Except that when the quantity of any item exceeds the quantity as in the tender by more than 10% the contractor will be paid for the quantity in excess of 10% at the rate entered in the SOR of the year during which the excess in quantity is first executed or tender rate whichever is less.

ઉપરોક્ત તમામ સુચનાનો અમલ ચુસ્તપણે તાત્કાલિક અસરથી કરવાનો રહેશે.

ગુજરાત રાજ્યના રાજ્યપાલશ્રીના હુકમથી અને તેમના નામે,

  
(એન.કે.પરમાર)  
ખાસ ફરજ પરના અધિકારી (વિ.યો.)  
માર્ગ અને મકાન વિભાગ  
ગાંધીનગર

પ્રતિ.

૧. નામ.રાજ્યપાલશ્રીના સચિવશ્રી, ગુજરાત રાજ્ય, રાજભવન, ગાંધીનગર
૨. માન. મુખ્યમંત્રીશ્રીના અગ્રસચિવશ્રી, ગુજરાત રાજ્ય, ગાંધીનગર
૩. માન.નાયબ મુખ્યમંત્રીશ્રીના અંગત સચિવશ્રી, ગુજરાત રાજ્ય, ગાંધીનગર
૪. માન. રાજ્ય કક્ષાનામંત્રીશ્રી (માર્ગ અને મકાન)ના અંગત સચિવશ્રી, ગુજરાત રાજ્ય, ગાંધીનગર
૫. અંગત સચિવશ્રી, સચિવશ્રીનું કાર્યાલય, માર્ગ અને મકાન વિભાગ, સચિવાલય, ગાંધીનગર
૬. અંગત સચિવશ્રી, સચિવશ્રીનું કાર્યાલય, નર્મદા, જળસંપત્તિ પાણી પુરવઠા અને કલ્પસર વિભાગ, સચિવાલય, ગાંધીનગર
૭. અંગત સચિવશ્રી, અગ્રસચિવશ્રીનું કાર્યાલય, આરોગ્ય અને પરિવાર કલ્યાણ વિભાગ, સચિવાલય, ગાંધીનગર
૮. અંગત સચિવશ્રી, અધિક મુખ્ય સચિવશ્રીનું કાર્યાલય શહેરી વિકાસ અને શહેરી ગૃહ નિર્માણ વિભાગ, સચિવાલય, ગાંધીનગર
૯. અંગત સચિવશ્રી, અગ્રસચિવશ્રીનું કાર્યાલય, પંચાયત, ગ્રામ ગૃહનિર્માણ અને ગ્રામ વિકાસ વિભાગ, સચિવાલય, ગાંધીનગર
૧૦. એકાઉન્ટન્ટ જનરલશ્રી, રાજકોટ/અમદાવાદ
૧૧. સર્વે મુખ્ય ઇજનેરશ્રીઓ, માર્ગ અને મકાન વિભાગ, સચિવાલય, ગાંધીનગર
૧૨. સર્વે મુખ્ય ઇજનેરશ્રીઓ, નર્મદા, જળસંપત્તિ પાણી પુરવઠા અને કલ્પસર વિભાગ, સચિવાલય, ગાંધીનગર
૧૩. મેનેજીંગ ડીરેક્ટરશ્રી, ગુજરાત રાજ્ય માર્ગ વિકાસ નિગમ, નિર્માણભવન, ગાંધીનગર
૧૪. મુખ્ય ઇજનેરશ્રી અને ડાયરેક્ટરશ્રી, સ્ટાક ટ્રેનીંગ કોલેજ, ગાંધીનગર
૧૫. ડાયરેક્ટરશ્રી, ગુજરાત એન્જીનીયરીંગ રીસર્ચ ઇન્સ્ટીટ્યુટ (ગેરી), વડોદરા
૧૬. ઉપસચિવશ્રી, ગુજરાત તકેદારી આયોગ, તકેદારી ભવન, ગાંધીનગર
૧૭. નાણાં સલાહકારશ્રી, માર્ગ અને મકાન વિભાગ, સચિવાલય, ગાંધીનગર
૧૮. સર્વે અધિક્ષક ઇજનેરશ્રીઓ, માર્ગ અને મકાન વિભાગ (રાજ્ય, પંચાયત, ને.હ., પાટનગર યોજના વર્તુળ, વિદ્યુત વર્તુળ સહીત)
૧૯. સર્વે કાર્યપાલક ઇજનેરશ્રીઓ (ઉક્ત વર્તુળ હેઠળના)
૨૦. સર્વે તાંત્રિક અધિકારીશ્રીઓ, માર્ગ અને મકાન વિભાગ, સચિવાલય, ગાંધીનગર
૨૧. સર્વે તાંત્રિક શાખાઓ, માર્ગ અને મકાન વિભાગ, સચિવાલય, ગાંધીનગર
૨૨. પ્રમુખશ્રી, ગુજરાત કોન્ટ્રાક્ટર્સ એસોસીએશન, ગજજરા હોલ, લો ગાર્ડન, લો કોલેજ રોડ, અમદાવાદ
૨૩. શાખા સીલેક્ટ ક્ષેત્ર-૨૦૧૭



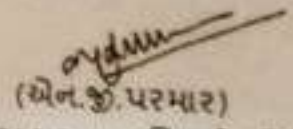
વેતને જાને જી.વેસ.ટી.ના અમલવારી તથા  
પરિવેશ રેલ (બી-૧) ટેન્કર ફોર્મના માપદંડોમાં  
સુધારો થતા બી-૧ અને બી-૨ ફોર્મના કલોઝમાં  
સુધારા બાબત

પરિપત્ર ક્રમાંક: એસએસઆર-૧૦-૨૦૧૭-૫૦-સી  
માર્ગ અને મકાન વિભાગ  
બ્લોક નં. ૧૪, નવા સચિવાલય,  
ગાંધીનગર  
તા.૧૧/૦૮/૨૦૧૭

સુધારો:-

સંદર્ભ:- માર્ગ અને મકાન વિભાગ, સચિવાલય, ગાંધીનગરના પરિપત્ર ક્રમાંક: એસએસઆર-૧૦-૨૦૧૭-૫૦-સી  
તા.૨૯/૦૮/૨૦૧૭

સંદર્ભમાં નિર્દિષ્ટ માર્ગ અને મકાન વિભાગના તા.૨૯/૦૮/૨૦૧૭ના પરિપત્રના ફોર્મ બી-૧ કલોઝ નં.૨૪  
માં કરેલ સુધારો કે જેમાં જણાવેલ છે કે "ઇજારદારશ્રીને તેમણે કરેલ કામગીરી અંગે જ્યારે પણ બીલની ચૂકવણી  
કરવાની થાય ત્યારે ઉપરોક્ત સૂચવેલ પદ્ધતિ પ્રમાણે તે કામ કરવામાં આવેલ છે કે કેમ? તેની ખરાબ સંબંધિત  
અધિકાર ઇજારદારશ્રી પાસે કરાવ્યા બાદ જ બીલનું ચૂકવણું કરવામાં આવશે" ને આથી રદ કરવામાં આવે છે.  
આથી તા.૨૯/૦૮/૨૦૧૭ના પરિપત્રના ઉપરોક્ત સિવાયની બાકીની સૂચનાઓ યથાવત રહે છે. આ  
સૂચનાનો યુસ્તપણે તાત્કાલિક અસરથી અમલ કરવાનો રહેશે.

  
(એન.કે.પરમાર)

ખાસ કરજ પરના અધિકારી (વિ.ચો.)  
માર્ગ અને મકાન વિભાગ  
ગાંધીનગર

પ્રતિ.

૧. અંગત સચિવશ્રી, સચિવશ્રીનું કાર્યાલય, માર્ગ અને મકાન વિભાગ, સચિવાલય, ગાંધીનગર
૨. અંગત સચિવશ્રી, સચિવશ્રીનું કાર્યાલય, નર્મદા, જળસંપત્તિ પાણી પુરવઠા અને કલ્પસર વિભાગ, સચિવાલય,  
ગાંધીનગર
૩. અંગત સચિવશ્રી, અગ્રસચિવશ્રીનું કાર્યાલય, આરોગ્ય અને પરિવાર કલ્યાણ વિભાગ, સચિવાલય, ગાંધીનગર
૪. અંગત સચિવશ્રી, અધિક મુખ્ય સચિવશ્રીનું કાર્યાલય, શહેરી વિકાસ અને શહેરી ગૃહ નિર્માણ વિભાગ,  
સચિવાલય, ગાંધીનગર
૫. અંગત સચિવશ્રી, અગ્રસચિવશ્રીનું કાર્યાલય, પંચાયત, ગ્રામ ગૃહનિર્માણ અને ગ્રામ વિકાસ વિભાગ,  
સચિવાલય, ગાંધીનગર
૬. એકાઉન્ટન્ટ જનરલશ્રી, રાજકોટ/અમદાવાદ

જે ઈજારદારો રજીસ્ટ્રેશન ધરાવતા હોય  
તેમના જ ટેન્ડર ખોલવા બાબત

ગુજરાત સરકાર  
માર્ગ અને મકાન વિભાગ  
પરિપત્ર ક્રમાંક:- ટીએનસી-૧૦-૨૦૧૬-(FA-591-16)-૦૨-સી  
સચિવાલય, ગાંધીનગર  
તા.૦૩-૦૯-૨૦૧૬

વંચાણે લીધા:- (૧) ઠરાવ ક્રમાંક:- આરજીએન-૬૦૮૯-૮-પાર્ટ-૧-સી તા.૨૭-૦૧-૧૯૯૮  
(૨) ઠરાવ ક્રમાંક:- આરજીએન-૬૦૮૯-૮-પાર્ટ-૧-સી તા.૦૬-૦૮-૨૦૧૧


પરિપત્ર :-

કેટલીક મા.મ. વિભાગીય કચેરીઓ દ્વારા કોન્ટ્રાક્ટર તરફથી રજીસ્ટ્રેશન રીન્યુઅલ/કેટેગરી રીન્યુઅલની અરજી કરવામાં આવેલ હોય, પણ તેમનું રજીસ્ટ્રેશન રીન્યુઅલ/કેટેગરી રજીસ્ટ્રેશન જેતે ટેન્ડર ખોલવાની તારીખે ન મળેલ હોય / આપવામાં આવેલ ન હોય તેમ છતાં તેમનાં ટેન્ડર ખોલવામાં આવેલ હતાં. પરિણામે આ ટેન્ડર ફરીવાર મંગાવવાના થાય છે તેમજ તેના કારણે કામના અમલીકરણમાં વિલંબ થાય છે. આથી હવે આ બાબતે નીચે મુજબની કાર્યપદ્ધતિ યુસ્તપણે અમલમાં મુકવાની રહેશે.

કાર્યપાલક ઇજનેરશ્રી/અધિક્ષક ઇજનેરશ્રી ધ્વારા ટેન્ડર ખોલવાની તારીખે જે ઈજારદારો જેતે ટેન્ડર માટે પાત્રતા પ્રમાણેની કક્ષામાં રજીસ્ટ્રેશન ધરાવતા હોય તેમજ જેતે ટેન્ડર માટેની જરૂરી કેટેગરી/સ્પેશ્યીલ કેટેગરીમાં પણ રજીસ્ટ્રેશન ધરાવતાં હોય, આમ આ બન્ને શરતો પુર્ણ કરતા હોય તેવા ઈજારદારોના જ ટેન્ડર ખોલવાનાં રહેશે.

ટેન્ડર ખોલવાની તારીખે જે ઈજારદારની રજીસ્ટ્રેશન રીન્યુઅલ/કેટેગરી રજીસ્ટ્રેશનની પ્રક્રિયા પુર્ણ થયેલ ન હોય, તેમનાં ટેન્ડર ખોલવાનાં રહેશે નહીં. તેમ છતાં આ પ્રકારનાં પાત્રતા ન ધરાવતાં ઈજારદારોનાં ટેન્ડર ખોલવામાં આવશે તો સંબંધિતોની જવાબદારી નક્કી કરવામાં આવશે તેની ગંભીરતાથી નોંધ લેવી.

આ પરિપત્ર ગુજરાત રાજ્ય બહાર રજીસ્ટર્ડ થયેલ કોન્ટ્રાક્ટર ધ્વારા જો ગુજરાતમાં વિભાગના કામોના ટેન્ડર ભરેલ હોય, તેવા કિસ્સામાં લાગુ પડશે નહીં.

  
(એ. એન. મિસ્ત્રી)  
ઉપ સચિવ(રા.ર.)  
માર્ગ અને મકાન

નકલ રવાના :-

- (૧) મા.નાયબ મુખ્ય મંત્રીશ્રી અને મંત્રીશ્રી (મા.મ.) વિભાગના અંગત સચિવશ્રીની જાણ સારૂ.
- (૨) મા.રા.ક..મંત્રીશ્રીનાં અંગત સચિવશ્રીની જાણ સારૂ.
- (૩) મુ.ઇ.(મા.મ.) અને અ.સ.શ્રી, મા.મ. વિભાગ, સચિવાલય, ગાંધીનગર
- (૪) મુ.ઇ.(પંચા.) અને અ.સ.શ્રી, મા.મ. વિભાગ, સચિવાલય, ગાંધીનગર
- (૫) મુ.ઇ.(ને.હા.) અને અ.સ.શ્રી, મા.મ. વિભાગ, સચિવાલય, ગાંધીનગર
- (૬) મુ.ઇ.(પા.યો.) અને અ.સ.શ્રી, મા.મ. વિભાગ, સચિવાલય, ગાંધીનગર
- (૭) મુ.ઇ.(ગુ.નિ.) અને અ.સ.શ્રી, મા.મ. વિભાગ, સચિવાલય, ગાંધીનગર
- (૮) નિયામકશ્રી (એસટીસી) સ્ટાફ સ્ટ્રેનીંગ કોલેજ, ગાંધીનગર
- (૯) મુ.ઇ.શ્રી (પી એન્ડ પી), મા.મ. વિભાગ, સચિવાલય, ગાંધીનગર
- (૧૦) નાણાંકીય સલાહકારશ્રી, (મા.મ.) વિભાગ, નાણાં વિભાગ, સચિવાલય, ગાંધીનગર
- (૧૧) સર્વે અ.ઇ.શ્રીઓ (મા.મ.) વર્તુળ, પેટા/ મા.મ.વર્તુળ/ ને.હા.વર્તુળ/ એક્સપ્રેસ -વે -  
વર્તુળ/ પાટનગર યોજના વર્તુળ.
- (૧૨) સર્વે કા.ઇ.શ્રીઓ ઉપર્યુક્ત વર્તુળો હસ્તકના સર્વે વિભાગો.
- (૧૩) સર્વે તાંત્રિક અધિકારીશ્રીઓ (ના.કા.ઇ.શ્રીઓ સહિત)
- (૧૪) સર્વે પ્રોજેક્ટ શાખાઓ મા.મ. વિભાગ, સચિવાલય, ગાંધીનગર
- (૧૫) સીલેક્ટ ફાઇલ સી - શાખા, ૨૦૧૬



જે કામ માટે એકજ ટેન્ડર આવેલ હોય તે  
ટેન્ડર પુન : માંગવા બાબત

ગુજરાત સરકાર,  
માર્ગ અને મકાન વિભાગ  
સુચના ક્રમાંક : TNC-10-2017-03-C(R&B)  
સચિવાલય, ગાંધીનગર  
તા.૧૮/૦૨/૨૦૧૭

સંદર્ભ :- પીડીડબલ્યુ / ૧૦૨૦૦૭ / (ભાગ - ૧) સ

**પ્રસ્તાવના :-**

અનુભવે પ્રસ્થાપિત થયેલ છે કે, બાંધકામની કામગીરી માટે જાહેર નિવિદાથી ટેન્ડર માંગવામાં આવે છે ત્યારે કેટલીક વાર એક જ ઈજારદાર દ્વારા ટેન્ડર ભરવામાં આવે ત્યારે આ ટેન્ડર વિભાગીય કક્ષાએ ખોલ્યા બાદ વર્તુળ કચેરીમાં તથા કેટલાંક કિસ્સામાં સરકારમાં મંજૂરી અર્થે રજૂ કરવામાં આવે છે, તેમજ કેટલીક વાર ટેન્ડર નામંજૂર કરી પુન: માંગવાનો નિર્ણય કરવામાં આવે છે.

પ્રધાનમંત્રી ગ્રામ સડક યોજનાની માર્ગ દર્શિકા પ્રમાણે પ્રથમવારનું સીગલ ટેન્ડર નહી ખોલવા અને આવું સીગલ ટેન્ડર ફરીથી માંગવાની કાર્યવાહી કરવાની રહે છે. કેન્દ્રીય તકેદારી આયોગની માર્ગદર્શિકા મુજબ પણ એક માત્ર ટેન્ડર આવેલ હોય, તેવા કિસ્સામાં આવું ટેન્ડર મંજૂર નહી કરીને ફરીથી માંગવાની કાર્યવાહી કરવાની રહે છે અને ત્યાર પછીના પ્રયત્નોમાં પણ એક જ ટેન્ડર આવે તો આવું ટેન્ડર જો વ્યાજબી ભાવ વાળું હોય તેવા સંજોગોમાં ટેન્ડર મંજૂર કરવા વિચારણા કરી શકાશે.

**ઠરાવ :-**

પુખ્ત વિચારણાને અંતે ઉક્ત સંજોગોમાં નીચે મુજબની કાર્યપદ્ધતિ નક્કી કરવાનું ઠરાવવામાં આવે છે.

(૧) જે કામ / પેકેજ માટે માત્ર એક જ ટેન્ડર ભરાઈને આવેલ હોય તેવા કામ / પેકેજના ટેન્ડરને Single Tender ગણવાનું રહેશે. આ પ્રકારના કિસ્સામાં ટેન્ડર ખોલવાનું રહેશે નહી તથા ટેન્ડર પુન : માંગવાનું રહેશે. માત્ર વિશિષ્ટ સંજોગો, જેવા કે કુદરતી આપત્તી અને તાકીદની પરિસ્થિતિમાં માંગેલ ટેન્ડરોમાં પુરતાં કારણો તેમજ અભિપ્રાય સાથે Single Tender સ્વીકારવા માટે રજૂ કરવામાં આવે તો તેવા સંજોગોમાં ટેન્ડર મંજૂર કરવા બાબતે વિચારણાં કરી શકાશે.

(૨) બીજી વાર માંગવામાં આવેલ ટેન્ડરમાં પણ જો એક જ ટેન્ડર ભરાઈને આવે, તો તે ખોલીને આવું ટેન્ડર જો વ્યાજબી ભાવ વાળું હોય તેવા સંજોગોમાં ટેન્ડર મંજૂર કરવા બાબતે વિચારણા કરવાની રહેશે.

આ હુકમો તાત્કાલીક અસરથી અમલમાં આવે છે આ ઠરાવ નાણા વિભાગની ફાઈલ ક્રમાંક : ટીઈએન / ૨૦૧૬ / એફએ (મા.મ.) પર મળેલ સરકારશ્રીની મંજૂરી અન્વયે બહાર પાડવામાં આવે છે.

ગુજરાત રાજ્યના રાજ્યપાલશ્રીના હુકમથી અને તેમના નામે.

(એ.એન. મિસ્ત્રી)

ઉપ સચિવ (રા.ર)

માર્ગ અને મકાન વિભાગ

પ્રતિ,

માન.મંત્રીશ્રી (મા.મ.) ના અંગત સચિવશ્રી,સચિવાલય, ગાંધીનગર

માન. રા.ક.મંત્રીશ્રી(મા.મ.)ના અંગત સચિવશ્રી,સચિવાલય, ગાંધીનગર

માન. મંત્રીશ્રી(ન.જ. એન પ્રા.પુ અને કલ્પસર વિભાગ)ના અંગત સચિવશ્રી, સચિવાલય, ગાંધીનગર

નર્મદા અને જળ સંપત્તિ અને પાણી પુરવઠા વિભાગ, સચિવાલય, ગાંધીનગર

આરોગ્ય અને પરિવાર કલ્યાણ વિભાગન, સચિવાલય ગાંધીનગર

પંચાયત, ગ્રામ ગૃહ નિર્માણ, અને ગ્રામ વિકાસ વિભાગ, સચિવાલય ગાંધીનગર

શહેરી વિકાસ અને શહેરી ગૃહ નિર્માણ વિભાગ, સચિવાલય, ગાંધીનગર

એકાઉન્ટન્ટ જનરલ, ઓડીટ – ૧, ઓડીટ ભવન, નવરંગપુરા અમદાવાદ – ૯.

એકાઉન્ટન્ટ જનરલ, ઓડીટ – ૨, રેસકોર્ષ, રાજકોટ

એકાઉન્ટન્ટ જનરલ,(એ એન્ડ ઈ), રેસકોર્ષ, રાજકોટ

ડેપ્યુટી એકાઉન્ટન્ટ જનરલ (એ એન્ડ ઈ), પાંચમો માળ, ઓડીટ ભવન નવરંગપુરા, અમદાવાદ – ૯

સચિવશ્રી, ગુજરાત તકેદારી આયોગ, ગાંધીનગર

સર્વે અ.ઈ.શ્રીઓ / મા.મ. વિભાગ, પંચાયત (મા.મ.) વર્તુળ, / રા.ધો.મા.મ. વર્તુળ/ રા.મા. યોજના વર્તુળ/ પા.યોજના વર્તુળ / એ.વે. વર્તુળ / વિદ્યુત વર્તુળ સહિત.

સર્વે કા.ઈ.શ્રીઓ, ઉપરોક્ત વર્તુળ હેઠળના સર્વે વિભાગ

નિયામકશ્રી, ગેરી વડોદરા

મેનેજિંગ ડિરેક્ટરશ્રી, ગુ.રા.મા. વિકાસ નિગમ લી. ગાંધીનગર

મુખ્ય કારોબારી અધિકારી, ગુજરાત મેરીટાઈમ બોર્ડ સે.૧૦, ગાંધીનગર.

નિયામકશ્રી ઉપવન બગીચા, ગાંધીનગર

નાણાંકીય સલાહકારશ્રી, મા.મ વિભાગ, ગાંધીનગર

સર્વે તાંત્રિક અધિકારીશ્રીઓ (ના.કા.ઈશ્રીઓ સહિત) મા.મ વિ, સચિવાલય, ગાંધીનગર

સર્વે પ્રોજેક્ટ શાખાઓ, મા.મ. વિ. સચિવાલય, ગાંધીનગર

સીલેક્ટ ફાઈલ – ૨૦૧૭

ગુજરાત સરકાર  
માર્ગ અને મકાન વિભાગ  
પરિપત્ર ક્રમાંક- ટીએનસી/૧૦/૨૦૦૨ (૧૪)/સ,  
સચિવાલય, ગાંધીનગર  
તારીખ. ૨૮/૪/૨૦૦૩

વિષય :- રાજ્ય સરકારના બાંધકામ માટે વપરાતા ગૌણ ખનિજોની રોયલ્ટી ભરવા બાબત.

સંદર્ભ :- મા.મ.વિ.નો તા. ૨૩-૧૦-૮૮ નો પરિપત્ર ક્રમાંક- ટીએનસી /૨૨૮૬/યુઓ-૩૮/  
(૧૯)-સ

પરિપત્ર :-

માર્ગ અને મકાન વિભાગનાં સંદર્ભમાં દર્શાવેલ તા.૨૩/૧૦/૮૮ નો પરિપત્ર અમલી બનતાં આ પરિપત્ર મુજબ પરિપત્રની તારીખથી સીક્યોરીટી ડીપોઝીટ પરત કરવા માટે રોયલ્ટી ભર્યા અંગેનાં પ્રમાણપત્રનો આગ્રહ રાખવાનો રહેશે નહિં. તેવું નક્કી કરવામાં આવેલ. આ સુધારો ટેન્ડરનાં કલોઝ - ૩૬ (બી-૧) અને ટેન્ડર કલોઝ-૩૫ (બી-૨) ફોર્મમાં ઉમેરવામાં આવેલ. પરંતુ ટેન્ડર કલોઝ નંબર-૧ માં આ ઠરાવ સંદર્ભે જરૂરી સુધારો જે તે સમયે કરવામાં આવેલ ન હોવાથી, ટેન્ડરનાં કલોઝ-૧ અને કલોઝ-૩૬ (બી-૧) કલોઝ-૩૫ (બી-૨) વચ્ચે વિસંગતતા રહેવા પામેલ છે. આ વિસંગતતા દૂર કરવાની બાબત સરકારશ્રીનાં સક્રિયા વિચારણા હેઠળ હતી. આ વિસંગતતા દૂર કરવાની બાબતે પુખ્ત વિચારણાનાં અંતે ટેન્ડર ફોર્મ બી-૧ અને બી-૨ નાં કલોઝ-૧ નાં ફકરા-૨ માં (મા.મ.) વિભાગનાં તા.૨૩-૧૦-૮૮ નાં પરિપત્રનાં સંદર્ભે "Including the Royalty charge if No Due Certificate' is not produced by the contractor" શબ્દો દુર કરી, કલોઝ નં.૧ માં નીચે મુજબનો સુધારો કરવામાં આવે છે.

Fifty percentage of the Security Deposit alongwith performance bond shall become refundable within fifteen days after the final completion certificate is issued as per clause-7. All dues under this contract or other contract or otherwise shall be recovered from the aforesaid amount of fifty percentage of the said security deposit and the balance shall be refunded within fifteen days after the final certificate is issued as per clause-7. The remaining fifty percentage of the security deposit shall be refunded after the expiry of the Defect Liability period as per Clause 17 and 17A, after deducting there from the amount of expenses, if any, due to Govt. under this contract. (See Performance Bond on Page No. 44).

આ ઉપરાંત અગાઉ તા.૨૩/૧૦/૮૮ નાં પરિપત્રમાં દર્શાવેલ શરતોમાં વધારાની ૧-એ શરત ઉમેરવામાં આવે છે.

૧:એ – "ફાઈનલ બીલની નકલ જીલ્લાના સંલગ્ન ઉદ્યોગ અને ખાણ વિભાગનાં જીલ્લા ભુસ્તર અધિકારીને આપવાની રહેશે."

આ સૂચનાનો અચુક અમલ થાય તે જોવા સર્વે સંબંધિતોને જણાવવામાં આવે છે.

( અશોક પંડ્યા )

ઉપ સચિવ,  
માર્ગ અને મકાન વિભાગ

પ્રતિ,

સર્વે અધિક્ષક ઈજનેરશ્રીઓ, મા.મ.વર્તુળો, પંચાયત મા.મ.વર્તુળો, એક્સપ્રેસવે વર્તુળ, રાષ્ટ્રીય ધોરી માર્ગ વર્તુળ, પાટનગર યોજના વર્તુળ સહિત.

સર્વે કાર્યપાલક ઈજનેરશ્રીઓ (ઉપરોક્ત વર્તુળો હેઠળના વિભાગો સહિત)

નકલ રવાના :-

ઉદ્યોગ ખાણ અને ઉર્જા વિભાગ, સચિવાલય, ગાંધીનગર.

નર્મદા જળ સંપત્તિ અને પાણી પુરવઠા વિભાગ, સચિવાલય, ગાંધીનગર.

નિયામકશ્રી, ભુસ્તર વિજ્ઞાન અને ખનીજ ખાતુ, બ્લોક નં.૧૩, ત્રીજા માળે જુના સચિવાલય, ગાંધીનગર.

નિયામકશ્રી, ગુજરાત ઈજનેરી સંશોધન સંસ્થા, વડોદરા.

નિયામકશ્રી, એન્જીનીયરીંગ સ્ટાફ કોલેજ, ગાંધીનગર.

મેનેજીંગ ડીરેક્ટરશ્રી, ગુજરાત રાજ્ય બાંધકામ નિગમ લી., ગાંધીનગર.

મેનેજીંગ ડીરેક્ટરશ્રી, ગુજરાત રાજ્ય માર્ગ વિકાસ નિગમ લી., ગાંધીનગર.

સર્વે તાંત્રિક અધિકારીશ્રીઓ (ના.કા.ઈ.શ્રીઓ સહિત), માર્ગ અને મકાન વિભાગ, સચિવાલય, ગાંધીનગર.

સર્વે પ્રોજેક્ટ શાખાઓ માર્ગ અને મકાન વિભાગ, સચિવાલય, ગાંધીનગર.

સીલેક્ટ ફાઈલ.

## **NOTIFICATION**

**Labour and Employment Department  
Sachivalaya, Gandhinagar  
Dated the 3<sup>rd</sup> January, 2005**

### **BUILDING AND OTHER CONSTRUCTION WORKERS WELFARE CESS RULES, 1998**

No.GHR/205/04/CWA/204/841/M-3

In exercise of the powers conferred by Clause No.1 and (g) of Rule-2 of the Building and Other Construction Workers Welfare Cess Rules pass the Government of Gujarat hereby appoints the following officer to be the Cess Collector and Assessing Officer not below the rank of Gazetted Officer for the purpose of collecting of cess under Section-3 and assessment of cess under Section-5 of the Building and Other Construction Worker's Welfare Cess Act, 1996 (28 of Para).

- (1) All Heads of Departments of Government of Gujarat in relation for another construction work of Government.
- (2) All Sections of Heads of the Public Section under
- (3) All Executive Heads of local authorities except Gram Panchayat, Dist. Panchayat, where an approval of the building and other construction work / Local authority is required.

By order and in the name of the Governor of Gujarat.

Sd/- (Shambhai Patel)  
Joint Secretary to Government

બાંધકામ મટીરીયલ્સ તેમજ કોમ્પોનેન્ટ્સ સેમ્પલની ગુણવત્તા માટેના પરીક્ષણ પૈકીના ૮૦% પરીક્ષણ સ્થળ પર તથા ૧૦% પરીક્ષણ સરકાર માન્ય લેબોરેટરી / ગેરી દ્વારા તથા ૧૦% ગેરી લેબોરેટરીમાં કરવા બાબત

ગુજરાત સરકાર  
માર્ગ અને મકાન વિભાગ,  
પરિપત્ર ક્રમાંક : પરચ / ૧૦૨૦૦૭ / ૨૮ / સ  
સચિવાલય, ગાંધીનગર.  
તા. ૩૧/૧૨/૨૦૦૯

**પરિપત્ર :-**

બાંધકામ મટીરીયલ્સ તેમજ કોમ્પોનેન્ટ્સ સેમ્પલની ગુણવત્તા માટેના પરીક્ષણ હાલ ગેરી કે સરકાર માન્ય સંસ્થા (લેબોરેટરી) મારફતે કરવામાં આવે છે, કામોની પ્રગતિની સમીક્ષા દરમ્યાન ક્ષેત્રીય અધિકારીઓ તરફથી જાણવા મળેલ છે કે ઉક્ત હયાત પ્રક્રિયામાં ટેસ્ટીંગના પરિણામો વિલંબથી મળે છે, જેમાં સમય પણ ખૂબ વ્યતિત થાય છે. ઈજારદાર એસોસિએશન તરફથી આવી રજઆતો મળી છે, આથી આ મુશ્કેલી ધ્યાને લેતાં ઈજારદારશ્રી દ્વારા જે તે કામ માટે સ્થાપવામાં આવતી લેબોરેટરીમાં સ્થળ પર જ પરીક્ષણ કરવામાં આવે તો વિલંબ નિવારી શકાય તે બાબત વિચારણા હેઠળ હતી, પુખ્ત વિચારણાના અંતે નીચે મુજબની નીતિ હાલના તબક્કે અનુસરવા નક્કી કરવામાં આવ્યું છે.

નીચે જણાવેલ પરીક્ષણોમાં પ્રવર્તમાન પદ્ધતિમાં ફરફાર કરી ફીક્વન્શી અનુસાર જરૂરી પરીક્ષણો પૈકી ૧૦% સરકાર માન્ય લેબોરેટરી / ગેરી તથા ૧૦% ગેરી લેબોરેટરી અને ૮૦% ફીલ્ડ લેબોરેટરી દ્વારા કરાવવાના રહેશે. પરંતુ ગેરીમાં નીચેના દરેક પૈકી ઓછામાં ઓછું ૧ (એક) પરીક્ષણ ગેરી લેબોરેટરીમાં કરવાનું રહેશે તથા ઓછામાં ઓછું એક પરીક્ષણ ગેરી / સરકાર માન્ય લેબોરેટરીમાં કરાવવાનો રહેશે. જેમાં નીચે દર્શાવેલ પરીક્ષણો સ્થળ પર કરવાના રહે છે.

એ	એગ્રીગેટ	(૧) ગ્રેડેશન (૨) ફલેકીનેશ અને ઈલોંગેશન વેલ્યુ (૩) ઈમ્પેક્ટ વેલ્યુ (૪) વોટર એબસોર્પશન
બી	માટી	(૧) ફીલ્ડ એફડીડી અને એફએમસી (૨) સીવ એનાલીસીસ
સી	રેતી	(૧) ગ્રેડેશન
ડી	ઈટો	(૧) ડાયમેનશન અને ટોલરન્સ ટેસ્ટ (૨) વોટર એબસોર્પશન
ઈ	કોંક્રીટ	(૧) નોન ડીસ્ટ્રક્ટીવ ટેસ્ટ (અલ્ટ્રા સોનીક ટેસ્ટીંગ પદ્ધતિથી) (૨) સ્લમ્પ ટેસ્ટ (૩) કોમ્પ્રેસીવ સ્ટ્રેન્થ
એફ	બીટુમીનસ મીક્સ	(૧) ડામરની ટકાવારી
જી	ડ્રાય મીક્ષ મટીરીયલ	(૧) ગ્રેડેશન

**શરતો :-**

૧. ઈજારદારે કામની ગુણવત્તા માટે ધારા ધોરણ પ્રમાણેની અને ઉપર જણાવેલ પરીક્ષણો માટે પ્રમાણિત થયેલ જરૂરી તમામ સાધનો સહિતની ફીલ્ડ ટેસ્ટીંગ લેબોરેટરી સ્વ ખર્ચે કામના સ્થળે યોગ્ય જગ્યા ઉપર સ્થાપવાની રહેશે. રસ્તાના કામ માટે લાગુ પડતા પ્લાન્ટના સ્થળને કામનું સ્થળ ગણી શકાય. પરંતુ કામનું સ્થળ લેબોરેટરીથી દુર હોય તો ઈજારદારશ્રી દ્વારા મોબાઈલ લેબોરેટરીની જરૂરી વ્યવસ્થા રાખવાની રહેશે.
૨. કા.ઈ.શ્રી જયારે સ્થળ પર તેઓનું ચેકીંગ કરવા જાય ત્યારે ટેસ્ટીંગ તેઓએ તેમની રૂબરૂમાં પણ કરવાનું રહેશે.
૩. ધારા ધોરણ પ્રમાણેના પરીક્ષણોની સંખ્યા પૈકી ૮૦% પરીક્ષણ ફીલ્ડ લેબોરેટરીમાં ઈજારદારના અધિકૃત ક્વોલીફાઈડ ઈજનેર કે જેઓને સંબંધિત કાર્યપાલક ઈજનેરશ્રીએ I-CARD આપેલ હોય તેમના દ્વારા ખાતાના ના.કા.ઈ. / મ.ઈ. /

- અ.મ.ઈ. ની હાજરીમાં જ કરવાના રહેશે અને પરિણામોમાં સંયુક્ત સહીઓ કરવાની રહેશે જ્યારે ૧૦% પરીક્ષણ ગેરી / સરકાર માન્ય લેબોરેટરી (ઓછામાં ઓછું એક પરીક્ષણ) અને ૧૦% ગેરી લેબોરેટરી (ઓછામાં ઓછું એક પરીક્ષણ) મારફતે કરાવવાના રહેશે.
૪. કુલ પરીક્ષણોના ૮૦% પરીક્ષણ એક જ સ્થળે સમયે એકજ તબક્કામાં નહીં કરતાં કામની પ્રગતિ મુજબ જે તબક્કાએ જે તે કામગીરીને અનુરૂપ જે મટીરીયલ્સ વાપરવાનું થતું હોય તદઅનુસાર શરૂઆતના તબક્કામાં રાખવું વચ્ચેના તબક્કામાં તેમજ આખરી તબક્કામાં કરાવવાનું રહેશે. આમ છતાં આ બાબતે સ્થાનિક કક્ષાએથી ના.કા.ઈ.શ્રીએ જરૂરીયાત મુજબ તબક્કાવાર પરીક્ષણો નક્કી કરવાના રહેશે.
૫. ગુણવત્તા નિયમન ધારા-ઘોરણ પંચાણેના બધા જ રજીસ્ટર નિયમિત રીતે નિભાવવાના રહેશે, અને તે જે સ્થળે લેબોરેટરીમાં ઉપલબ્ધ રહે તેમ રાખવાના રહેશે.
૬. જો કોઈ કારણસર ટેસ્ટીંગના સાધન અપ્રાપ્ય હોય અથવા વસાવવામાં સમય જાય તેમ હોય કે વ્યવહારૂ ન હોય (જેમ કે ઈલેક્ટ્રોમેટ્રિક બેરીંગ) તો આવા પરીક્ષણો ગેરી / સરકાર માન્ય સંસ્થાઓમાં કરાવી શકાશે. અને આ બાબતનો નિર્ણય સંબંધિત કા.ઈ.શ્રી / ના.કા.ઈ.શ્રીએ કરવાનો રહેશે. ગેરીમાં ન થઈ શકે તેવા ટેસ્ટ સરકાર માન્ય લેબોરેટરીમાં કરાવી શકાય.
૭. વિભાગના ક્ષેત્રિય તાંત્રિક સ્ટાફે ના.કા.ઈ. / મ.ઈ. / અ.મ.ઈ. એ તેમજ ઈજારદારના તાંત્રિક સ્ટાફ દ્વારા ગેરીમાં પરીક્ષણ જાતે કરવાનો સંતોષકારક અનુભવ મેળવી આ બાબતનું ગેરીનું પ્રમાણપત્ર પણ મેળવવાનું રહેશે. જે તે જિલ્લા / પ્રાદેશિક સ્તરે ગેરીની લેબોરેટરીમાં કોર્ષ કન્ડક્ટ કરવા માટે જરૂરી ફી જે તે વિભાગના કા.ઈ.શ્રીએ ચુકવવાની રહેશે અને આ કાર્યવાહી સમયબદ્ધ પૂર્ણ થાય તે માટે સંબંધિત અ.ઈ.શ્રીએ આ કામગીરીની વખતોવખત સમીક્ષા કરવાની રહેશે.
૮. આ પરિપત્રથી ઉપર જણાવેલા પરીક્ષણો પૈકી ૮૦% પરીક્ષણો ક્ષેત્રિય લેબોરેટરીમાં કરવાનો સમય તા. ૧/૦૧/૨૦૧૦ થી કરવાનો રહેશે.
૯. ગેરીમાં ટેસ્ટીંગ કરાવતાં સમયે ગેરીનો ટેસ્ટીંગ ચાર્જ ત્વરીત ભરવાનો રહેશે. જેથી પરીક્ષણના પરીણામો સમયસર મેળવી શકાય.

(આર. કે. ચૌહાણ)

ખાસ ફરજ પરના અધિકારી (વિ.યો.)

માર્ગ અને મકાન વિભાગ.

પ્રતિ,

૧. માન. મંત્રીશ્રી (મા.મ.) વિભાગના અંગત સચિવશ્રીની જાણ સારૂ.
૨. મુ.ઈ.શ્રી (મા.મ.) અને અ.સ.શ્રી, માર્ગ અને મકાન વિભાગ, સચિવાલય, ગાંધીનગર.
૩. મુ.ઈ.શ્રી (પંચા.) અને અ.સ.શ્રી, માર્ગ અને મકાન વિભાગ, સચિવાલય, ગાંધીનગર.
૪. મુ.ઈ.શ્રી (ને.હા.) અને અ.સ.શ્રી, માર્ગ અને મકાન વિભાગ, સચિવાલય, ગાંધીનગર.
૫. મુ.ઈ.શ્રી (પા.યો.) અને અ.સ.શ્રી, માર્ગ અને મકાન વિભાગ, સચિવાલય, ગાંધીનગર.
૬. મુ.ઈ.શ્રી (ગુ.નિ.) અને અ.સ.શ્રી, માર્ગ અને મકાન વિભાગ, સચિવાલય, ગાંધીનગર.
૭. નિયામકશ્રી (એસટીસી) સ્ટાફ ટ્રેનીંગ કોલેજ, ગાંધીનગર
૮. મુ.ઈ.શ્રી (પીએનપી) માર્ગ અને મકાન વિભાગ, સચિવાલય, ગાંધીનગર.
૯. નાણાં સલાહકારશ્રી, (મા.મ.વિ.) નાણાં વિભાગ, સચિવાલય, ગાંધીનગર.
૧૦. સર્વે અ.ઈ.શ્રીઓ, મા.મ. વર્તુળ, પેટા / મા.મ. વર્તુળ / ને.હા. વર્તુળ / એક્સપ્રેસ-વે વર્તુળ / પાટનગર યોજના વર્તુળ.
૧૧. સર્વે કા.ઈ.શ્રીઓ ઉપર્યુક્ત વર્તુળો હસ્તકના સર્વે વિભાગો.
૧૨. સર્વે તાંત્રિક અધિકારીશ્રીઓ (ના.કા.ઈ.શ્રીઓ સહિત).
૧૩. સર્વે પ્રોજેક્ટ શાખાઓ (રસ્તાને લગતી) માર્ગ અને મકાન વિભાગ, સચિવાલય, ગાંધીનગર.
૧૪. સિલેક્ટ

ફાઈલ.

**Acceptance of Bank Guarantee as  
Security Deposit and Earnest  
Money Deposit.**

**Government of Gujarat**

**Finance Department**

GR. No.: FD/MSM/e-file/4/2023/0057/D.M.O.

Date: 21/04/2023

Read: FD GR. No.: EMD/4/2022/0002/DMO Dt. 20/05/2022

**Preamble:**

Tendering authorities of the State Government and its Boards/Corporations/PSUs frequently take Bank Guarantee from the bidders towards Security Deposit and Earnest Money Deposit. The State Government had issued the list of eligible banks vide above read resolutions of this department dated 20/05/2022.

After careful consideration, the Government has decided to approve the list of Banks whose Bank Guarantees would be accepted for the purpose mentioned above. It has now been decided to resolve as follows:

**Resolution:**

Government Departments and State Government Boards / Corporations / PSUs would accept Bank Guarantee (towards Security Deposit and Earnest Money Deposit) issued by any of the banks included in the **Annexure I**, attached to this Resolution.

The tendering authority will be required to ascertain the authenticity of the Bank Guarantee and set up necessary internal control procedures.

By order and in the name of the Governor of Gujarat.

  
(S. Chhakechhuak)

Additional Secretary (Budget)  
Finance Department



**To,**

The Secretary to His Excellency Governor of Gujarat, Raj Bhavan, Gandhinagar

Principal Secretary to Hon. Chief Minister

PS to Hon. Finance Minister

PS to all Hon. Ministers, State Ministers and Deputy Ministers

PS to Chief Secretary

PS to Principal Secretary, Finance Department

PS to Secretary (EA), Finance Department

PS to Secretary (Expenditure), Finance Department

PS to Additional Secretary (B), Finance Department

All Administrative Departments, Sachivalaya, Gandhinagar

System Manager, Finance Department for put up on GSWAN website

Select File DMO-Finance Department

**Annexure I.****Finance Department, GR. No.: FD/MSM/e-file/4/2023/0057/D.M.O.**

Date: 21/04/2023

(A) Guarantees issued by the following banks will be accepted as SD/EMD on permanent basis:

❖ **All Nationalized Banks**

(B) Guarantees issued by the following Banks will be accepted as SD/EMD for the period up to March 31, 2024. The validity cut-off date in the GR is with respect to the date of issue of Bank Guarantee irrespective of the date of termination of Bank Guarantee.

Sr No	Name of Banks	Sr No	Name of Banks
1	AXIS Bank	17	Kotak Mahindra Bank
2	AU Small Finance Bank	18	South Indian Bank
3	Bandhan Bank	19	Standard Chartered Bank
4	BNP Paribas	20	Tamilnadu Mercantile Bank
5	City Union Bank	21	Utkarsh Small Finance Bank
6	CSB Bank	22	The Kalupur Commercial Co-op. Bank
7	DBS Bank India Limited	23	Ahmedabad Mercantile Co-op. Bank
8	DCB Bank	24	Nutan Nagarik Sahakari Bank Ltd.
9	Equitas Small Finance Bank	25	Rajkot Nagarik Sahakari Bank Ltd.
10	FEDERAL Bank	26	Saraswat Co-Operative Bank Ltd
11	HDFC Bank	27	SVC Co-Operative Bank LTD.
12	HSBC Bank	28	The Gujarat State Co-operative Bank
13	ICICI Bank	29	The Mehsana Urban Co-Op. Bank Ltd
14	IndusInd Bank	30	The Surat District Co-Operative Bank Ltd
15	Karnataka Bank	31	The Surat People's Co-Op. Bank Ltd
16	Karur Vysya Bank	32	Saurashtra Gramin Bank

**All the eligible banks are instructed to collect the original documents/papers of guarantee from the concerned tendering authority.**


(S. Chhakchhuak)

Additional Secretary (Budget)

Finance Department

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સરકારના વિવિધ વિભાગો/  
ખાતાઓ દ્વારા જી.એસ.ટી. કાયદા  
હેઠળ TDS માટે નોંધણી નંબર  
લેવા બાબત.

ગુજરાત સરકાર

નાણાં વિભાગ

પરિપત્ર ક્રમાંક:- જીએસટી/૧૦૧૭/૧૦૯૭/જીએસટી સેલ

સચિવાલય, ગાંધીનગર.

તા. ૧૫/૦૬/૨૦૧૮

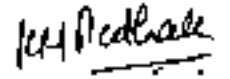
૧. વંચાણે લીધો :- નાણાં વિભાગનો તા.૧૯/૦૭/૨૦૧૭ નો પરિપત્ર ક્રમાંક-  
જીએસટી/૧૦૧૭/૧૦૯૭/ જીએસટી સેલ
૨. વંચાણે લીધો :- નાણાં વિભાગનો તા.૨૫/૧૦/૨૦૧૭ નો પરિપત્ર ક્રમાંક-  
જીએસટી/૧૦૧૭/૧૦૯૭/ જીએસટી સેલ
૩. વંચાણે લીધો :- નાણાં વિભાગનો તા.૦૮/૦૫/૨૦૧૭ નો પરિપત્ર ક્રમાંક-  
જીએસટી/૧૦૧૭/૧૦૯૭/ જીએસટી સેલ
૪. નાણા વિભાગનું તા.૧૪-૯-૨૦૧૮નું જાહેરનામું ક્રમાંક. (GHN-89)/GST-  
2018/S.1(4)TH.

ગુજરાત ગુડ્સ એન્ડ સર્વિસીસ ટેક્સ એક્ટ, ૨૦૧૭ તથા સેન્ટ્રલ ગુડ્સ એન્ડ સર્વિસીસ ટેક્સ એક્ટ, ૨૦૧૭ ની કલમ ૫૧ અનુસાર જ્યારે કોઈ સરકારી વિભાગ, સ્થાનિક સત્તામંડળ અને સરકાર હસ્તકના જાહેર સાહસો રૂ.૨,૫૦,૦૦૦/- થી વધુની કિંમતનું ટેન્ડર બહાર પાડીને વેરાપાત્ર યીજપરતુઓ ખરીદે કે વેરાપાત્ર સેવાઓ મેળવે તો કુલ ૨% (બે ટકા) ટેક્સ ડીડક્શન એટ સોર્સ કરવાનું થાય, જેમાં ૧% (એક ટકો) ગુજરાત ગુડ્સ એન્ડ સર્વિસીસ ટેક્સ અને ૧% (એક ટકો) સેન્ટ્રલ ગુડ્સ એન્ડ સર્વિસીસ ટેક્સ હેઠળ કાપવાનો થાય અને **SGST: 00060010101** તથા **CGST: 00050010101** મદદે, જે મહિનામાં ડીડક્શન થયું હોય તેના અંત પછીનાં ૧૦ દિવસની અંદર, સરકારી તિજોરીમાં જમા કરાવવાના રહેશે. વધુમાં, આ કપાત સામે કોન્ટ્રાક્ટરને ટી.ડી.એસ.ની કપાત કરનારે નમૂના **GSTR-7A** માં પ્રમાણપત્ર આપવાનું રહેશે તથા ઠરાવેલ સમય મર્યાદા ગુજબ નમૂના **GSTR-7** માં પત્રક ભરવાનું રહેશે.

આ કલમનો અમલ જી.એસ.ટી. કાઉન્સિલની ભલામણ મુજબ તા.૩૦-૯-૨૦૧૮ સુધી મુલતવી રાખેલ હતો, જેનો અમલ હવે સંદર્ભમાં વંચાણે લીધેલા તા.૧૪-૯-૨૦૧૮ના જાહેરનામા અનુસાર તા.૧-૧૦-૨૦૧૮ થી કરવાનો થાય છે, જેના માટે ગુજરાત જીએસટી અધિનિયમ, ૨૦૧૭ની કલમ ૨૫ તથા ગુજરાત જીએસટી રૂલ્સ, ૨૦૧૭ના નિયમ ૧૨ (૧) અન્વયે ટેન્ડર દ્વારા ખરીદી કરનાર કે સેવા મેળવનાર સરકારી સક્ષમ અધિકારીએ નમૂના **GST REG-07** માં અરજી કરીને નોંધણી દાખલો મેળવવાનો રહે છે.

ઉક્ત જોગવાઈઓનો અમલ તમામ સરકારી વિભાગ, સ્થાનિક સત્તામંડળ અને સરકાર હસ્તકળા જાહેર સાહસોએ તા.૧-૧૦-૨૦૧૮ થી કરવાનો હોઈ, તાત્કાલિક અસરથી જીએસટી નેટવર્ક ઉપર ઓન-લાઈન વિગતો ભરીને તથા જરૂરી પૂરાવા અપલોડ કરીને નોંધણી દાખલો મેળવી લેવો જરૂરી બને છે. આથી, સર્વે વિભાગો, ખાતાના વડા, તાબાની તમામ કચેરીઓ અને સ્થાનિક સ્વરાજ્યની તમામ સંસ્થાઓ, જેવી કે મહાનગરપાલિકા, નગરપાલિકા, શહેરી વિહારા સત્તામંડળ, જિલ્લા પંચાયત, તાલુકા પંચાયત, ગ્રામ પંચાયત તેમજ સરકારી બોર્ડ અને કોર્પોરેશન, સરકારી કંપનીઓ, એસપીવી, વગેરે ને તેમના કાર્યક્ષેત્ર અને કામગીરી અનુસાર લાગુ પડવાપાત્ર હોય તો સત્વરે નોંધણી દાખલો મેળવી લેવા જણાવવામાં આવે છે. સદર કામગીરી માટે કોઈ કાયદાકીય માર્ગદર્શન કે ટેકનિકલ માર્ગદર્શન માટે જરૂર જણાય તો નજીકની રાજ્ય કર કચેરી અથવા જીએસટી નેટવર્કની હેલ્પલાઈન અથવા રાજ્ય કર કમિશનર દ્વારા અમદાવાદ અને અન્ય કચેરીઓમાં શરૂ કરવામાં આવેલ હેલ્પ ડેસ્કનો સંપર્ક કરવા જણાવવામાં આવે છે.

ગુજરાતના રાજ્યપાલશ્રીના હુકમથી અને તેમનાં નામે



(કે.એચ.પાઠક)

સંયુક્ત સચિવ (ટેક્સ)

નાણાં વિભાગ.

નકલ રવાના જાણ તથા જરૂરી અમલ સારૂ:-

- સચિવાલયનાં સર્વે વિભાગના અધિક મુખ્ય સચિવશ્રી/અગ્ર સચિવશ્રી/ સચિવશ્રી
- તમામ કલેક્ટરશ્રી તથા ડીડીઓશ્રી
- તમામ બોર્ડ/ કોર્પોરેશન
- તમામ સ્થાનિક સ્વરાજ્યની સંસ્થાઓ

**NOTIFICATION  
FINANCE DEPARTMENT.**

Sachivalaya, Gandhinagar.  
Dated the 14<sup>th</sup> September, 2018.

**Notification No. 50/2018-State Tax**

Gujarat  
Goods  
and  
Services  
Tax Act,  
2017

No.(GHN-89)/GST-2018/S.1(4)TH:- In exercise of the powers conferred by sub-section (3) of section 1 of the Gujarat Goods and Services Tax Act, 2017 (Guj.25 of 2017) and in supersession of the Government Notification, Finance Department No.(GHN-82)/GST-2017/S.1(3)/TH dated the 15<sup>th</sup> September, 2017, Notification No. 33/2017-State Tax, except as respects things done or omitted to be done before such supersession, the Government of Gujarat hereby appoints the 1<sup>st</sup> day of October, 2018, as the date on which the provisions of section 51 of the said Act shall come into force with respect to persons specified under clauses (a), (b) and (c) of sub-section (1) of section 51 of the said Act and the persons specified below under clause (d) of sub-section (1) of section 51 of the said Act, namely:-

- (a) an authority or a board or any other body, -
- (i) set up by an Act of Parliament or a State Legislature;  
or
- (ii) established by any Government,
- with fifty-one percent. or more participation by way of equity or control, to carry out any function;
- (b) Society established by the Central Government or the State Government or a Local Authority under the Societies Registration Act, 1860 (21 of 1860);
- (c) public sector undertakings.

This notification shall be deemed to have been issued on the 13<sup>th</sup> day of September, 2018.

By order and in the name of the Governor of Gujarat,

  
K H Pathak

Joint Secretary to Government.

રાજ્યમાં બાંધકામ માટે વપરાતા ગૌણ  
ખનિજોની રોયલ્ટીની વસુલાત અંતિમ  
વપરાશકાર પાસેથી કરવા બાબત

ગુજરાત પાણી પુરવઠા અને ગટર વ્યવસ્થા બોર્ડ

"જલસેવા ભવન" સે.૧૦-એ ગાંધીનગર.

પરિપત્ર નં. એબી/સીમે-૧-૨/૨૦૧૦-૧૧/ફા.નં.૨૫/૩૦૯૫/સને ૨૦૧૧ ૩૬૫૮

તા. ૧૫/૬/૨૦૧૧

વંચાણે લીધા :- (૧) ગુજરાત પા.પુ. અને ગ.વ્ય.બોર્ડ ગાંધીનગરનો પરિપત્ર નં.

P.H.W.Dn. MOUASA	
Inward No.	૨૫૭૭
Date :	૨૦/૬/૧૧
E.E. :	(૨)
D.A. :	
H.C. :	
Marking	

એબી/ સીમે-૧-૨/૨૦૧૦-૧૧/ફા.નં.૨૫/૩૦૯૫/સને ૨૦૧૧

તા. ૧૨-૫-૨૦૧૧

ગુજરાત સરકારના નર્મદા, જળસંપત્તિ, પા.પુ. અને કલ્પસર  
વિભાગ, સચિવાલય, ગાંધીનગરના ઠરાવ ક્રમાંક જીઇએન-  
૨૦૧૦-૫૯૫-(૬)એમઆઇસેલ (ક-૧) તા. ૨૯-૪-૨૦૧૧

ગુજરાત પાણી પુરવઠા અને ગટર વ્યવસ્થા બોર્ડ ગાંધીનગરના સંદર્ભ-૧  
હેઠળના પરિપત્રથી બાંધકામ માટે વપરાતા ગૌણ ખનિજોની રોયલ્ટી બાબતે  
કાર્યવાહી કરવા સુચનાઓ પરિપત્રિત કરવામાં આવેલ છે.

ત્યારબાદ ગુજરાત સરકારના નર્મદા, જળસંપત્તિ, પા.પુ. અને કલ્પસર  
વિભાગ, સચિવાલય, ગાંધીનગરના સંદર્ભ-૨ હેઠળના ઠરાવથી (નકલ સામેલ છે)  
બાંધકામમાં વપરાતા ગૌણ ખનિજોની રોયલ્ટીની વસુલાત અંતિમ વપરાશકાર  
પાસેથી કરવા બાબતે કાર્યપદ્ધતિ ઠરાવવામાં આવેલ છે જે મુજબ બોર્ડ હસ્તકની  
ક્ષેત્રિય કચેરીઓમાં અમલ કરવા નકકી થયેલ હોઇ નીચે મુજબની કાર્યપદ્ધતિનો  
અમલ કરવાનો રહે છે.

(૧) હાલમાં બાંધકામમાં વપરાતા નીચેના ખનિજો માટે આ કામે પદ્ધતિનો  
અમલ કરવાનો રહેશે.

- સાદી રેતી/માટી/કંકર/ગ્રેવલ
- બ્લેક ટ્રેપ (કપચી, ગ્રીટ, મેટલ, રબલ, વિગેરે)
- બિલ્ડીંગ સ્ટોન/લાઇમ સ્ટોન/સેન્ડ સ્ટોન/ક્વાર્ટઝાઇટ

AS  
જન મુલેશ્વર  
d



- સોફ્ટ મુરમ/હાર્ડ મુરમ
- ઇંટ માટી/ઇંટ

(૨) રોયલ્ટીની વસુલાત માટેની કાર્યપધ્ધતિ

સરકારી બાંધકામમાં વપરાતા ગૌણ ખનિજોની રોયલ્ટી વખતો વખત ચુકવાતા રનીંગ બીલમાંથી કપાત કરવાની રહેશે અને આખરી બીલમાંથી બાકી રહેતી તમામ રોયલ્ટીની રકમની વસુલાત જે તે ઠેકેદારની સીક્યોરીટી ડીપોઝીટ છુટી કરતા પહેલાં જે તે સંલગ્ન વિભાગે વસુલવાની રહેશે સરકારશ્રીને બાંધકામમાં વપરાયેલ ખનિજોની પુરેપુરી રોયલ્ટી મળી રહે તે માટે પરિશિષ્ટ-૧ માં જણાવેલ દર અનુસાર મુજબ કપાત કરવાની રહેશે.

ઉપરોક્ત વસુલાત કરેલ રોયલ્ટીની રકમ નીચેના સદરે સમય મર્યાદામાં સબધિત વિભાગે જમા કરાવવાની રહેશે.

૦૮૫૩-નોન ફેરસ માઇનીંગ એન્ડ મેટલર્જીકલ ઇન્ડસ્ટ્રીઝ


૧૦૨- મીનરલ કન્સેશન ફી, રેન્ટ એન્ડ રોયલ્ટી

૦૧ - રીસીપ્ટ અન્ડર ગુજરાત માઇનોર મીનરલ રૂલ્સ-૧૯૬૬

- (૩) બાંધકામમાં વપરાતા ગૌણ ખનિજોના પ્રવર્તમાન રોયલ્ટી દર પરિશિષ્ટ-૧ માં દર્શાવેલ છે.
- (૪) રાજ્ય સરકાર દ્વારા ગૌણ ખનિજોના રોયલ્ટી દરોની જ્યારે જ્યારે ફેરવિચારણા થશે ત્યારે તે મજબૂના દરે રોયલ્ટી વસુલ/કપાત કરવાની રહેશે.
- (૫) સરકારી, અર્ધસરકારી કામોમાં વપરાયેલ ગૌણ ખનિજોની કપાત કરેલ રોયલ્ટીની વિગત પરિશિષ્ટ-૨ માં દર માસે ૧૦ તારીખ સુધીમાં જે તે સબધિત કચેરીએ ભૂસ્તર વિજ્ઞાન અને ખનિજ ખાતાની સંલગ્ન જીલ્લા કચેરીને મોકલી આપવાની રહેશે.
- (૬) આ કાર્યપધ્ધતિની તા. ૧-૪-૨૦૧૧ પછીના ડ્રાફ્ટ ટેન્ડર પેપર્સમાં જોગવાઈ કરવાની રહેશે અને તે પહેલાંના કામોને લાગુ પડશે નહીં અને આવા કામોમાં હાલની એડવાન્સ પ્રથા મુજબ નિયમોનુસાર ખનિજો મેળવી ઉપયોગ કરવાનો રહેશે.

ઉકત પરિપત્રનો અમલ બોર્ડ હસ્તકની સર્વે ક્ષેત્રિય કચેરીઓ દ્વારા અચૂક કરવાનો રહેશે.

બિડાણ : ઉપર મુજબ

  
(ડૉ. જયપાલસિંહ)

સભ્ય સચિવ

પ્રતિ,

- મુખ્ય ઇજનેરશ્રી ઝોન-૧/૨/૩/૪, વડોદરા/અમદાવાદ/રાજકોટ/ભુજ
- મુખ્ય ઇજનેરશ્રી મટીરીયલ સેલ/યાંત્રિક
- પ્રોજેક્ટ ડાયરેક્ટરશ્રી એડીબી/અર્બન સેલ ગાંધીનગર.
- નિયામકશ્રી ગુજરાત જલસેવા તાલીમ સંસ્થા ગાંધીનગર
- અધિક્ષક ઇજનેરશ્રી (સર્વે)
- કાર્યપાલકશ્રી (સર્વે)
- સીનીયર મેનેજરશ્રી (નાણાં-હિસાબ) સર્વે
- નાયબ મેનેજરશ્રી (નાણાં-હિસાબ) સર્વે
- સીસ્ટમ મેનેજરશ્રી, કોમ્પ્યુટર સેલ, વડી કચેરી, ગાંધીનગર.

નકલ રવાના

- માન. અધ્યક્ષશ્રીના કાર્યકારી, સચિવશ્રી, બોર્ડ કચેરી, ગાંધીનગર.
- સભ્ય સચિવશ્રી, અંગત મદદનીશશ્રી, બોર્ડ કચેરી, ગાંધીનગર.
- નાણાં નિયંત્રકશ્રી, બોર્ડ કચેરી, ગાંધીનગર.
- મુખ્ય વહીવટી અધિકારીશ્રી, બોર્ડ કચેરી, ગાંધીનગર.

જનક નં. ૨૧૦૧/૧૫૩૦ ૧૨૦૧૨ તા. ૨૦/૦૩/૧૩

આ સંબંધે આજના તારીખે નાયબ સચિવશ્રીને જાણ કરવામાં આવે છે.  
જનક નં. ૨૧૦૧/૧૫૩૦-૧૫૩૦ (વિભાગ-વોડાસા/નાણાં)  
તારીખ ૨૦/૦૩/૧૩ નાં આજના તારીખે આજના તારીખે ૨૦/૦૩/૧૩.



કાર્યપાલક ઇજનેર  
જા.આ.બાંધકામ વિભાગ  
ગુ.પા.પુ. અને ગ.વ્ય. બોર્ડ  
બોડાસા.





1. 8/11  
1. 8/11

ખનિજોની રોયલ્ટીની વસુલાત અંતિમ  
વપરાશકાર પાસેથી કરવા બાબત"

ગુજરાત સરકાર,  
નર્મદા, જળસંપત્તિ, પાણી પુરવઠા અને કલ્પસર વિભાગ,  
ઠરાવ ક્રમાંક:-જીઈએન-૨૦૧૦-૫૯૫-(૬)-એમઆઈસેલ (ક-૧),  
સચિવાલય, ગાંધીનગર.

તા. /૪/૨૦૧૧.

29 APR 2011

વંચાણે લીધા:-

- SM  
U.S.S.  
P.R.W. S.S.  
M.S.S.
- (૧) ઉદ્યોગ અને ખાણ વિભાગ, સચિવાલય, ગાંધીનગર પરિપત્ર ન.એનસીઆર-૧૦૯૦-૩૦૮૩-છ  
તા.૧૨-૧-૧૯૯૪.
- (૨) ઉદ્યોગ અને ખાણ વિભાગ, સચિવાલય, ગાંધીનગર પરિપત્ર ન.એનસીઆર-૧૦૯૦-૩૦૮૩-છ  
તા.૯-૫-૧૯૯૪.

ઠરાવ:-

SM  
2/6

રાજ્ય સરકારે સપ્ટેમ્બર-૨૦૦૩ માં જાહેર કરેલ ખનિજ નીતિ અનુસાર ખનિજ જથ્થાની  
રોયલ્ટી પુરપુરી મળી રહે તે માટે રસ્તા અને મકાન, સિયાઈ, પંચાયત, નિગમો વિગેરેના  
ઠેકેદારોના કામોના બિલોમાંથી સીધી કપાત કરવાની પ્રથા અમલમાં મૂકવાની જાહેરાત કરાયેલ  
છે. રાજ્ય સરકારશ્રીના પરિપત્ર તા.૯-૫-૧૯૯૪ મુજબ ઠેકેદારોએ વપરાશ કરેલ ખનિજ જથ્થા  
મુજબના રોયલ્ટીના આધાર/પુરાવાની ચકાસણી કરી સંલગ્ન ભૂસ્તર વિજ્ઞાન અને ખનિજ  
ખાતાની જિલ્લા કચેરીઓ દ્વારા "નો ડયુ" પ્રમાણપત્ર આપવાની પ્રથા અમલમાં છે. ઠેકેદારો દ્વારા  
નો ડયુ સર્ટીફિકેટ રજુ થયા બાદજ સિક્યોરીટી ડીપોઝીટ છૂટી કરવામાં આવે છે. ઉપરોક્ત  
પદ્ધતિમાં વિલંબ થતો નિવારવા હાલમાં પરિપત્ર તા.૧૮-૮-૨૦૦૯થી ઝડપી ચકાસણી કરી  
તાત્કાલિક આજું પ્રમાણપત્ર આપવાની જોગવાઈઓ કરેલ છે.

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2/6

હાલની પદ્ધતિ પારદર્શક અને સરળ બનાવવા અને બાંધકામમાં વપરાતા ગૌણ  
ખનિજની રોયલ્ટી પૂરેપૂરી મળી રહે તે માટે તા.૧-૭-૨૦૧૦ ના રોજ માન. મુખ્ય મંત્રીશ્રીના  
અધ્યક્ષસ્થાને મળેલ બેઠકમાં થયેલ સૂચન મુજબ રાજ્યમાં મળી આવતાં ગૌણ ખનિજોની રોયલ્ટી  
લીઝ ધારક પાસેથી ન લેતાં અંતિમ વપરાશકાર (End user) પાસેથી લેવામાં આવે તો

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બાંધકામના ઠેકેદારો વિગેરેને કામમાં સરળતા રહેશે. સરકારી બાંધકામોમાં રોયલ્ટી, વખતો વખત ચુકવાતા બિલોમાંથી કપાત કરી (At source) વસુલાત કરવાનું નક્કી કરવામાં આવેલ હતું. જે ધ્યાને લઈ સરકાર દ્વારા પુખ્ત વિચારણાને અંતે નીચે મુજબની કાર્યપદ્ધતિનો અમલ કરવા ઠરાવવામાં આવે છે.

૧. હાલમાં બાંધકામમાં વપરાતા નીચેના ખનિજો માટે આ કાર્યપદ્ધતિનો અમલ કરવાનો રહેશે.

- સાદી રેતી/ માટી/ કંકર/ ગ્રેવલ
- બ્લેકટ્રેપ (કપચી, ગ્રીટ, મેટલ, રબલ, વિગેરે)
- બિલ્ડીંગ સ્ટોન/ લાઈમસ્ટોન/ સેન્ડસ્ટોન/ક્વાર્ટઝાઈટ
- સોફ્ટ મુરમ/ હાર્ડ મુરમ
- ઈંટ માટી/ ઈંટ

૨. રોયલ્ટી વસુલાત માટેની કાર્યપદ્ધતિ:-

સરકારી બાંધકામમાં વપરાતા ગૌણ ખનિજોની રોયલ્ટી વખતો વખત ચુકવાતા રનીંગ બીલમાંથી કપાત કરવાની રહેશે અને આખરી બીલમાંથી બાકી રહેતી તમામ રોયલ્ટીની રકમની વસુલાત જે તે ઠેકેદારની સીક્યોરીટી ડિપોઝીટ છુટી કરતાં પહેલાં જે તે સંલગ્ન વિભાગે વસુલાતની રહેશે. સરકારીને બાંધકામમાં વપરાયેલ ખનિજોની પુરેપુરી રોયલ્ટી મળી રહે તે માટે પરિશિષ્ટ-૧માં જણાવેલ દર અનુસાર મુજબ કપાત કરવાની રહેશે. ઉપરોક્ત વસુલાત કરેલ રોયલ્ટીની રકમ નીચેના સદરે સમય મર્યાદામાં સંબંધિત વિભાગે જમા કરાવવાની રહેશે.

૦૮૫૩ - નોન ફેરસ માઈનીંગ એન્ડ મેટલર્જીકલ ઈન્ડસ્ટ્રીઝ

૧૦૨ - મીનરલ કન્સેશન ફી, રેન્ટ એન્ડ રોયલ્ટી

૦૧ - રીસીચ્ટ અન્ડર ગુજરાત માઈનોર મીનરલ રૂલ્સ-૧૯૬૬

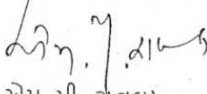
૩. બાંધકામમાં વપરાતા ગૌણ ખનિજોના પ્રવર્તમાન રોયલ્ટી દર પરિશિષ્ટ-૧ માં દર્શાવેલ છે.

૪. રાજ્ય સરકાર દ્વારા ગૌણ ખનિજોના રોયલ્ટી દરોની જ્યારે જ્યારે ફેરવિચારણા થશે ત્યારે તે મુજબના દરે રોયલ્ટી વસુલ/ કપાત કરવાની રહેશે.

૫. સરકારી, અર્ધસરકારી કામોમાં વપરાયેલ ગૌણ ખનિજોની કપાત કરેલ રોયલ્ટીની વિગત પરિશિષ્ટ-૨ માં દર માસે ૧૦ તારીખ સુધીમાં જે તે સંબંધિત કચેરીએ ભુસ્તર વિજ્ઞાન અને ખનિજ ખાતાની સંલગ્ન જીલ્લા કચેરીને મોકલી આપવાની રહેશે.

ના જાહેરમુદ્દતમાં તા.૦૮/૦૮/૨૦૨૨ પછીના ડ્રાફ્ટ ટન્ડર પપ્પસમાં જાગવાઈ કરવાની રહેશે અને તે પહેલાના કામોને લાગુ પડશે નહીં અને આવા કામોમાં હાલની એડવાન્સ રોયલ્ટી પ્રથા મુજબ નિયમોનુસાર ખનિજો મેળવી ઉપયોગ કરવાનો રહેશે.

ગુજરાત રાજ્ય સરકારના રાજ્યપાલશ્રીના હુકમથી અને તેમના નામે,

  
( એમ. પી. પટેલ )

ખાસ ફરજ પરના અધિકારી (સિં.ચો.)

નર્મદા, જળસંપત્તિ, પાણી પુરવઠા અને કલ્પસર વિભાગ,  
ગાંધીનગર.

પ્રતિ,

- માન. મંત્રીશ્રી (જસં.)ના અંગત સચિવશ્રી, ન.જ.સં.પા. પુ. અને ક. વિ. સચિવાલય, ગાંધીનગર.
- માન. રાજ્યકક્ષા મંત્રીશ્રી(જસં.)ના અંગત સચિવશ્રી, ન.જ.સં.પા.પુ.અને ક.વિ. સચિવાલય,ગાંધીનગર.
- માન. સંસદીય સચિવશ્રી(જસં.) ના અંગત સચિવશ્રી, ન.જ.સં.પા.પુ.અને ક.વિ. સચિવાલય,ગાંધીનગર
- સચિવશ્રી (જસં.) ના અંગત સચિવશ્રી, ન.જ.સં.પા.પુ.અને ક.વિ. સચિવાલય,ગાંધીનગર.
- ખાસ સચિવશ્રી (જસં.) ના અંગત સચિવશ્રી, ન.જ.સં.પા.પુ.અને ક.વિ. સચિવાલય,ગાંધીનગર
- સર્વે મુખ્ય ઈજનેરશ્રી અને અધિક સચિવશ્રી, ન.જ.સં.પા.પુ.અને ક.વિ. સચિવાલય,ગાંધીનગર
- વહીવટી સંચાલકશ્રી, જળસંપત્તિ વિકાસ નિગમ લી. ગાંધીનગર.
- મુખ્ય ઈજનેર અને નિયામકશ્રી, જળ અને જમીન વ્યવસ્થાપન સંસ્થા, આણંદ.
- મુખ્ય ઈજનેર અને નિયામકશ્રી, ગુજરાત ઈજનેરી સંશોધન સંસ્થા, વડોદરા.
- સર્વે તાંત્રિક અધિકારી, ન.જ.સં.પા.પુ.અને ક.વિ. સચિવાલય,ગાંધીનગર
- સર્વે અધિક્ષક ઈજનેરશ્રીઓ, ન.જ.સં.પા.પુ.અને ક.વિભાગ.
- સર્વે શાખાઓ ન.જ.સં.પા.પુ.અને ક.વિભાગ, સચિવાલય, ગાંધીનગર.
- સિલેક્ટ ડ્રાઇલ

પરિશિષ્ટ - ૧

બાંધકામમાં વપરાતા ગૌ ખનીજોના રોયલ્ટીના દર:-(તા.૧૫-૧-૨૦૧૦ ની અસરથી)

અં.નં.	ખનિજનું નામ	રોયલ્ટી દર પ્રતિ મે. ટન
૧	ગૌણ ખનિજ લાઈમસ્ટોન (અ) ડ્રેસ બ્લોક (બ) રબલ (ક) મેટલ	૩૦
૨	બ્લોક ટ્રેપ (અ) રબલ (બ) કપચી (ક) મેટલ (ડ) ગ્રીટ	૨૫
૩	સેન્ડ સ્ટોન (અ) ડ્રેસ બ્લોક (બ) રબલ (ક) મેટલ	૩૦
૪	કવાર્ટાઈઝ	૨૦
૫	સામાન્ય રેતી	૧૨
૬	કંકર	૧૨
૭	સામાન્ય માટી	૧૨
૮	સોફ્ટ મુરમ	૧૨
૯	હાર્ડ મુરમ	૨૦
૧૦	ગ્રેવલ	૧૫
૧૧	બિલ્ડીંગ સ્ટોન (અ) રાજુલા બિલ્ડીંગ સ્ટોન (બ) ધાંગધા સેન્ડ સ્ટોન(બિલ્ડીંગ સ્ટોન તરીકે ઉપયોગ) (ક) રાયોલાઈટ (બાંધકામ માટે ઉપયોગી)	૩૦
૧૨	અન્ય બાંધકામના ખનિજો	૩૦

સરકારી/ અર્ધસરકારી બાંધકામમાં વપરાયેલ ગૌણણ ખનિજોની દર માસે રોયલ્ટીની વિગત દર્શાવતું પત્રક:-

૧. કચેરીનું નામ:-.....
૨. માસ/ વર્ષ.....

અં.નં.	કોન્ટ્રાક્ટરનું નામ અને સરનામું	કામનું નામ	વર્ક ઓર્ડર નંબર તારીખ અને કામની વિગત	વપરાયેલ ખનિજ જથ્થાની રોયલ્ટી/ ખનિજ કિંમતની વિગત						નોંધ
				ખનિજનું નામ	જથ્થો મે. ટન	રોયલ્ટી નો દર	રોયલ્ટી/ ખનિજ કિંમતની રકમ રૂ. માં	ચલણ નંબર	તારીખ	
૧	૨	૩	૪	૫	૬	૭	૮	૯	૧૦	૧૧

કુલ રૂ.....

ઓડિટ અધિકારીની સહી અને હોદ્દો

નંબર

તારીખ

સંબંધિત અધિકારીની સહી/ હોદ્દો

પ્રતિ,

મદદનીશ ભુસ્તરશાસ્ત્રીશ્રી/ ભુસ્તરશાસ્ત્રીશ્રી,

ભુસ્તર વિજ્ઞાન અને ખનિજ ખાતુ,

જીલ્લા કચેરી.....ની જાણ તથા સંબંધિત ચલણની નકલ સામેલ છે.

બાંધકામ માટે વપરાતા ગૌણ ખનીજોની  
રોયલ્ટી તથા બાંધકામ શ્રમયોગીઓના  
કલ્યાણ અંગે સેસની રકમ એકઠી કરવા  
બાબત.

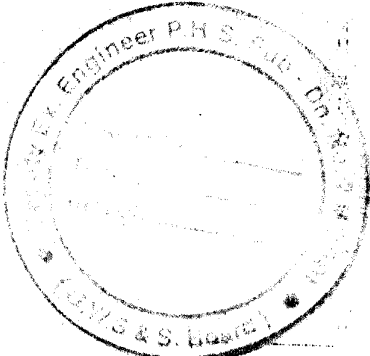
## ગુજરાત પાણી પુરવઠા અને ગટર વ્યવસ્થા બોર્ડ,

" જલસેવા ભવન " સેક્ટર-૧૦-એ ગાંધીનગર

પરિપત્ર નં. એબી/સીમે-૧-૨/૨૦૧૦-૧૧/ફા.નં.૨૫/૩૦૬૫ સને ૨૦૧૧

તા.૧૨/૫/૨૦૧૧.

વંચાણે લીધા :-



PHS Sub. Div. Morbi
AB-૨
૧૬/૫/૧૧

- ૧) ગુજરાત પાણી પુરવઠા અને ગટર વ્યવસ્થા બોર્ડ, કોન્ટ્રાક્ટર એસોશીએશન, ગુજરાત રાજ્ય, અમદાવાદનો તા. ૨૧-૮-૦૯ નો પત્ર
- ૨) ગુજરાત પાણી પુરવઠા અને ગટર વ્યવસ્થા બોર્ડ કોન્ટ્રાક્ટર એસોશીએશન, ગુજરાત રાજ્ય સાથેની તા. ૨૨-૬-૨૦૧૦ ની મીટીંગની કાર્યવાહી નોંધ જે સીનીયર મેનેજર (ના/હિ), ગુ.પા.પુ. અને ગ.વ્ય.બોર્ડ, ગાંધીનગરના પત્ર નં. એબી/સીમે-૧-૨//૨૦૧૦-૧૧/ફા.નં.૨૫/૫૬૪૩, તા. ૧૧-૮-૨૦૧૦ હેઠળ બહાર પડાયેલ છે.
- ૩) નાણાં નિયંત્રકશ્રી, ગુ.પા.પુ. અને ગ.વ્ય.બોર્ડ, ગાંધીનગરના પત્ર નં. એબી/સીમે-૧-૨/૨૦૧૦-૧૧/ફા.નં.૨૫/૬૧૯૪, તા. ૩-૯-૨૦૧૦ હેઠળ નિયુક્ત થયેલ કમિટિનો તા. ૧-૧૧-૨૦૧૦ નો અહેવાલ જે મુખ્ય ઇજનેરશ્રી ઝોન-૨ અમદાવાદના પત્ર નં. એબી-૨/૨૦૧૦-૧૧/કોન્ટ્રાક્ટર એસો./ફા.નં.૫૦/૩૨/૬ તા. ૧-૧૧-૨૦૧૧

૬૨૬  
૨૨/૫/૧૧  
આમુખ  
PB  
૨૧/૫/૧૧  
૨૨/૫/૧૧  
૨૧/૫/૧૧

ગુજરાત પાણી પુરવઠા અને ગટર વ્યવસ્થા બોર્ડ, અમદાવાદ દ્વારા વિવિધ મુદ્દે સંદર્ભ-(૧) હેઠળના પત્રથી રજુઆત કરવામાં આવેલ. જે સંદર્ભે સભ્ય સચિવશ્રી, ગુ.પા.પુ. અને ગ.વ્ય.બોર્ડની અધ્યક્ષતામાં કોન્ટ્રાક્ટર એસોશીએશનના પ્રતિનિધિઓ સાથે તા. ૨૨-૬-૨૦૧૦ ના રોજ મીટીંગ યોજવામાં આવેલ. જે દરમ્યાન એસોશીએશનની રજુઆતના મુદ્દે વિગતેથી ચર્ચા કરવામાં આવેલ. તે પૈકી બાંધકામ માટે વપરાતા ગૌણ ખનીજોની રોયલ્ટી તથા બાંધકામ શ્રમયોગીઓના કલ્યાણ અંગે સેસની રકમ એકઠી કરવા બાબતે પ્રવર્તમાન



નિયમો અંગેનો અભ્યાસક રીતે અન્વયેની ભલામણ આપવા મુખ્ય ઇજનેર, ઝોન-૨, અમદાવાદની અધ્યક્ષતામાં એક કમીટીનું ગઠન કરવામાં આવેલ. સદર કમીટીના અધ્યક્ષ દ્વારા સંદર્ભ-(૩) હેઠળના ઉલ્લેખિત તા. ૧-૧૧-૨૦૧૧ ના પત્રથી તેમનો અહેવાલ મળેલ છે. સદર અહેવાલ તથા અહેવાલમાં ઉલ્લેખિત બાબતોના પ્રવર્તમાન નિયમો ઉપર કાળજીપૂર્વક વિચારણા કરી નીચે મુજબ કાર્યવાહી કરવા ઠરાવવામાં આવે છે.

પરિપત્ર :-

(૧) બાંધકામ માટે વપરાતા ગૌણ ખનીજોની રોયલ્ટી ભરવા બાબતે માર્ગ અને મકાન વિભાગના પરિપત્ર નં. ટીએનસી/૨૨૮૬/યુઓ-૩૯/(૧૯)/સ તા. ૨૩-૧૦-૧૦૮૯ ની જોગવાઈઓ મુજબ નીચે પ્રમાણેની કાર્યવાહી કરવી.

ક) રૂપિયા ૨.૦૦ લાખ સુધીની અંદાજીત રકમના કામો હોય તેવા કામો માટે કાર્યપાલક ઇજનેરશ્રી કામનો વર્કઓર્ડર આપે કે તુર્ત જ તે કામના શીડ્યુલ-બી ની નકલ જે તે વિસ્તારનાં ભુસ્તર અને ખનીજ શાખાના સંબંધિત અધિકારીને મોકલી આપવાની રહેશે.

ખ) રૂપિયા ૨.૦૦ લાખ થી ઉપરના કામના કોન્ટ્રાક્ટરોએ તેઓએ ખરીદેલ ખનીજનો જથ્થો અને તે ક્યાંથી ખરીદેલ છે અને તે વેચનારની વિગતો દર્શાવતા બીલોની નકલ તથા પત્રકનાં રૂપમાં માહિતી દર ત્રણ માસે જે તે વિસ્તારનાં ભુસ્તર અને ખનીજ શાખાનાં સંબંધિત અધિકારીને મોકલી આપવાની રહેશે. આ બીલોમાં માલ વેચનારનું નામ, સ્થળ, તારીખ અને માલ લેનારનું નામ, માલનું નામ અને જથ્થો વિગતે દર્શાવેલ હોવા જોઈએ.

ગ) જરૂર પડે જરૂરી કિસ્સામાં જે તે વિસ્તારનાં ભુસ્તર અને ખનીજ શાખાના સંબંધિત અધિકારી તરફથી વધુ માહિતી/વિગત માલ કે બીલના સંબંધમાં માંગવામાં આવે તો જે તે કાર્યપાલક ઇજનેરશ્રી ખનીજ ખાતાના અધિકારીને તે વિગતો કોન્ટ્રાક્ટર પાસેથી મેળવવામાં મદદ કરશે.

આ સંજોગોમાં માર્ગ અને મકાન વિભાગના ઉપર ઉલ્લેખિત તા. ૨૩-૧૦-૧૦૮૯ ના પરિપત્રની તારીખથી સીક્યોરીટી ડીપોઝીટ પરત કરવા માટે રોયલ્ટી ભરાયા અંગેના પ્રમાણપત્ર અંગેનો આગ્રહ રાખવાનો રહેશે નહીં. પરંતુ આ પરિપત્રની તારીખથી આ પ્રથા અમલી બનાવવામાં આવેલ છે તે પહેલાં કોન્ટ્રાક્ટરે જે માલ વાપર્યો હોય તેના સંબંધમાં નો-ડયુ સર્ટીફિકેટ તે વખતની પ્રથા મુજબ મેળવવાનું રહેશે.

(૨) બાંધકામ શ્રમયોગીઓના કલ્યા અંગેની સેસની રકમ એકઠી કરવા બાબતે ગુજરાત સરકાર શ્રમ અને રોજગાર વિભાગ, ગાંધીનગરના ઠરાવ નં. સીડબલ્યુએ/૨૦૦૪/

૮૪૧/ એમ-૩/તા.૩૦-૧-૨૦૦૬(નકલ સામેલ છે) મુજબ નવા કામોના અંદાજોમાં ૧ ટકા મુજબ સેસની જોગવાઈ રાખવા જણાવવામાં આવે છે. વધુમાં આ સેસની વસુલાત એજન્સીના બીલમાંથી કરવાની જોગવાઈ બાંધકામના ટેન્ડરોમાં કરવાની રહેશે. ક્ષેત્રિય અધિકારીઓ દ્વારા કરારની શરત મુજબ લેબર સેસની રકમ બીલમાંથી કપાત કરી સરકારશ્રીમાં જમા કરાવવાની રહેશે.

પરંતુ જે કામોના કરારમાં આ બાબતની જોગવાઈ ન હોય તથા ભવિષ્યમાં લાગુ થનાર કોઈ સેસ બાબતે જવાબદારી એજન્સીની જવાબદારી ન રાખવામાં આવેલ હોય, તેવા કિસ્સામાં સેસ ભરવાની જવાબદારી એજન્સીના પક્ષે રહે નહીં જો કે ટીપીસી જે ટેન્ડરમાં લેબર સેસ સહિત ભાવો મંજૂર કરેલા હોય તેવા કિસ્સામાં લેબર સેસ એજન્સીના બિલમાંથી કાપવાનું રહેશે. તેથી આ સંજોગોમાં લેબર સેસની રકમ ભરવાની થતી હોય તો તે બોર્ડ દ્વારા ભોગવવાની રહે. આમ છતાં આવા કિસ્સામાં એજન્સીઓ પાસેથી સેસ વસુલ કરવામાં આવેલ હોય તો તે એજન્સીને રીએમ્બર્સ કરી આપવાની રહેશે.

વધુમાં કાપેલ લેબરસેસ તાકીદે સરકારી તિજોરીમાં ચલણથી નિયત કરેલા હેડમાં ભરી દેવાની પણ તકેદારી રાખવાની રહેશે.

બિડાણ : ઉપર મુજબ

*Jan*  
(ડૉ. જયપાલસિંહ)  
સભ્ય સચિવ

પ્રતિ,

- મુખ્ય ઇજનેરશ્રી ઝોન-૧/૨/૩/૪
- મુખ્ય ઇજનેરશ્રી મટીરીયલ સેલ(સિવિલ)/યાંત્રિક
- પ્રોજેક્ટ ડાયરેક્ટરશ્રી. એડીબી/અર્બન સેલ, ગાંધીનગર.
- નિયામકશ્રી, જલસેવા તાલીમ સંસ્થા, સે.૧૫, ગાંધીનગર.
- અધિક્ષક ઇજનેરશ્રી (સર્વે)/ કાર્યપાલક ઇજનેરશ્રી (સર્વે)
- સીનીયર મેનેજરશ્રી (ના./હિ) સર્વે/ નાયબ મેનેજરશ્રી (ના./હિ) સર્વે
- સીસ્ટમ મેનેજરશ્રી, કોમ્પ્યુટર સેલ, વડી કચેરી, ગાંધીનગર.

નકલ રવાના

- માન. અધ્યક્ષશ્રીના કાર્યકારી, સચિવશ્રી, ગુ.પા.પુ. અને ગ.બોર્ડ, ગાંધીનગર
- સભ્ય સચિવશ્રીના અંગત મદદનીશશ્રી, ગુ.પા.પુ. અને ગ.વ્ય.બોર્ડ, ગાંધીનગર
- નાણાં નિયંત્રકશ્રી, ગુ.પા.પુ. અને ગ.વ્ય.બોર્ડ, ગાંધીનગર
- મુખ્ય વહીવટી અધિકારીશ્રી, ગુ.પા.પુ. અને ગ.વ્ય.બોર્ડ, ગાંધીનગર.

નો. એન/સી/૧૨૧૧  
૨૦/૬/૧૧

જાન. બા.ક.વ. શુ. બ.કા. જા.બો.ના ૧(૨)૩ મેન/કોન્ટ્રી

૧૬/૧૧/૧૧ ૨૦/૬/૧૧ ૨૦/૬/૧૧

૨૦/૬/૧૧

*[Signature]*  
Executive Engineer  
Public Health Works Div.  
Guj. W.S. & S. Board,  
MORBI.



Instructions on implementation of  
the Building and other Construction  
Workers (ROE & COS) Act, 1996  
and Building and other Construction  
Workers Welfare Cess Act, 1996

Government of Gujarat  
Labour & Employment Department  
G.R. No. CWA-2004-841-M3  
Sachivalaya, Gandhinagar  
Dated: January 2006

30 JAN 2006

Read : Labour & Employment Department, Gandhinagar GR No. CWA-2004-1831-M(3)  
dated 9-12-2005

RESOLUTION

Building and other constructions workers are one of the largest and most vulnerable segments of the unorganised labour. Their work is characterised by inherent risk to life and limb of the workers and also by the casual nature, temporary relationship between employer and employee, uncertain working hours, lack of basic amenities and inadequate welfare facilities.

Government of India has decided to constitute Welfare Boards for such workers in every State and accordingly, the Building and other Construction Workers (Regulation of Employment & conditions of Service) Act, 1996 was enacted by Parliament and brought into force from 19th August, 1996. Implementation of the Act including cess collection has already commenced in Kerala, Karnataka, Tamil Nadu and Delhi. Under the said Act, Government of Gujarat has constituted a Board under section 18. The State Government has been given powers to make rules for carrying out the provisions of this Act.

Accordingly, Government of Gujarat made Gujarat Building and other Construction Workers (Regulation of Employment and Condition of Service) Rules, 2003

LL  
1/12/06

સચિવાલય, ગાંધીનગર,  
ગુજરાત સરકાર  
જાન્યુઆરી ૨૦૦૬  
૧૫૪૮  
૨૭૧૩૧૦૬

published these Rules vide Notification No. GHR-2003-111-CWA-2003 dated 18th August, 2003. Government of Gujarat has also constituted Building and other Construction Workers Welfare Board vide Notification GHR/2004/163/CWA/2004/3743-M3, dated 18th December, 2004. Secretary has been appointed as Chairman.

Government of India has also enacted the Building and Other Construction Workers' Welfare Cess Act (hereinafter called as Cess Act) and brought it in force dated 19th August, 1996. The Cess Act provides for the levy and collection of cess on the cost of construction incurred by the employers, for increasing the resources of the Welfare Board. Section 3 of the Cess Act provides that cess shall be levied and collected not less than 1% of the cost of construction incurred by an employer. Rule 5 of Building and other Construction Workers Welfare Cess Rules, 1998 reads as follows :-

- (1) The proceeds of the cess collected under Rule 4 shall be transferred by such Government office, Public Sector Undertakings, local authority or cess collector, to the Board along with the form of challan prescribed (and in the head of account of the Board) under the accounting procedures of the State, by whatever name they are known.
- (2) Such Government Office or Public Sector Undertaking may deduct from the cess collected, or claim from the Board, as the case may be, actual collection expenses not exceeding one per cent of the total amount collected.
- (3) The amount collected shall be transferred to the Board within thirty days of its collection.

Moreover, under Rule 6, every employer, within thirty days of commencement of his work or payment of cess, as the case may be, has to furnish information in Form 1 to the Assessing Officer. Under Rule 12, the Assessing Officer, in cases where the employer has not pay the cess or has paid less cess, can impose a penalty upto the amount of cess payable.

By Government of Gujarat Notification No. GHR/2005/04/CWA/2004/841/M3, dated 3rd January 2005, all Heads of the Departments of the Government of Gujarat, all Executive Heads of Public Sector Undertakings and all Executive Heads of Local

Authorities (except Gram Panchayat and Nagar Panchayats) are declared as Cess Collectors and Assessing Officers.

The Building and other Construction Workers Welfare Board has passed the necessary resolution to collect the cess with effect from 18th December 2004.

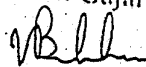
Accordingly, the cess is payable by Government Offices, Public Sector Undertaking, Local Authority or Cess Collector to the Board in Challan prescribed, in the following Head/Sub Head :

Major Head - 0230-Labour and Employment  
Minor Head - 106-Fees under Contract Labour (Regulation and Abolition) Rules  
Sub Head - (04)-Income from Cess levied under Gujarat Building & Other Construction Workers' Welfare Cess Act, 1996

Approval of the Finance Department, Government of Gujarat has been taken for meeting the expenditure to be incurred for the various welfare activities by the Gujarat Building & other Construction Workers Welfare Board and the opening of the Accounting Head/Sub-head in file No. CWA-2004-1831-M3, on 1st December, 2005 (copy of Resolution dated 9/12/2005 is enclosed).

All Government Departments, Public Sector Undertakings and local authorities are instructed to pay the above cess as per the Act. All Departments, Public Sector Undertakings and local authorities are also advised to incorporate the 1% cess in their estimates for all new works.

By order and in the name of Governor of Gujarat.



(Vinod Babbar)

Principal Secretary to Government  
Labour & Employment Department.

જામીનગીરી અનામત(એસડી) અને અર્નેસ્ટ  
મની ડીપોઝીટ(ઇએમડી) રૂપે બેન્ક ગેરંટી  
સ્વીકારવા બાબત

ગુજરાત પાણી પુરવઠા અને ગટર વ્યવસ્થા બોર્ડ

જલસેવા ભવન, સેક્ટર-૧૦/એ, ગાંધીનગર

પરિપત્ર ક્રમાંક: એબી/સી.મે.૧-૨/૨૦૦૭-૦૮/કા.નં.૩૫/૩૫૮

તારીખ : ૦૧ / ૦૮ / ૨૦૧૮

પરિપત્ર:

વંચાણે લીધો:

ગુજરાત સરકારના નાણાં વિભાગનો ઠરાવ ક્રમાંક: ઇએમડી/૧૦/૨૦૧૮/૧૮/ડીએમઓ તા.૧૬/૦૪/૨૦૧૮

ઉપરોક્ત વિષય અને સંદર્ભ અન્વયે જણાવવાનું કે, બોર્ડ હસ્તક ચાલતા કામો માટે જામીનગીરી અનામત (એસ.ડી.) અને અર્નેસ્ટ મની ડીપોઝીટ(ઇએમડી) તરીકે નાણાંકીય વર્ષ ૨૦૧૮-૧૯ માટે કઇ કઇ બેન્કની ગેરંટી સ્વીકારી શકાય, તેનો ગુજરાત સરકારના નાણાં વિભાગનો તા.૧૬/૦૪/૨૦૧૮ નો ઠરાવ આ સાથે સામેલ છે, જે વંચાણે લઇ તે મુજબની સુચનાઓનું પાલન કરવા જણાવવામાં આવે છે.

બિડાણ : ઠરાવની નકલ અને એનેક્સર-૧

(એસ.જી.પટેલ)  
નાણાં નિયંત્રક

પ્રતિ:

મુખ્ય ઇજનેરશ્રી, ઝોન-૧/૨/૩/૪/૫, વડોદરા/અમદાવાદ/રાજકોટ/ભૂજ/જુનાગઢ  
મુખ્ય ઇજનેરશ્રી, મટીરીયલ સેલ(સિવિલ)/યાંત્રિક, બોર્ડ કચેરી, ગાંધીનગર  
મુખ્ય ઇજનેરશ્રી, મોનીટરીંગ સેલ, બોર્ડ કચેરી, ગાંધીનગર  
પ્રોજેક્ટ ડાયરેક્ટરશ્રી, અર્બન સેલ, બોર્ડ કચેરી, ગાંધીનગર  
નિયામકશ્રી, જલસેવા તાલીમ સંસ્થા, સેક્ટર-૧૫, ગાંધીનગર  
મુખ્ય વહીવટી અધિકારીશ્રી, બોર્ડ કચેરી, ગાંધીનગર  
અધિક્ષક ઇજનેરશ્રી (તમામ)/ કાર્યપાલક ઇજનેરશ્રી(તમામ)  
સીનીયર મેનેજરશ્રી(ના/હિ) સર્વે  
નાયબ મેનેજરશ્રી(ના/હિ) સર્વે  
સીસ્ટમ મેનેજરશ્રી, કોમ્પ્યુટર સેલ, બોર્ડ કચેરી, ગાંધીનગર - બોર્ડની વેબસાઇટ ઉપર મુકવા સારું.

નકલ સવિનય રવાના:

માન.અધ્યક્ષશ્રીના કાર્યકારી સચિવશ્રી, બોર્ડ કચેરી, ગાંધીનગર  
સહ્ય સચિવશ્રીના અંગત મદદનીશશ્રી, બોર્ડ કચેરી, ગાંધીનગર

C-453

**Acceptance of Bank  
Guarantee as Security Deposit  
and Earnest Money Deposit.**

**Government of Gujarat**

**Finance Department**

GR. No.: EMD/10/2018/18/DMO

Date: 16/04/2018

Read: FD GR. No.: EMD/10/2016/328/DMO Dt. 01/05/2017

**Preamble:**

Tendering authorities of the State Government and its Boards/Corporations/Societies/PSUs frequently take Bank Guarantee from the bidders towards Security Deposit (SD) and Earnest Money Deposit (EMD). State Government had issued the list of eligible banks for the financial year 2017-18 vide above mentioned resolution of this department Dt. 01-05-2017.


After careful consideration, the Government has decided to approve the list of Banks whose Bank Guarantees would be accepted in the Financial Year 2018-19 and it has now been decided to resolve as follows:

**Resolution:**

Government Departments and its Boards/Corporations/Societies/PSUs would accept Bank Guarantee [towards Security Deposit (SD) and Earnest Money Deposit (EMD)] issued by any of the bank included in the **Annexure I**, attached to this Resolution.

The tendering authority will be required to ascertain the authenticity of the Bank Guarantee and set up necessary internal control procedures.

**By order and in the name of the Governor of Gujarat**

  
(J G Shelat)  
Section Officer  
Finance Department

To,

- The Secretary to the Governor of Gujarat, Raj Bhavan, Gandhinagar.
- The Principal Secretary to Hon. Chief Minister.
- PS to Hon. Deputy Chief Minister.
- PS to all Hon. Ministers, State Ministers and Deputy Ministers.
- PS to Leader of Opposition Party.
- Secretary, Legislative Assembly Secretariat, Gandhinagar.
- PS to Chief Secretary.
- PS to Additional Chief Secretary Finance Department.
- PS to Secretary (Economic Affairs), Finance Department
- PS to Secretary (Expenditure), Finance Department.
- PS to Deputy Secretary (Budget).
- All Administrative Departments, Sachivalaya, Gandhinagar.
- All Heads of Department.
- All Public Sector Enterprises of the State.
- All State's Boards/Corporations/Societies.
- Accountant General-I (Audit) Gujarat, Ahmedabad.
- Accountant General (A&E) Gujarat, Ahmedabad.
- Accountant General-II (Audit) Gujarat, Rajkot.
- Accountant General (A&E) Gujarat, Rajkot.
- Pay & Accounts Office, Gandhinagar / Ahmedabad.
- Chief Information Officer, Finance Department.
- All Joint Secretary / Deputy Secretary / Under Secretary of Finance Department.
- All Branches, Finance Department (Including Finance Branches).
- System Manager, Finance Department for put up on GSWAN website.
- Select File DMO-Finance Department.

## Annexure I.

Finance Department, GR. No.: EMD/10/2018/18/DMO

Date: 16/04/2018

(A) Guarantees issued by following banks will be accepted as SD/EMD on permanent basis.

- ❖ All Nationalized Banks including the Public Sector Bank- IDBI Ltd.

(B) Guarantees issued by following Banks will be accepted as SD/EMD for period up to March 31, 2019. The validity cut-off date in GR is with respect to date of issue of Bank Guarantee irrespective of date of termination of Bank Guarantee.

- ❖ Rajkot Nagarik Sahakari Bank Ltd.
- ❖ The Mehsana Urban Co-Operative Bank Ltd.
- ❖ The Surat District Co-Op. Bank Ltd.
- ❖ The Ahmedabad Mercantile Co-Op. Bank Ltd.
- ❖ Nutan Nagarik Sahakari Bank Ltd.
- ❖ The Kalupur Commercial Co-operative Bank Ltd.
- ❖ Saurashtra Gramin Bank
- ❖ Baroda Gujarat Gramin Bank
- ❖ RBL Bank
- ❖ Karur Vysya Bank
- ❖ AXIS Bank
- ❖ ICICI Bank
- ❖ HDFC Bank
- ❖ Kotak Mahindra Bank
- ❖ IndusInd Bank
- ❖ DCB Bank
- ❖ FEDERAL Bank
- ❖ YES Bank

*All the eligible banks are instructed to collect the original documents/papers of guarantee from the concerned tendering authority.*



(J G Shelat)  
Section Officer  
Finance Department

-----XXXXX-----

ઉદ્યોગ અને ખાણ વિભાગના ઠરાવ ક્રમાંક:એસપીઓ/૧૦૨૦૧૫/૧૯૧૦૯૩/ચ. તા.૦૩/૦૬/૨૦૧૬નું

પરિશિષ્ટ-૨

Supply of material to be purchased  
By Government Departments/Offices-  
Consideration of Quotation for-

**GOVERNMENT OF GUJARAT**  
**FINANCE DEPARTMENT**  
Circular No.GST 1070/6246-TH,  
Sachivalaya, Gandhinagar  
Dated the 30<sup>th</sup> January, 1971

Read: Government Circular, Finance Department No.STA-2752/1173-K,  
Dated the 2<sup>nd</sup> May, 1962 (Reproduced Below)

**CIRCULAR**

Read: Government Circular, Finance Department No. Circular No.STA-2752/1173-K, Dated the 2<sup>nd</sup> May, 1962, Government has directed that While considering the quotations from suppliers who are liable to sales Tax/General Sales Tax, the amount of tax so payable should be left out of account; whereas in the case of suppliers who have to pay Sales Tax under the local Sales Tax law or the Central Sales Tax Act,1956 to the Government of any other State, the amount of Such taxes should be added to the gross price inclusive of tax considered. The comparative quotations computed on the above basis should then be considered on merits. It has come to the notice of Government that in spite of these instructions, some of the Government Departments/Offices do not follow the said instructions. It is therefore directed that the instructions and the procedures prescribed in the aforesaid circular in regard to consideration of quotations for supply of materials to be purchased by Government Departments/Offices should be observed scrupulously.

By order and in the name of the Government of Gujarat,

Sd/-

**T.K.JAYARAMAN**

Deputy Secretary to the Govt. of Gujarat.  
Finance Department.

To,

1. All Secretariat Departments.
2. All Heads of Departments and Heads Office Under the Secretariat Departments/Offices.
3. All Finance Advisers
4. The Accountant General, Gujarat, Ahmedabad.
5. The Pay and Accountant Officer, Ahmedabad/Gandhinagar
6. All Branches in Finance Department
7. The Commissioner of Sales Tax, Ahmedabad (With 100 copies) (Distribution "A" Class)

  
MR SONI-US-IMD

Page 27 of 27



CONTRACT NO.

**Bhavnagar Municipal Corporation  
BHAVNAGAR**



**(A WHOLLY OWNED BHAVNAGAR MUNICIPAL CORPORATION UNDERTAKING)**

**ESTIMATED COST**

**BID DOCUMENT FOR UPGRADATION OF DRAINAGE LINE NETWORK IN OLD SOCIETIES OF ADHEWADA AREA UNDER BHAVNAGAR MUNICIPAL CORPORATION (BMC), BHAVNAGAR. DISTRICT: BHAVNAGAR**

**ESTIMATED COST: RS. 10,43,72,277.30/-**

**VOLUME – IIIA: GENERAL TECHNICAL SPECIFICATION**

**Employer**

**EXECUTIVE ENGINEER**

**(Drainage Dept.)**

**BHAVNAGAR Municipal Corporation**

Sir Mangal Sinhji Road, Near Kalanala,

Bhavnagar,

Bhavnagar,-364001.

Contact Number: 0278 2424801-10

**VOLUME- III B:**  
**TECHNICAL SPECIFICATION - CIVIL WORKS**

<b>SECTION</b>	<b>PARTICULARS</b>
Section - 1	GENERAL AND MATERIAL
Section - 2	SURVEY & GEOTECHNICAL INVESTIGATION FOR DESIGN
Section - 3	CONCRETE
Section - 4	BUILDING DETAILS
Section - 5	STRUCTURE STEEL WORKS
Section - 6	WATER SUPPLY AND SANITARY WORKS
Section - 7	EARTHWORK
Section - 8	ITEMWISE SPECIFICATIONS

# ***SPECIFICATIONS***

## ***SECTION: 1***

### ***GENERAL AND MATERIAL***

## SECTION: 1

### GENERAL AND MATERIAL

#### GENERAL

##### **1.0 Employer's Drawings:**

- 1.1. The drawings listed in the Tender document are the Employer's conceptual drawings and are to be got approved prior to start of the works with actual site conditions & level in consultation with EIC.

##### **2.0 Drawing Sheet Format:**

- 2.1. All drawings provided by the Contractor shall be on standard size sheets, prepared on computer with AutoCAD and shall show the following particulars in a title block located in the lower right-hand corner, in addition to the name of Contractor and equipment manufacturer, date, scale, drawing number, revision number (R0 for drawings submitted initially, R1, R2, etc. for drawings submitted subsequently) and title.

Title: - BMC

**Project name: - BID DOCUMENT FOR UPGRADATION OF DRAINAGE LINE NETWORK IN OLD SOCIETIES OF ADHEWADA AREA UNDER BHAVNAGAR MUNICIPAL CORPORATION (BMC), BHAVNAGAR. DISTRICT: BHAVNAGAR**

A blank space of 90 mm x 100 mm shall be provided for the Engineer's approval stamp and provision shall be made for details of revisions to be recorded.

- 2.2. All drawings submitted by the Tenderer/Contractor shall use the English language and SI units. All drawings shall be clearly and fully cross-referenced to the other drawings as relevant.

##### **3.0 Tender / Contract Drawings:**

- 3.1. Drawings submitted by the Tenderer shall show all the essential items of the Plant offered together with sufficient details to enable the general arrangement of the Plant to be determined.

- 3.2. The drawings and documents to be provided by the Tenderer / Contractor shall be as

per the schedules of price but shall not be limited to those listed:

**4.0 Submissions and Approval of Drawings:**

4.1. The following shall be the procedure for submission and approval of drawings:

4.1.1. The Contractor shall submit 4 copies of the drawings to the Employer. All the drawings are to be signed by the Contractor or his authorized representatives

4.1.2. The Engineer's Representative will review the drawings and, if found fit for approval, the Employer will return 2 copies to the Contractor duly approved.

4.1.3. In case the drawings/documents are not fit for approval but worth for review, the Engineer's Representative will mark the comments on the drawings and return 2 copies to the Contractor. In such case, the Contractor shall resubmit the revised drawings within two weeks as per sub-clause 4.1.1 above and the same shall be repeated till the drawings are finally approved as per sub-clause 4.1.2 above.

4.1.4. If the submitted drawings/documents are not worth for review, the Contractor will be informed accordingly.

4.1.5. On receipt of the approved drawings as per sub-clause 4.1.2 above, the Contractor shall submit CD or Pen drive and documents to the employer.

4.1.6. After tests on completion, the Contractor shall submit, within 15 days of the conclusion of the tests, floppies of the "As Built Drawings" to the Employer.

4.1.7 When the drawings are received by the Engineer's Representative after revision by the Contractor, he will only review the revision made and hence the Contractor shall carefully identify all the revised details / dimensions and also describe the revisions in the revision block.

4.1.8 No drawings, with corrections made after taking the prints, will be accepted.

4.1.9 Approval of drawings by the Engineer shall not relieve the Contractor of his

responsibility in terms of the Contract.

#### **5.0 Delivery, Unloading and Storing at Site:**

- 5.1. The Contractor shall be responsible for checking all materials delivered to Site and shall keep the Engineer's Representative fully informed of the state of deliveries. The Contractor shall carry out, at his cost, all instructions of Engineer or his Representative for proper unloading, preservation, maintenance, storage and security of materials delivered to Site until he fulfills all his obligations under the Contract.
- 5.2. The Contractor shall erect and maintain on the Site any temporary storage facility as required and approved by the Engineer.
- 5.3. Multiple handling and movement of materials during storage and retrieval shall be avoided.

#### **6.0 Spare Parts:**

- 6.1. Spare Parts required after the taking over the Plant shall be filled up by the bidder in the price schedule.
- 6.2. Spares during pre-commissioning trials, commissioning tests, maintenance, guarantee etc. shall be provided by the Contractor. The necessary spares shall be brought by the Contractor prior to the pre-commissioning test so as to avoid the downtime of equipment due to non-availability of them. All these spares have to be provided as required, by Contractor free of cost.
- 6.3. All spare parts shall be new, unused and strictly interchangeable with the parts for which they are intended to be replacements and shall be treated and packed for long storage under the climatic conditions prevailing at the Site. Each spare part shall be clearly marked or labeled on the outside of its packing with its description, number and purpose. When more than one spare is packed in a single case or other container, a general description of its contents shall be shown on the outside of such case or container and a detailed list enclosed. All cases, containers and other packages shall be marked and numbered in an approved manner for the purpose of identification. Spares shall be delivered to Site after the completion of erection but before start of commissioning of Plant along with technical leaflets and details. Spare parts shall be indicated in the assembly drawing showing clearly the part numbers.

6.4. All cases, containers or other packages are liable to be opened for such examination as the Engineer's Representative may require and packing shall be designed to facilitate opening and thereafter re-packing. In the event of some specific spares offered in the Contract being withdrawn from manufacture owing to changes in design of equipment or similar reasons viz., model being obsolete etc., the Contractor shall inform the Employer before such withdrawal so that the Employer can take timely alternative steps.

**7.0 Tools:**

7.1. Tools shall be delivered to site just prior to Tests on Completion.

7.2. The specified tools shall not be used for the erection of the Plant being supplied and except that the Engineer may call upon the Contractor to demonstrate their use or effectiveness, they must be handed over to the Employer in a completely new and unused condition. Should the Contractor require any such tools at site for erection, he shall provide his own.

The test equipment shall include special purpose items essential to the testing or re-calibration of related items of Facilities.

**MATERIALS AND WORKMANSHIP:**

**1.0 Introduction:**

1.1 This part of the Specification sets out the general standards of materials to be supplied and the workmanship required to be ensured by the Contractor. All component parts of the Works shall, unless otherwise specified, comply with the provisions of employer's requirement or be subject to the approval of the Employer. Particular attention shall be paid to a neat, orderly and well-arranged installation carried out in a methodical competent manner.

**2.0 Reference Specifications and Standards:**

2.1 Where reference is made in the Specification to a British Standard Specification (hereinafter abbreviated to 'B.S') issued by the British Standards Institution of 2, Park street, London W.1., or to an Indian Standard Specification (I.S.) issued by the Bureau of Indian Standards, (earlier known as Indian Standard Institution), ManakBhavan, 9 Bahadur shah Zafar Marg, New Delhi 110 002, or American Society

for Testing and materials (ASTM) issued by ASTM 1916 Race Street, Philadelphia, P.A., 19103, U.S.A. or American national Standards Institute (ANSI) issued by ANSI 1430, Broadway, New York, N.Y., 10018, U.S.A. or Japanese Industrial Standards (JIS) issued by Japanese Standards Association, 4-1-24, Alaska, Minato-Ku, Tokyo 107, Japan or to any other equivalent Standard it shall be to the latest revision of that Standard on the Tender opening date.

- 2.2 The Contractor may propose at no extra cost to the Employer, the use of any relevant authoritative internationally recognized Reference Standard.
- 2.3 All details, materials and utensils supplied and workmanship performed shall comply with the specified Standards. If Tenderer offers equipment to other Standards, the equipment material should be equal or superior to those specified and full details of the difference shall be supplied.
- 2.4 In the event of conflict between this Specification and the Codes for equipment, provisions of this Specification shall govern. Certain specifications issued by national or other widely recognized bodies are referred to in this Specification. In referring to the Standard Specifications the following abbreviations are used:

IS	:	Indian Standard
ANSI	:	American National Standards Institute
API	:	American Petroleum Institute
ASME	:	American Society of Mechanical Engineers
ASTM	:	American Society of Testing and Materials
AWS	:	American Welding Society
AWWA	:	American Water Works Association
ISO	:	International Organization for Standardization
DIN	:	Deutsches Institute fur Normung
BS	:	British Standard
IEC	:	International Electro technical Commission
IEE	:	Institution of Electrical Engineers
IEEE	:	Institute of Electrical and Electronic Engineers
NEMA	:	National Electrical Manufacturers Association



AGMA : American Gear Manufacturer's Association

**3.0 Materials – General:**

3.1 All materials incorporated in the Works shall be the most suitable for the duty concerned and shall be new and of reputed make approved quality, free from imperfections and selected for long life and minimum maintenance. Non-destructive tests, if called for in the Specification, shall be carried out. All submerged moving parts of the Plant, or shafts and spindles or faces etc. in contact with them shall be of corrosion resistant materials. All parts in direct contact with various chemicals, shall be completely resistant to corrosion, or abrasion by these chemicals, and shall maintain their properties without aging due to the passages of time, exposure to light or any other cause.

**4.0 Workmanship – General:**

4.1 Workmanship and general finish shall be of first-class quality and in accordance with best workshop practice.

4.2 All similar items of the Plant and their component parts shall be completely interchangeable. Spare parts shall be manufactured from the same materials as the originals and shall fit all similar items.

4.3 All parts, which can be worn or damaged by dust, shall be totally enclosed in dust proof housings. All materials incorporated in the Works shall be the most suitable for the duty concerned, free from imperfections and selected for long life and minimum maintenance. All necessary accessories required for satisfactory and safe operation of the Plant shall be supplied by the Contractor unless it is specifically excluded from his scope. Suitable provision by means of eyebolts or other means are to be provided to facilitate handling of all items that are too heavy or bulky for lifting and carrying by two men.

**5.0 Welding:**

5.1 Welding shall comply with the latest revision of the BS 5135 Code.

5.2 Welders shall be qualified in accordance with the requirement of the appropriate section of BS 4871. The Engineer shall have the right to call for further qualification from time to time from any welder who in the opinion of the Engineer does not

produce weld in accordance with the qualification. Each welder shall be assigned a number and letter. Each welding elements shall clearly be identified as to its welder marking the welder's Code adjacent to the welds. A record chart shall be maintained for each welder showing the procedures, for which he has qualified, the date of such qualification, the type of defects produced and their frequency. The Engineer shall disqualify the welder whose Work requires a disproportionate amount of repairs. All procedures where required shall be qualified as per BS EN 283-3.

- 5.3 Inspection and quality of surveillance shall not be limited to the examination of finished welds. The techniques employed shall be based on methods which are known to produce good results and which have been verified at Site by actual demonstration.
- 5.4 Haphazard striking of the electrodes for establishing an arc shall not be permitted. The arc shall be struck either on the joint or on a starting tag. The starting tag shall be of the same material or a material compatible with the base metal being welded. In case of any inadvertent strike on place other than the welding, the area affected shall be ground flushed and examined by liquid penetration method.
- 5.5 Generally, a stringer bead technique shall be used with a slight oscillation of necessary to avoid slag and to minimize the number of beads needed to fill exceed 3 times the wire diameter. Vertical welds shall be made in upward direction. For all pipes above 300 mm dia., welding shall be done whenever possible, by 2 welders working simultaneously along both sides of the pipe.
- 5.6 The root pass shall have less than 1.5 mm internal reinforcement. Defects like icicles, burn through and excessive "such back", etc. shall be cause for rejection of welds.
- 5.7 Final welds shall be suitable for appropriate fabrication of the non-destructive examination of the weld. If grinding is necessary, the weld shall be blended into the parent metal without gouging or thinning of the parent metal in any way. Uneven and excessive grinding may be a cause for rejection. Fillet weld shall preferably be convex and free from undercutting and overlap at the toe of weld. Convexity and

concavity shall not exceed 1.5 mm. The leg lengths shall not exceed the specified size by more than 1.5 mm.

5.8 All attachments such as lugs, brackets and other non-pressure parts shall also be done by qualified welders in accordance with the design details and materials specifications. Temporary attachments shall be removed in a manner that will not damage the parent metal. Areas of temporary attachments shall be dressed smooth and examined by ultrasonic or liquid penetration methods.

5.9 All tack welds shall be made using qualified procedure and welders, the number of sizes of tack welds shall be kept as small as to consist of adequate strength and joint alignments. All tack welds shall be examined visually for defects and if found defective shall be completely removed. As welding proceeds, tack welds shall be either removed completely or shall be properly prepared by grinding or filling their starting ends so that they may be satisfactorily incorporated in the welds. Unacceptable defects shall be removed by grinding machine or chipping or gouge. Flame gouging may be permitted provided gouged surfaces are ground at least by 1.0 mm below the deepest indentation.

5.10 All weld repairs shall be carried out using the approved welding procedures and welders. Re-welded areas shall be re-examined by the methods specified for the original welds and the Engineer's Representative shall duly qualify repair procedures.

#### **6.0 Pre-heating and Post-heating Treatment:**

6.1 Pre-heating and post heating treatment shall conform to the relevant application Codes. Pre-heating not exceeding 121 deg. C for all carbon steel construction above 25 mm thickness would be mandatory. Such pre-heating would be maintained during flame cutting, flame or arc gouging, welding and repairs and may be done by gas heating by gas torches/gas rings with neutral flame. The temperature shall be checked by temperature indicating crayons. However, such pre-heating will not be necessary for welds less than 6 mm size. In large diameter pipe fabricated out of plate materials, production control test plates in accordance with the BS 4870-part 1 Table 6 to represent 30% of the long seams and each welder's performance would be

mandatory.

## **7.0 Electrodes:**

7.1 All electrodes shall be stored in their original sealed containers under dry conditions. Electrodes shall remain identified until consumed. All electrodes shall be dried before use. Drying ovens shall be provided in Work areas for drying purposes. Electrodes withdrawn from oven shall be promptly used and excess unused electrodes shall be promptly returned to oven.

## **8.0 Examination/NDT/Radiography**

8.1 The various stages of examination and types shall be as stipulated in the respective fabrication Codes. Radiographic examination shall be carried out as per provisions of BS 2600 or BS 2910; Ultrasonic tests where called for shall be carried out as per provisions of BS 3926; magnetic particle tests shall be carried out as per BS 6072. Liquid penetration tests shall be carried out as per BS 6443.

## **9.0 Stainless Steel Welding:**

9.1 All welding consumable such as electrodes, filler wires, argon gas for shielding and purging shall be of high quality and the proposed brand shall be furnished for approval of the Engineer. Weld deposits shall have similar or higher physical properties and similar chemical composition to the members joined.

9.2 All electrodes shall be purchased in sealed containers only and stored in their packing intact. The packets opened shall be consumed as early as possible. The electrodes removed from the containers shall be kept in holding ovens at temperatures recommended by electrode manufacturer. Special care shall be taken in avoiding mixing of electrodes in the oven. The electrodes and filling wires shall be free from rust, oil, grease, earth and other foreign matter.

9.3 Argon gas with purity 99.5% shall be used for shielding and purging. The purity of gas shall be certified by the gas manufacturers.

9.4 Non-destructive examination of the welds shall be carried out to ensure quality of

weld.

- 9.5 The electric current for welding shall be direct current, straight polarity (electrode negative). The welding current shall be kept minimum possible to ensure minimum heat affected zone in the parent material. Other side of the weld joint shall be periodically flushed with argon gas.

#### **10.0 Castings:**

- 10.1 Cast iron shall be of standard grey close-grained quality. The structure of the castings shall be homogeneous and free from non-metallic inclusions and other injurious defects. All surfaces of castings, which are not machined, shall be smooth and shall be carefully fettled to remove all foundry irregularities.

- 10.2 Minor defects in depth not exceeding 12.5 percent of total metal thickness and which will not ultimately affect the strength and serviceability of the casting may be repaired by approved welding techniques. The Engineer shall be notified of large defects and no repair welding of such defects shall be carried out without prior approval of the Engineer. If the removal of metal for repair should reduce the stress resisting cross section of the casting by more than 25 percent, or to such an extent that the computed stress in the remaining metal exceeds the allowable stress by more than 25 percent, then casting shall be rejected. Test coupons cast simultaneously with the main castings shall be identified to check physical, chemical analysis of casting. Major defects on casting are not acceptable. Castings repaired by welding for minor defects shall be stress-relieved after such welding. Non-destructive tests as directed by the Engineer will be required for any casting containing defects whose extent cannot otherwise be judged, or to determine where repair welds have been properly made.

#### **11.0 Forging:**

- 11.1 All major stress-bearing forging shall be made to a Standard Specification. Forging shall be subjected to magnetic particle testing or dye penetration test at the areas of fillets and change in section. The testing shall be conducted after rough machining (10 microns). Any defect, which will not machine out during the final machining, will be gouged out fully, inspected by dye penetration or magnetic particle inspection to ensure that the defect is fully removed and repaired using an approved repair

procedure. Any indication, which proves to penetrate deeper than 2.5% of the finished thickness of the component, shall be reported to the Engineer giving the details like location, length, width and depth. For the magnetic particle inspection, the choice of wet or dry particles shall be at the Contractor's discretion.

11.2 All forging shall be demagnetized after test and shall be heat-treated for the relief of residual stresses.

**12.0 Design Life:**

12.1 The Works as a whole shall be new, of sound workmanship, robustly designed for a long reliable operating life and shall be capable of 24 hours per day continuous operation for prolonged period in the climatic and working conditions prevailing at the Site, and with the minimum of maintenance. Particular attention shall be given to temperature changes, the stability of paint finish for high temperatures, the rating of engines, electrical machinery, thermal overload services, cooling systems and the choice of lubricants for possible high and prolonged operating temperatures. The Contractor shall be called upon to demonstrate this for any component part either by service records, or evidence of similar equipment already installed elsewhere or relevant type tests. Routine maintenance and repair shall as far as possible not require the services of highly skilled personnel.

12.2 The Plant shall be designed to provide easy access to and replacement of component parts, which are subject to wear, without the need to replace whole units. No parts in contact with water shall have a life from new to replacement or repair of less than five years.

12.3 Design features shall include the protection of Plant against damage caused by vermin, dirt, dust and dampness and to reduce risk of fire. Plant shall operate without undue vibration, and parts shall be designed to withstand the maximum stresses under the most severe condition of normal service. Materials shall have a high resistance to change in their properties due to the passage of time, exposure to light, temperature and any other cause, which may have a detrimental effect upon the performance or life of the Works.

12.4 Plant located outside lockable areas/building shall have additional features to prevent un-authorized operation.

### **13.0 Name Plate:**

- 13.1 Each item of the Plant shall have permanently attached to it in a conspicuous position, a nameplate and rating plate. Upon these shall be engraved or stamped, the manufacturer's name, type and serial number of Plant, details of the loading and duty at which the item of Plant has been designed to operate, and such diagrams as may be required by the Engineer. All indicating and operating devices shall have securely attached to them or marked upon them designations as to their function and proper manner of use.
- 13.2 Nameplates, rating plates and labels shall be of a non-flame propagating material, either non-hygroscopic or transparent plastic with engraved lettering of a contrasting color. Fixing shall be by means of non-corrosive screws; drive rivets or adhesives shall not be used.
- 13.3 Warning labels shall be provided where necessary to warn of dangerous circumstances or substances. Inscriptions or graphic symbols shall be black on a yellow background.
- 13.4 Instruction labels shall be provided where safety procedures such as wearing of protective clothing are essential to protect personnel from hazardous or potentially hazardous conditions. These labels shall have inscriptions or graphic symbols in white on a blue background.

### **14.0 Nuts, Bolts, Studs and Washers:**

- 14.1 Nuts, bolts, studs and washers for incorporation in the Plant shall conform to the requirements of the appropriate standard. Nuts and bolts shall be of the best quality of specified grade, machined on the shank and under the head and nut.
- 14.2 Fitted bolts shall be a light driving fit in the reamed holes they occupy, shall have the screwed portion of such a diameter that it will not be damaged in driving and shall be marked in a conspicuous position to ensure correct assembly at Site.
- 14.3 Washers, locking devices and anti-vibration arrangements shall be provided where necessary. Jointing hardware for the entire Plant shall be provided with sufficient

spares to cater for site losses.

14.4 Where bolts pass through structural members taper washers shall be fitted, where necessary, to ensure that no bending stress is caused in the bolt. Where there is a risk of corrosion, bolts, nuts and studs shall be designed so that the maximum stress does not exceed half the yield stress of the material under any conditions. All bolts, nuts and washers that are subject to frequent adjustment or removal in the course of maintenance and repair shall be made of nickel-bearing stainless steel.

14.5 The Contractor shall supply all holding down, alignment and leveling bolts complete with anchorages, nuts, washers and packing required to attach the Plant to its foundations, and all bed plates, frames and other structural parts necessary to spread the loads transmitted by the Plant to concrete foundations without exceeding the design stresses.

**15.0 Allowances for Wastage:**

15.1 The Contractor shall supply reasonable excess quantities to cover wastage of those consumable, which will be normally subject to waste during erection, commissioning and setting to Work.

**16.0 Painting – General:**

16.1 The Contractor shall be responsible for the cleaning, preparation for painting, and priming or otherwise protecting, as specified, all parts of the Plant at the place of manufacture prior to packing.

16.2 Parts may be cleaned but surface defects may not be filled in before testing at the manufacturer's works. Parts subject to hydraulic test shall be tested before any surface treatment. After test, all surfaces shall be thoroughly cleaned and dried out, if necessary by washing with an approved de-watering fluid prior to surface treatment. Except where the specification provides to the contrary all painting materials shall be applied in strict accordance with the paint manufacturer's instructions.

16.3 All protective coatings shall be suitable for use in warm humid climates. All primers,



under coats and finishes shall be applied by brush or airless spray, except where otherwise specified. Consecutive coats shall be in distinct but appropriate shades. All paints shall be supplied from the store to the painters, ready for application, and addition of thinners or any other material shall be prohibited.

**17.0 Painting at Place of Manufacture:**

17.1 Steel and cast iron parts shall be sand blasted to near white cleaning before painting. Edges, sharp corners etc. shall be ground to a curve before sand blasting. A primer coat of a zinc rich epoxy resin based coating with at least 75 microns' dry film thickness is to be provided. In addition, the parts are to be provided with adequate number of coats of coal tar epoxy polyamine coating to a dry film thickness of 175 microns including primer coating.

**18.0 Painting at Site:**

18.1 Immediately on arrival at the site, all items of Plant shall be examined for damage to the paint coat applied at the manufacturer's works, and any damaged portions shall be cleaned down to the bare metal, all rust removed, and the paint coat made good with similar paint.

18.2 After erection, such items, which are not finish painted, shall be done so and, items that have been finish painted at the manufacturer's works shall be touched up for any damaged paintwork. For finish painting, two coats of synthetic enamel conforming to IS: 2932 shall be applied. Dry film thickness of each coat shall be at least 25 microns.

18.3 The dry paint film thickness shall be measured by Electrometer or other instruments approved by the Employer. In order to obtain the dry film thickness specified the Contractor should ensure that the coverage rate given by the paint manufacturer would enable this thickness to be obtained. Strength of adhesion shall be measured with an adhesion tester and this value shall not be less than  $10 \text{ kg/cm}^2$ . Painted fabricated steel work which is to be stored prior to erection shall be kept clear of the ground and shall be laid out or stacked in an orderly manner that will ensure that no water or dirt can accumulate on the surface. Suitable packing shall be laid between the stacked materials. Where cover is provided, it shall be ventilated.

**19.0 Galvanizing:**

19.1 Wherever galvanizing has been specified the hot dip process shall be used. The galvanized coating shall be of uniform thickness. Weight of zinc coatings for various applications shall not be less than those indicated below:

a) Fabricated steel

Thickness less than 2 mm but not less than 1.2 mm - 340 gms./sq.m

Thickness 2 mm and above - 460 gms./sq.m

b) Fasteners

Up to nominal size M10 - 270 gms./sq.m

Over M10 - 300 gms./sq.m

19.2 Galvanizing shall be carried out after all drilling; punching, cutting, bending and welding operations have been carried out. Burrs shall be removed before galvanizing. Any Site modification of galvanized parts should be covered well by zinc rich primer and aluminum paint.

**20.0 Support for Pipe work & Valves:**

20.1. All necessary supports, saddles, sling, fixing bolts & foundation bolts shall be supplied to support the pipe work. Valve and other facilities mounted in the pipe work shall be supported independent of the pipes to which they connect.

## INSPECTION AND TESTING AT MANUFACTURER'S PREMISES

### 1.0 Inspection and Tests:

#### 1.1 Valve:

1.1.1 During testing there shall be no visible evidence of structural damage to any of the valve component.

1.1.2 Motorized valves shall be tested with their actuators, with a differential head equivalent to their maximum working pressure, to prove that the actuators are capable of opening and closing the valves under maximum unbalanced head condition within the specified opening or closing period.

1.1.3 The following test shall be carried out for sluice valves:

- a) Seat leakage test at rated pressure
- b) Hydrostatic test at 1.5 times the rated pressure
- c) Valve operation

1.1.4 The following test shall be carried out for non-return valves:

- a) Seat leakage test at rated pressure
- b) Body hydrostatic test at 1.5 times rated pressure
- c) Operation

#### 1.2 Pipe work:

1.2.1 Testing of pipes and fitting shall be carried out in accordance with relevant Indian Standard and internationally approved standard. Pipes, fittings and expansion bellows shall be hydrostatically tested for 1.5 times the rated pressure.

#### 1.3. E.O.T. Crane:

1.3.1 The cranes shall be completely assembled in the Contractor's or subcontractor's Works and shall be subjected to the tests as specified in IS- 8071S-3177 or relevant internationally approved standard. The Contractor shall provide the test weights.

#### 1.4 Equipment for testing:

Equipment required for testing CC cubes and testing of steel bars are installed at main H/W site.

# ***SPECIFICATIONS***

## ***SECTION:2***

### ***SURVEY & GEOTECHNICAL INVESTIGATION FOR DESIGN***

## Specifications for Minimum Investigations required for Project:

### Survey and Soil Exploration:

To plan out and obtain pre-approval and subsequently carry out Topographic and level Survey, preparing cross sections, Longitudinal sections, Soil exploration to obtain foundation design data at various locations for all the components listed in preamble on previous page, complete all as per general pre-approved plan and as per detailed description and specifications and including submitting survey, soil exploration and analysis reports in six copies along with two soft copies and getting the same approved by the engineer in charge.

Work consists of providing all equipment, materials, labour etc. to carry out survey, to provide permanent markers of various points for later use, to create permanent bench mark of approved design and approved location on the site, to carry out soil exploration to obtain information for foundation design as well as collecting data to determine various design parameters, to collect all data, prepare interim and final reports for submission and approval of the Engineer in-charge, all as per detailed description, specifications and as directed by the Engineer in-charge. This may call for revised hydraulic design, in case location of headwork/ sub headwork/ village level sump etc. changes. However, minimum pipe size (as given in Schedules and drawings) shall be adhered to. In certain cases, due to revised location of tail end point sump, level may be higher or frictional losses may increase. This will demand pipe size of higher diameter and contractor shall carry out hydraulic design to suit specific section subject. In case level of such sump reduces or location reduces the length ultimately resulting into permission of lower size, size given in schedule & drawing shall be provided and on no account, it shall be reduced.

It must be clearly understood that the data furnished with the tender and suggested procedure for survey and soil exploration are purely for general guidance of the bidders for selecting the best design criteria. The contractor is expected to carry out additional work if it becomes necessary in the process of selecting appropriate criteria. In any case responsibility of assuring the guaranteed water supply will fully rests with him.

### Work Description:

Work under this item involves survey, soil exploration and investigation as described below. Survey maps and all interim as well as final reports of soil investigation, other tests as well as the reporting of final test shall be submitted in six paper copies as

well as two soft copies and these will form part of a permanent record of the project for use during construction, operation, and maintenance stages as well as for future use. All below mentioned work shall be all inclusive and will be carried out as per detailed specifications and as directed by the Engineer in-charge.

Survey and soil investigation shall be completed within one & half month. In case after delay of 15 calendar days the department will get completed the work from departmental agency at the risk and cost of the contractor which shall be binding to the contractor.

**Survey work shall consist of the following:**

- A. To carry out Block level survey based on GTS benchmark, prepare longitudinal section along alignment of all types of pipelines and prepare contour survey of the allotted plot of land and the river bed of the width of 100m – 50m on either side - of the suggested center line of the alignment, and prepare contour maps to a scale of 1:500 or larger. Survey in the river may be carried out with help of sounding technique or long metallic rod inserted in water from the boat. All the levels/ distance may be measured with help of total station or DGPS.
- B. Selecting most appropriate location (on the basis of survey) to determine various geotechnical parameters for carrying out design of various components shall be responsibility of the contractors and it shall be carried out by laboratory approved by GOG acceptable to BMC.
- C. Above survey shall be carried out in stages as and when required, using the latest equipment like TOTAL STATION or DGPS with high accuracy. In case dumpy level/ auto level is used, then fly back as well as closing error must be performed without which survey will be considered as NOT completed. All levels will be based on GTS, and the work shall include transferring level from a reliable established GTS benchmark in the vicinity of the site of work and establishing a permanent bench mark on site at a suitable location as per approved design and location. Above survey will be carried out jointly with the representative of the owner, as per his convenience during day time.
- D. Detailed Longitudinal Section for each pipe shall be prepared and HGL marked on it for approval of BMC. After marking of such data only, execution of pipeline shall be permitted.
- E. Detailed contour plan of the headwork/sub headwork etc. prepared with interval of 0.2 m so as to determine position of various units.

- A. 150 mm bores or more diameters (Minimum one no per unit/structure) will be made to collect information for the foundation design of the intake well, approach bridge supports, underground sump, Pump House, other structures. Minimum depth of bores from the existing level at the location of various structures shall be governed by IS stipulations or more as per requirement of specific structural design. Disturbed and undisturbed soil samples will be collected, and grain size analysis by dry sieving/Wet analysis, determination of liquid plastic limit and other necessary tests like C value, N value,  $\phi$  value and important parameters to carry out structural design and facilitate execution of structures shall be carried out. All levels including ground level of the bore point, levels of various strata and water levels etc. will be noted in reference to GTS.
- B. Trial pit and bore for laying of pipeline underground or saddle support/ pedestal/ bridge/ existing structure etc. shall be carried out in accordance with relevant IS stipulation to facilitate strata identification and payment towards excavation and other allied works. this shall also include collection of data necessary for structural design of thrust block and other ancillary crossing works.
- (A) **Specification for drilling, investigation, furnishing details of bore logs, laboratory testing and reporting:**
1. The investigation bores shall be made by percussion method and not by rotary method. No bentonite slurry or drilling mud shall be used. The bores shall be cased when it is to be done in sandy and silty strata.
  2. The quantity of boring mentioned in work description is approximate and likely to vary materially if investigating alternative location of Infiltration Well becomes necessary. Any change in the quantity of boring work shall not entitle the contractor for any claim or compensation. His rates shall be deemed to cover such an eventuality.
  3. The disturbed samples shall be collected at every 1.5 Mt. Depth or at the points where the strata change whichever is less.
  4. The samples so collected shall be preserved in systematic manner in core boxes, when the bore is in progress. After the bore is completed, each of the samples shall be packed in two separate poly thin bags with contents of approx. 0.5 Kg and properly numbered giving other details so as to identify the position to which the samples represent. All other details such as the bores Sr. Nos., the depth from which the samples are taken etc. should be clearly given with the samples.
  5. Out of the two sets of samples collected for every bore one set of samples with all requisite details shall be sent to the laboratory for testing and the second set of samples together with requisite details shall be supplied to the clients in their office for record. The casing pipes shall be removed after above compliance and with the

approval of the Engineer in-charge. The recovered samples shall be tested in the laboratory for grain size analysis and Atterbergs limits to identify the samples in accordance with the provision in IS.1498, 1971. The testing of samples shall have to be done at the recognized laboratory approved by the engineer-in charge.

6. The drilling shall be terminated at approx. 2.0 Mts. below the impervious (e.g. clay) strata, when bores are being made primarily to find the level of impervious strata. And if the samples collected indicate the soil being predominantly clayey further drilling shall be discontinued. In sandy strata including sand with gravels and small size boulders, Bores shall be extended at least up to 15 Mts. below bed level or low water level whichever is lower, however if required by Client Consultants, The bores may have to be carried further.
7. Where bores are required to be done in water channel in river/nallah bed, necessary island/islands shall be prepared in sand or sand filled gunny bags. The cost of which shall be covered within the rates quoted.
8. The rates quoted shall be inclusive for drilling in all kinds of strata including boulders, soft or hard rock.
9. For every bore water level encountered shall be recorded together with variation in water level if during the period of boring.
10. All levels shall be with reference to the GTS Bench Mark. For this purpose, a pucca GTS Bench mark shall be established in the region of proposed survey and investigation area.
11. The readings are to be recorded and observations are to be submitted with the reports in the format as per Proforma 1 and 2 shown below. The Contractor shall prepare bore charts for each and every bore in the approved manner and Proforma as required by Client.
12. The disturbed samples are to be analyzed as per relevant clause of I.S. 2720 Part I to IV.
13. The water samples of water pumped out during pump test shall be collected and analyzed covering requirements of I.S. 10500 to establish its portability and the results of the chemical and other tests submitted in the format shown in Proforma 3.
14. A Technical report covering the observations and tests is to be submitted to the client with the contractor's recommendations for selecting the most suitable site for the Radial well which could give the desired yield. The site for location of the pumping test shall be finalized in consultation with the clients before the work of pumping test including necessary boring work for the same is taken up.



**(B) Specification for preparing and submitting the full technical report:**

1. The survey work shall be carried out with proper accuracy and permanent Bench Mark shall be established at points which are approved by the Engineer in-charge. Also, sufficient number of permanent identification marks shall be established on the bank to enable establishment of base lines and the survey map to be included in the report shall contain sufficient details with respect to these permanent marks to enable the contractor to relocate the soil investigation bores as well as pump well and piezometric bores positions.
2. Based on the soil investigation carried out, a contour map of the area investigated showing the soil strata shall be prepared and included in the technical report.
3. The soil investigation work shall be carried out as per specifications and information will be recorded in the format given in attached Proforma 1 and 2.
4. The short chemical analysis of water samples shall be carried out as per I.S. 10500 and results reported in format given in attached Proforma 3.
5. The Proforma included in the tender are only for guidance and by no means are they to be considered as the only ones required for reporting the investigation. Additional information which is considered necessary shall be collected and recorded systematically in proper format to arrive at the relevant conclusions.
6. Using these parameters discharge shall be calculated for different water levels of the river, and the report shall make definite recommendations as regards to the number of radials, their levels, and their lengths required to obtain the desired yield.



<b>PROFORMA 2</b>						
<i>Bore hole no.</i>	<i>Date of start</i>	<i>Date of comp.</i>		<i>Termination depth</i>	<i>Revision no.</i>	
<i>Depth of sample</i>	<i>Grain size analysis</i>					
	<i>.% Gravel</i>	<i>.% sand</i>	<i>Hydrometer</i>		<i>LL%</i>	<i>PL%</i>
			<i>.% Silt</i>	<i>.% Clay</i>		<i>PI%</i>

<b>PROFORMA 3: CHEMICAL ANALYSIS OF WATER</b>				
<i>Date of collection</i>		<i>Source</i>		
<i>Date of arrival at lab</i>		<i>Location</i>	<i>Village :</i>	
<i>Lab ref. no.</i>				
<i>Sr. no.</i>	<i>Characteristics</i>	<i>Permissible value as per IS 10500</i>		
		<i>Desirable</i>	<i>Relaxable in absence of alternate source</i>	<i>Analytical value</i>
1	Color			
2	Odor			
3	Turbidity			
4	Dissolved solids			
5	pH			
6	Total hardness as CaCO <sub>3</sub>			
7	Calcium			
8	Magnesium			
9	Chloride			
10	Sulphate			
11	Nitrate			
12	Fluoride			
13	Manganese			
Signature:				
Date:				

# ***SPECIFICATIONS***

***SECTION:3***

***CONCRETE***

## SECTION -3:

### CONCRETE

#### 2.0 Applicable Codes with latest revisions.

##### 2.0.1 Materials

- 1) IS.269 Specification for 33 grade ordinary Portland cement.
- 2) IS.455 Specification for Portland slag cement.
- 3) IS.1489 Specification for Portland- Pozzolana cement (Part 1&2).
- 4) IS:8112 Specification for 43 grade ordinary Portland cement.
- 5) IS:12269 Specification for 53 grade ordinary Portland cement.
- 6) IS:12330 Specification for sulphate resisting Portland cement.
- 7) IS:383 Specification for coarse and fine aggregates from natural sources  
For concrete.
- 8) IS:432 Specification for mild steel and medium (tensile steel bars and hard-drawn steel) wires for concrete reinforcement. (Part 1 and 2)
- 9) IS:1786 Specification for high strength deformed steel bars and wires for Concrete reinforcement.
- 10) IS:1566 Specification for hard-drawn steel wire fabric for concrete Reinforcement.
- 11) IS:9103 Specification for admixtures for concrete.
- 12) IS:2645 Specification for integral cement water- proofing compounds.
- 13) IS:4990 Specification for plywood for concrete shuttering work.

##### 2.0.2 Material Testing:

- 1) IS.4031 Methods of physical tests for hydraulic cement (Parts 1 to 15)
- 2) IS:4032 Method chemical analysis of hydraulic cement.
- 3) IS:650 Specification for standard sand for testing of cement.
- 4) IS:2430 Methods for sampling of aggregates for concrete.
- 5) IS: 2386 Methods of test for aggregates for concrete (Parts 1 to 8)
- 6) IS:3025 Methods of sampling and test (physical and chemical) for water used in industry.
- 7) IS:6925 Methods of test for determination of water soluble chlorides in Concrete admixtures.

#### **2.0.3 Material Storage:**

- 1) IS:4082 Recommendations on stacking and storing of construction Materials at site.

#### **2.1.4 Concrete Mix Design:**

- 1) IS:10262 recommended guidelines for concrete mix design.
- 2) SP:23 (S&T) Handbook on Concrete Mixes

#### **2.1.5 Concrete Testing:**

- 1) IS.1199 Method of sampling and analysis of concrete.
- 2) IS:516 Method of test for strength of concrete.
- 3) IS:9013 Method of making, curing and determining compressive strength Of accelerated cured concrete test specimens.
- 4) IS:8142 Method of test for determining setting time of concrete by Penetration resistance.
- 5) IS:9284 Method of test for abrasion resistance of concrete.
- 6) IS:2770 Methods of testing bond in reinforced concrete.

### 2.1.6 Equipment:

- 1) IS:1791 Specification for batch type concrete mixers.
- 2) IS:2438 Specification for roller pan mixer.
- 3) IS:4925 Specification for concrete batching and mixing plant.
- 4) IS:5892 Specification for concrete transit mixer and agitator.
- 5) IS:7242 Specification for concrete spreaders.
- 6) IS:2505 General Requirements for concrete vibrators: Immersion type.
- 7) IS:2506 General Requirements for screed board concrete vibrators.
- 8) IS:2514 Specification for concrete vibrating tables.
- 9) IS:3366 Specification for pan vibrators.
- 10) IS:4656 Specification for form vibrators for concrete.
- 11) IS:11993 Code of practice for use of screed board concrete vibrators.
- 12) IS:7251 Specification for concrete finishers.
- 13) IS:2722 Specification for portable swing weigh batchers for concrete (Single and double bucket type).
- 14) IS:2750 Specification for steel scaffoldings.

### 2.1.7 Codes of Practice:

- 1) IS:456 Code of practice for plain and reinforced concrete.
- 2) IS:457 Code of practice for general construction of plain and reinforced  
Concrete for dams and other massive structures.
- 3) IS:3370 Code of practice for concrete structure for storage of liquids (Part1to4)
- 4) IS:3935 Code of practice for composite construction.
- 5) IS:2204 Code of practice for construction of reinforced concrete shell roof
- 6) IS:2210 Criteria for the design of reinforced concrete shell structures and  
Folded Plates.
- 7) IS:2502 Code of practice for bending and fixing of bars for concrete  
Reinforcement.

- 8) IS:5525 Recommendation for detailing of reinforcement in reinforced Concrete works.
- 9) IS:2751 Code of practice for welding of mild steel plain and deformed bars used for reinforced concrete construction.
- 10) IS:9417 Specification for welding cold worked bars for reinforced concrete construction.
- 11) IS:3558 Code of practice for use of immersion vibrators for consolidating concrete.
- 12) IS:3414 Code of practice for design and installation of joints in buildings.
- 13) IS:4326 Code of practice for earthquake resistant design and construction Of building.
- 14) IS:4014 Code of practice for steel tubular scaffolding (Parts 1 & 2)
- 15) IS:2571 Code of practice for laying in situ cement concrete flooring.
- 16) IS:7861 Code of practice for extreme weather concreting: Part 1 Recommended practice for hot weather concreting.

#### **2.1.8 Construction Safety:**

- 1) IS: 3696 Safety code for scaffolds and ladders. (Parts 1 &
- 2) IS:7969 Safety code for handling and storage of building materials.
- 3) IS:8989 Safety code for erection of concrete framed structures.

#### **2.2 General:**

The Engineer in charge shall have the right at all times to inspect all operations including the sources of materials, procurement, layout and storage of materials, the concrete batching and mixing equipment and the quality control system. Such an inspection shall be arranged and the Engineer in charge's approval obtained, prior to starting of concrete work. This shall however, not relieve the Contractor from any of his responsibilities. All materials which do not conform to the Specifications shall be rejected.



Materials should be selected so that they can satisfy the design requirements of strength, serviceability, safety, durability and finish with due regards to the functional requirements and the environmental conditions to which the structure will be subjected. Materials complying with codes/standards shall generally be used.

Other materials may be used after approval of the Engineer in charge and after establishing their performance suitability based on previous data, experience or tests.

## **2.3 Materials:**

### **2.3.1 Cement:**

Unless otherwise called for by the Engineer in charge, cement shall be ordinary Portland cement conforming to IS: 269, IS: 8112 or IS: 12269. However, in any case, cement grade shall not be lower than 43 grades.

Where Portland Pozzolana or slag cements are used, it shall be ensured that consistency of quality is maintained, there will be no adverse interactions between the materials and the finish specified is not marred.

Only one type of cement shall be used in a particular unit. The source of supply, type or brand of cement within the same structure or portion thereof shall not be changed without approval from the Engineer in charge.

Cement which is not used within 90 days from its date of manufacture shall be tested at a laboratory approved by the Engineer in charge and until the results of such tests are found satisfactory, it shall not be used in any work.

### **2.3.2 Aggregates (General):**

Aggregates shall consist of naturally occurring stones (crushed or uncrushed), gravel and sand. They shall be chemically inert, strong, hard, clean, durable against weathering, of limited porosity, free from dust/silt/ organic impurities/deleterious materials and conform to IS:383. Aggregates such as slag, crushed over burnt bricks, bloated clay ash, sintered fly ash and tiles shall not be used.

Aggregates shall be washed and screened before use where necessary or if directed by the Engineer in charge.

Aggregates containing reactive materials shall be used only after tests conclusively prove that there will be no adverse effect on strength, durability and finish, including long term effects, on the concrete.

The fineness modulus of sand shall neither be less than 2.2 nor more than 3.2.

The maximum size of coarse aggregate shall be as stated on the drawings but in no case greater than 1/4 of the minimum thickness of the member.

Plums 160 mm and above of a reasonable size may be used in mass concrete where directed. Plums shall not constitute more than 20% by volume of the concrete.

### **2.3.3 Water:**

Water to be used for both mixing and curing shall conform to IS: 456. Potable water is generally satisfactory. Water containing any excess of acid, alkali, sugar or salt shall not be used.

### **2.3.4 Reinforcement:**

All reinforcement steel shall be TMT tor steel conforming to relevant I.S. for all RCC structure with CRS - Fe-415 conforming to IS-1786.

All reinforcement shall be clean, free from pitting, oil, grease, paint, loose mill scales, rust, dirt, dust, or any other substance that will destroy or reduce bond.

### **2.3.5 Admixtures:**

Accelerating, retarding, water-reducing and air entraining admixtures shall conform to IS: 9103 and integral water proofing admixtures to IS: 2645.

Admixtures may be used in concrete as per manufacturer's instructions only with the approval of the Engineer in charge. An admixture's suitability and effectiveness shall be verified by trial mixes with the other materials used in the works. If two or more admixtures are to be used simultaneously in the same concrete mix, their interaction shall be checked and trial mixes done to ensure their compatibility. There should also be no increase in risk of corrosion of the reinforcement or other embedment.

Calcium chloride shall not be used for accelerating set of the cement for any concrete containing reinforcement or embedded steel parts.

Wastage:

Wastage allowance for cement and steel shall be considered in the item rate and no extra payment shall be paid to the Contractor on any account.

#### **2.4 Samples and Tests:**

All materials used for the works shall be tested before use.

Manufacturer's test certificate shall be furnished for each batch of cement, steel and when directed by the Engineer in charge samples shall also be got tested by the Contractor in a laboratory approved by the Engineer in charge at no extra cost. Engineer in charge may appoint separate third party inspection for the material testing to ensure the quality of the work. The Contractor shall replace the defective material as an outcome of these tests.

Sampling and testing shall be as per IS: 2386 under the supervision of the Engineer in charge.

Water to be used shall be tested to comply with requirements of IS: 456.

The Contractor shall furnish manufacturer's test certificates and technical literature for the admixture proposed to be used. If directed, the admixture shall be got tested at an approved laboratory at no extra cost.

#### **2.5 Storing of Materials:**

All materials shall be stored in a manner so as to prevent its deterioration and contamination which would preclude its use in the works. Requirements of IS: 4082 shall be complied with.

The Contractor will have to make his own arrangements for the storage of adequate quantity of cement. If such cement is not stored properly and has deteriorated, the material shall be rejected. Cement bags shall be stored in dry weatherproof shed with a raised floor, well away from the outer walls and insulated from the floor to avoid moisture from ground. Not more than 15 bags shall be stacked in any tier. Storage arrangement shall be approved by the Engineer in charge. Storage under tarpaulins shall not be permitted. Each consignment of cement shall be stored separately and consumed in its order of receipt.

Each size of coarse and fine aggregates shall be stacked separately and shall be protected from leaves and contamination with foreign material. The stacks shall be on hard, clean, free draining bases, draining away from the concrete mixing area.

The Contractor shall make his own arrangements for storing water at site in tanks to prevent contamination.

The reinforcement shall be stacked on top of timber sleepers to avoid contact with ground water. Each type and size shall be stacked separately.

## **2.6 Concrete:**

### **2.6.1 General:**

Concrete grade shall be as designated on drawings. In concrete grade M15, M20 etc. the number represents the specified characteristic compressive strength of 150X150X150 mm cube at 28 days, expressed in  $N/mm^2$  as per IS:456. Concrete in the works shall be "DESIGN MIX CONCRETE" or "NOMINAL MIX CONCRETE". All concrete works of grade M5, M7.5 and M10 shall be NOMINAL MIX CONCRETE whereas all other grades, M15 and above, shall be DESIGN MIX CONCRETE. Concrete grade shall not be lower than M-20 for building and M-25 for water retaining structures (all units of STP including distribution chambers, sludge chambers, inlet/outlet chambers adjacent to PST/AT/SST).

### **2.6.2 Design Mix Concrete:**

#### **(a) Mix Design & Testing:**

For Design Mix Concrete, the mix shall be designed according to IS: 10262 and SP:23 to provide the grade of concrete having the required workability and characteristic strength not less than appropriate values given in IS:456. The design mix shall be cohesive and does not segregate and should result in a dense and durable concrete and also capable of giving the finish as specified. For liquid retaining structures, the mix shall also result in water tight concrete. The Contractor shall exercise great care while designing the concrete mix and executing the works to achieve the desired result.

The minimum cement content for Design Mix Concrete shall be as per Appendix-A of IS:456 or as given below, whichever is higher.

Grade of Concrete	Minimum Cement Content in Kg/m <sup>3</sup> of Concrete
M15	260
M20	315
M25	360
M30	380
M 35	400

The minimum cement content stipulated above shall be adopted irrespective of whether the Contractor achieves the desired strength with less quantity of cement. The CONTRACTOR's quoted rates for concrete shall provide for the above eventuality and nothing extra shall be paid to the CONTRACTOR on this account. Even in the case where the quantity of cement required is higher than that specified above to achieve desired strength based on an approved mix design, nothing extra shall become payable to the CONTRACTOR.

It shall be the Contractor's sole responsibility to carry out the mix designs at his own cost. He shall furnish to the EMPLOYER at least 30 days before concreting operations, a statement of proportions proposed to be used for the various concrete mixes and the strength results obtained. The strength requirements of the concrete mixes ascertained on 150 mm cubes as per IS: 516 shall comply with the requirements of IS:456.

Grade of Concrete	Minimum Compressive Strength N/sq.mm at 7 days	Specified Characteristic Compressive Strength N/sq.mm at 28 days
M 15	10.0	15.0
M 20	13.5	20.0
M 25	17.0	25.0
M 30	20.0	30.0
M 35	23.5	35.0
M 40	27.0	40.0

A range of slumps which shall generally be used for various types of construction unless otherwise instructed by the Engineer in charge is given below:

Structure/Member	Slump in millimeters	
	Maximum	Minimum
Reinforced foundation walls and footings	75	25
Plain footings, caissons and substructure walls	100	25
Slabs, Beams and reinforced walls	75	25
Pump & miscellaneous Equipment Foundations	100	25
Building columns	50	25
Pavements	50	25
Heavy mass construction	50	25

**(b) Batching & Mixing of Concrete:**

Proportions of aggregates and cement, as decided by the concrete mix design, shall be by weight. These proportions shall be maintained during subsequent concrete batching by means of weigh batchers capable of controlling the weights within one percent of the desired value.

Amount of water added shall be such as to produce dense concrete of required consistency, specified strength and satisfactory workability and shall be so adjusted to account for moisture content in the aggregates. Water- cement ratio specified for use by the Engineer in charge shall be maintained. Each time when the work stops, the mixer shall be cleaned out, and while recommencing, the first batch shall have 10% additional cement to allow for sticking in the drum.

Arrangement should be made by the Contractor to have the cubes tested in an approved laboratory or in field with prior consent of the Engineer in charge. Sampling and testing of strength and workability of concrete shall be as per IS:1199, IS:516 and IS:456, IS 3370.

**2.6.3 Nominal Mix Concrete;**

**(a) Mix Design & Testing:**

Mix design and preliminary tests are not necessary for Nominal Mix Concrete.

However, works tests shall be carried out as per IS: 456. Proportions for Nominal Mix Concrete and Water Cement Ratio may be adopted as per Table-3 of IS: 456. However, it will be the Contractor's sole responsibility to adopt appropriate nominal mix proportions to yield the specified strength.

(b) **Batching & Mixing of Concrete:**

Based on the adopted nominal mixes, aggregates shall be measured by volume. However, cement shall be by weight only.

**2.7 Formwork:**

Formwork shall be all inclusive and shall consist of shoring, bracings, sides of footings, walls, beams and columns, bottom of slabs etc. including ties, anchors, hangers, inserts, false work, wedges etc.

The design and engineering of the formwork as well as its construction shall be the responsibility of the Contractor. However, if so desired by the Engineer in charge, the drawings and calculations for the design of the formwork shall be submitted to the Engineer in charge for approval.

Formwork shall be designed to fulfill the following requirements:

- (a) Sufficiently rigid and tight to prevent loss of grout/ slurry or mortar from the concrete at all stages and appropriate to the methods of placing and compacting.
- (b) Made of suitable materials.
- (c) Capable of providing concrete of the correct shape and surface finish within the specified tolerance limits.
- (d) Capable of withstanding without deflection the worst combination of self-weight, reinforcement and concrete weight, all loads and dynamic effects arising from construction and compacting activities, earthquake, wind and weather forces.
- (e) Capable of easy striking out without shock, disturbance or damage to the concrete.
- (f) Soffit forms capable of imparting a camber if required.
- (g) Soffit forms and supports capable of being left in position if required.

- (h) Capable of being cleaned and/or coated, if necessary, immediately prior to casting the concrete; design temporary openings where necessary for these purposes and to facilitate the preparation of construction joints.

The formwork may be of timber, plywood, steel, plastic or concrete depending upon the type of finish specified. Sliding forms and slip form may be used with the approval of the Engineer in charge. Timber for formwork shall be well seasoned, free from sap, shakes, loose knots, worm holes, warps and other surface defects. Joints between formwork and between formwork and structures shall be sufficiently tight to prevent loss of slurry from concrete, using seals if necessary.

The faces of formwork coming in contact with concrete shall be cleaned and two coats of approved mold oil applied before fixing reinforcement. All rubbish, particularly chippings, shavings, sawdust, wire pieces dust etc. shall be removed from the interior of the forms before the concrete is placed. Where directed, cleaning of forms shall be done by blasting with a jet of compressed air at no extra cost.

Forms intended for reuse shall be treated with care. Forms that have deteriorated shall not be used. Before reuse, all forms shall be thoroughly scraped, cleaned, nails removed, holes suitably plugged, joints repaired and warped lumber replaced to the satisfaction of the Engineer in charge. The Contractor shall equip himself with enough shuttering to allow for wastage so as to complete the job in time.

Permanent formwork shall be checked for its durability and compatibility with adjoining concrete before it is used in the structure. It shall be properly anchored to the concrete.

Wire ties passing through beams, columns and walls shall not be allowed. In their place bolts passing through sleeves shall be used. Formwork spacers left in situ shall not impair the desired appearance or durability of the structure by causing spilling, rust staining or allowing the passage of moisture.

For liquid retaining structures, sleeves shall not be provided for through bolts nor shall through bolts be removed if provided. The bolts, in the latter case, shall be cut at 25 mm depth from the surface and the hole made good by cement mortar of the same proportion as the concrete just after striking the formwork.



Where specified all corners and angles exposed in the finished structure shall have chamfers or fillets of 20 mm x 20 mm size.

Forms for substructure may be omitted when, in the opinion of the Engineer in charge, the open excavation is firm enough (in hard non-porous soils) to act as a form. Such excavations shall be larger, as approved by the Engineer in charge, than that required as per drawing to compensate for irregularities in excavation.

The Contractor shall provide adequate props carried down to a firm bearing without overloading any of the structures.

The shuttering for beams and slabs shall be so erected that the side shuttering of beams can be removed without disturbing the bottom shuttering. If the shuttering for a column is erected for the full height of the column, one side shall be built up in sections as placing of concrete proceeds or windows left for placing concrete from the side to limit the drop of concrete to 1.0m or as approved by the Engineer in charge. The Contractor shall temporarily and securely fix items to be casted (embedment / inserts) in a manner that will not hinder the striking of forms or permit loss of grout.

Formwork showing excessive distortion, during any stage of construction, shall be repositioned and strengthened. Placed concrete affected by faulty formwork, shall be entirely removed and formwork corrected prior to placement of new concrete at Contractor's cost.

The striking time for formwork shall be determined based on the following requirements:

- (a) Development of adequate concrete strength;
- (b) Permissible deflection at time of striking form work;
- (c) Curing procedure employed - its efficiency and effectiveness;
- (d) Subsequent surface treatment to be done;
- (e) Prevention of thermal cracking at re-entrant angles;
- (f) Ambient temperatures; and
- (g) Aggressiveness of the environment (unless immediate adequate steps are taken to prevent damage to the concrete).

Under normal circumstances (generally where temperatures are above 20°C) forms may be struck after expiry of the time period given in IS: 456 unless approved otherwise by the Engineer in charge. For Portland Pozzolana slag cement the stripping time shall be suitably modified as approved by the Engineer in charge. It is the Contractor's responsibility to ensure that forms are not struck until the concrete has developed sufficient strength to support itself, does not undergo excessive deformation and resist surface damage and any stresses arising during the construction period.

## **2.8 Reinforcement Workmanship;**

Reinforcing bars supplied bent or in coils shall be straightened cold without damage.

No bending shall be done when ambient temperature is below 5°C. Local warming may be permitted if steel is kept below 10° C.

All bars shall be accurately cut and bent gradually and according to the sizes and shapes shown on the drawings/ schedules or as directed by Engineer in charge. Re-bending or straightening incorrectly bent bars shall not be done without the approval of the Engineer in charge.

Reinforcement shall be accurately fixed and maintained firmly in the correct position by the use of blocks, spacers, chairs, binding wire etc. to prevent displacement during placing and compaction of concrete. The tied in place reinforcement shall be approved by the Engineer in charge prior to concrete placement. Spacers shall be of such materials and designs as will be durable, not lead to corrosion of the reinforcement and not cause spilling of the concrete cover.

Binding wire shall be 16-gauge soft annealed wires. Ends of the binding wire shall be bent away from the concrete surface and in no case encroach into the concrete cover.

Substitution of reinforcement, laps/splices not shown on drawing shall be subject to Engineer in charge's approval.

## 2.9 Tolerances:

Tolerance for formwork and concrete dimensions shall be as per IS:456 unless specified otherwise.

Tolerances specified for horizontal or vertical building lines or footings shall not be construed to permit encroachment beyond the legal boundaries.

The formwork shall be designed and constructed to the shapes, lines and dimensions shown on the drawings within the tolerances given below:

(a)	Deviation from specified dimensions of cross section of columns and beams	- 6 mm+ 12 mm
(b)	Deviations from dimensions of footings (Tolerances apply to concrete dimensions only, not to positioning of vertical reinforcing steel or dowels	
	1) Dimension in plan	- 12 mm+ 50 mm
	2) Eccentricity	0.02 times the width of the footing in the direction of deviation but not more than 50 mm.
	3) Thickness	± 0.05 times the specified thickness

## 2.10 Preparation Prior to Concrete Placement:

Before concrete is actually placed in position, the inside of the formwork shall be cleaned and mold oil applied, inserts and reinforcement shall be correctly positioned and securely held, necessary openings, pockets, etc. provided.

All arrangements-formwork, equipment and proposed procedure, shall be approved by the Engineer in charge. Contractor shall maintain separate Pour Card for each pour as per the format enclosed.

## 2.11 Transporting, Placing and Compacting Concrete:

Concrete shall be transported from the mixing plant to the formwork with minimum time lapse by methods that shall maintain the required workability and will prevent segregation, loss of any ingredients or ingress of foreign matter or water.

In all cases concrete shall be deposited as nearly as practicable directly in its final position. To avoid segregation, concrete shall not be rehandled or caused to flow. For locations where direct placement is not possible and in narrow forms the Contractor shall provide suitable drops and "Elephant Trunks". Concrete shall not be dropped from a height of more than 1.0m.

Concrete shall not be placed in flowing water. Under water, concrete shall be placed in position by tremie or by pipeline from the mixer and shall never be allowed to fall freely through the water.

While placing concrete the Contractor shall proceed as specified below and also ensure the following:

- (a) Continuously between construction joints and pre-determined abutments.
- (b) Without disturbance to forms or reinforcement.
- (c) Without disturbance to pipes, ducts, fixings and the like to be cast in; ensure that such items are securely fixed. Ensure that concrete cannot enter open ends of pipes and conduits etc.
- (d) Without dropping in a manner that could cause segregation or shock.
- (e) In deep pours only when the concrete and formwork designed for this purpose and by using suitable chutes or pipes.
- (f) Do not place if the workability is such that full compaction cannot be achieved.
- (g) Without disturbing the unsupported sides of excavations; prevent contamination of concrete with earth. Provide sheeting if necessary. In supported excavations, withdraw the linings progressively as concrete is placed.
- (h) If placed directly onto hardcore or any other porous material, dampen the surface to reduce loss of water from the concrete.
- (i) Ensure that there is no damage or displacement to sheet membranes.

- (j) Record the time and location of placing structural concrete.

Concrete shall normally be compacted in its final position within thirty minutes of leaving the mixer. Concrete shall be compacted during placing with approved vibrating equipment without causing segregation until it forms a solid mass free from voids thoroughly worked around reinforcement and embedded fixtures and into all corners of the formwork. Immersion vibrators shall be inserted vertically at points not more than 450 mm apart and withdrawn slowly till air bubbles cease to come to the surface, leaving no voids. When placing concrete in layers advancing horizontally, care shall be taken to ensure adequate vibration, blending and melding of the concrete between successive layers. Vibrators shall not be allowed to come in contact with reinforcement, formwork and finished surfaces after start of initial set. Over-vibration shall be avoided.

Concrete may be conveyed and placed by mechanically operated equipment after getting the complete procedure approved by the Engineer in charge. The slump shall be held to the minimum necessary for conveying concrete by this method. When concrete is to be pumped, the concrete mix shall be specially designed to suit pumping. Care shall be taken to avoid stoppages in work once pumping has started.

Except when placing with slip forms, each placement of concrete in multiple lift work shall be allowed to set for at least 24 hours after the final set of concrete before the start of subsequent placement. Placing shall stop when concrete reaches the top of the opening in walls or bottom surface of slab, in slab and beam construction, and it shall be resumed before concrete takes initial set but not until it has had time to settle as approved by the Engineer in charge. Concrete shall be protected against damage until final acceptance.

#### **2.12 Mass Concrete Works:**

Sequence of pouring for mass concrete works shall be as approved by the Engineer in charge. The Contractor shall exercise great care to prevent shrinkage cracks and shall monitor the temperature of the placed concrete if directed.

#### **2.13 Curing:**

Curing and protection shall start immediately after the compaction of the concrete to protect it from:

- (a) Premature drying out, particularly by solar radiation and wind;

- (b) Leaching out by rain and flowing water;
- (c) Rapid cooling during the first few days after placing;
- (d) High internal thermal gradients;
- (e) Low temperature or frost;
- (f) Vibration and impact which may disrupt the concrete and interfere with its bond to the reinforcement.

All concrete, unless approved otherwise by the Engineer in charge, shall be cured by use of continuous sprays or ponded water or continuously saturated coverings of sacking, canvas or other absorbent material for the period of complete hydration with a minimum of 7 days. The quality of curing water shall be the same as that used for mixing.

Where a curing membrane is approved to be used by the Engineer in charge, the same shall be of a non-wax base and shall not impair the concrete finish in any manner. The curing compound to be used shall be approved by the EMPLOYER before use and shall be applied with spraying equipment capable of a smooth, even textured coat.

Curing may also be done by covering the surface with an impermeable material such as polyethylene, which shall be well sealed and fastened.

#### **2.14 Construction Joints and Keys:**

Construction joints will be as shown in the drawing or as approved by the EMPLOYER. Concrete shall be placed without interruption until completion of work between construction joints. If stopping of concreting becomes unavoidable anywhere, a properly formed construction joint shall be made with the approval of the Engineer in charge.

Dowels for concrete work, not likely to be taken up in the near future, shall be coated with cement slurry and encased in lean concrete as indicated on the drawings or as approved by the Engineer in charge.

Before resuming concreting on a surface which has hardened all laitance and loose stone shall be thoroughly removed by wire brushing, hacking and surface washed with high pressure water jet and treated with thin layer of cement slurry for vertical joints and horizontal layers.

When concreting is to be resumed on a surface which has not fully hardened, all laitance shall be removed by wire brushing, the surface wetted, free water removed and a coat of cement slurry applied. On this, a layer of concrete not exceeding 150 mm thickness shall be placed and well rammed against the old work. **Thereafter work shall proceed in the normal way.**

#### **2.15 Foundation Bedding:**

All earth surfaces upon which or against which concrete is to be placed, shall be well compacted and free from standing water, mud or debris. Soft or spongy areas shall be cleaned out and back filled with either soil-cement mixture, lean concrete or clean sand compacted as approved by the Engineer in charge. The surfaces of absorptive soils shall be moistened.

Concrete shall not be deposited on large sloping rock surfaces. The rock shall be cut to form rough steps or benches by picking, barring or wedging. The rock surface shall be kept wet for 2 to 4 hours before concreting.

#### **2.16 Finishes:**

##### **2.16.1 General:**

The formwork for concrete works shall be such as to give the finish as specified. The Contractor shall make good any unavoidable defects as approved consistent with the type of concrete and finish as specified. Defects due to bad workmanship (e.g. damaged or misaligned forms, defective or poorly compacted concrete) will not be accepted. The Contractor shall construct the formwork using the correct materials and to meet the requirements of the design and to produce finished concrete to required dimensions, plumbs, planes and finishes.

##### **Surface Finish Type F1:**

The main requirement is that of dense, well-compacted concrete. No treatment is required except repair of defective areas, filling all form tie holes and cleaning up of loose or adhering debris. For surfaces below grade, which will receive waterproofing treatment, the concrete shall be free of surface irregularities, which would interfere with proper and effective application of waterproofing material specified for use.

##### **Surface Finish Type F2:**

The appearance shall be that of a smooth dense, well-compacted concrete showing

the slight marks of well fitted shuttering joints. The Contractor shall make good any blemishes.

**Surface Finish Type F3:**

This finish shall give an appearance of smooth, dense, well-compacted concrete with no shutter marks, stain free and with no discoloration, blemishes, arises, air holes etc. Only lined or coated plywood with very tight joints shall be used to achieve this finish. The panel size shall be uniform and as large as practicable. Any minor blemishes that might occur shall be made good by the Contractor.

**Integral Cement Finish on Concrete Floor:**

In all cases where integral cement finish on a concrete floor has been specified, the top layer of concrete shall be screened off to proper level and tamped with tamper having conical projections so that the aggregate shall be forced below the surface. The surface shall be finished with a wooden float and a trowel with pressure. The finish shall be continued till the concrete reaches its initial set. No cement or cement mortar finish shall be provided on the surface. Where specified, a floor hardener as approved by the Engineer-In-Charge shall be supplied and used as recommended by the manufacturer.

The formwork for concrete works shall be such as to give the finish as specified. The Contractor shall make good any unavoidable defects as approved consistent with the type of concrete and finish specified; defects due to bad workmanship (e.g. damaged or misaligned forms, defective or poorly compacted concrete) will not be accepted. The Contractor shall construct the formwork using the correct materials and to meet the requirements of the design and to produce finished concrete to required dimensions, plumbs, planes and finishes.

**2.17 Repair and Replacement of Unsatisfactory Concrete:**

Immediately after the shuttering is removed, all the defective areas such as honey-combed surfaces, rough patches, holes left by form bolts etc. shall be inspected by the Engineer in charge who may permit patching of the defective areas or reject the concrete work.

All through holes for shuttering shall be filled for full depth and neatly plugged flush with surface.



Rejected concrete shall be removed and replaced by the Contractor at no additional cost to the Employer.

For patching of defective areas all loose materials shall be removed and the surface shall be prepared as approved by the Engineer in charge.

Bonding between hardened and fresh concrete shall be done either by placing cement mortar or by applying epoxy. The decision of the Engineer in charge as to the method of repairs to be adopted shall be final and binding on the Contractor. The surface shall be saturated with water for 24 hours before patching is done with 1:5 cement sand mortar. The use of epoxy for bonding fresh concrete shall be carried out as approved by the Engineer in charge.

#### **2.18 Vacuum Dewatering of Slabs:**

Where specified floor slabs, either grade or suspended, shall be finished by vacuum dewatering including all operations such as poker vibration, surface vibration, vacuum processing, floating and toweling as per equipment manufacturers recommendation. The equipment to be used shall be subject to the Engineer in charge's approval.

#### **2.19 Hot Weather Requirements:**

Concreting during hot weather shall be carried out as per IS: 7861 (Part I).

Adequate provisions shall be made to lower concrete temperatures which shall not exceed 40° C at the time of placement of fresh concrete.

Where directed by the Engineer in charge, the Contractor shall spray non-wax based curing compound on unformed concrete surfaces at no extra costs.

#### **Cold Weather Requirements.**

Concreting during cold weather shall be carried out as per IS: 7861 (Part II).

The ambient temperature during placement and up to final set shall not fall below 5° C. Approved antifreeze accelerating additives shall be used where directed.

For major and large scale concreting works the temperature of concrete at times of mixing and placing, the thermal conductivity of the formwork and its insulation and stripping period shall be closely monitored.

## **2.20 Liquid Retaining Structures:**

The Contractor shall take special care for concrete for liquid retaining structures, underground structures and those others specifically called for to guarantee the finish and water tightness.

The minimum level of surface finish for liquid retaining structures shall be as defined elsewhere. All such structures shall be hydro-tested.

The Contractor shall make all arrangements for hydro-testing of structure, all arrangements for testing such as temporary bulk heads, pressure gauges, pumps, pipe lines etc.

The Contractor shall also make all temporary arrangements that may have to be made to ensure stability of the structures during construction.

Any leakage that may occur during the hydro-test or subsequently during the defects liability period or the period for which the structure is guaranteed shall be effectively stopped either by cement-epoxy pressure grouting, guniting or such other methods as may be approved by the Engineer in charge. All such rectification shall be done by the Contractor to the entire satisfaction of the Engineer in charge at no extra cost.

## **2.21 Testing Concrete Structures for Leakage:**

Hydro-static test for water tightness shall be done at full storage level or soffit of cover slab, as may be directed by the Engineer in charge, as described below:

In case of structures whose external faces are exposed, such as elevated tanks, the requirements of the test shall be deemed to be satisfied if the external faces show no sign of leakage or sweating and remain completely dry during the period of observation of seven days after allowing a seven-day period for absorption after filling with water.

In the case of structures whose external faces are buried and are not accessible for inspection, such as underground tanks, the structures shall be filled with water and after the expiry of seven days after the filling; the level of the surface of the water shall be recorded. The level of water shall be recorded again at subsequent intervals of 24 hrs. Over a period of seven days. Backfilling shall be withheld till the tanks are tested. The total drop in surface level over a period for seven days shall be taken as an indication of the watertightness of the structure. The Engineer in charge shall

decide on the actual permissible nature of this drop in the surface level, taking into account whether the structures are open or closed and the corresponding effect it has on evaporation losses. Unless specified otherwise, a structure whose top is covered shall be deemed to be water tight if the total drop in the surface level over a period of seven days does not exceed 40 mm.

Each compartment, segment of the structure shall be tested individually and then all together.

For structures such as pipes, tunnels etc. the hydrostatic test shall be carried out by filling with water, after curing as specified, and subjecting to the specified test pressure for specified period. If during this period the loss of water does not exceed the equivalent of the specified rate, the structure shall be considered to have successfully passed the test.

## **2.22 Optional Tests:**

If the Employer feels that the materials i.e. cement, sand, coarse aggregates, reinforcement and water are not in accordance with the Specifications or if specified concrete strengths are not obtained, he may order tests to be carried out on these materials in laboratory, to be approved by the Engineer in charge, as per relevant IS Codes. Contractor shall have to pay for these tests.

In the event of any work being suspected of faulty material or workmanship requiring its removal or if the works cubes do not give the stipulated strengths, the Engineer in charge reserves the right to order the Contractor to take out cores and conduct tests on them or do ultrasonic testing or load testing of structure, etc. The Engineer in charge also reserves the right to ask the Contractor to dismantle and re-do such unacceptable work, at no cost to the Engineer in charge. Alternately Engineer in charge also reserves the right to ask the CONTRACTOR to dismantle and re-do such unacceptable work at the cost of CONTRACTOR.

## **2.23 Grouting:**

### **2.23.1 Standard Grout:**

Grout shall be provided as specified on the drawings.

The proportion of Standard Grout shall be such as to produce a flow able mixture consistent with minimum water content and shrinkage. Surfaces to be grouted shall be thoroughly roughened and cleaned. All structural steel elements to be grouted

shall be cleaned of oil, grease, dirt etc. The use of hot, strong caustic solution for this purpose will be permitted. Prior to grouting, the hardened concrete shall be saturated with water and just before grouting, water in all pockets shall be removed. Grouting once started shall be done quickly and continuously. Variation in grout mixes and procedures shall be permitted if approved by the Engineer in charge. The grout proportions shall be limited as follows:

Use	Grout Thickness	Mix Proportions	Water Cement Ratio (max)
a) Fluid mix	Under 25mm	One part Portland Cement to one part sand	0.44
b) General mix	25mm and over but less than 50mm	One part Portland Cement to 2 parts of sand	0.53
c) Stiff mix	50mm and over	One part Portland Cement to 3 parts of sand	0.53

### 2.23.2 Non-Shrink Grout:

Non-shrink grout where required shall be provided in strict accordance with the manufacturer's instructions /specifications on the drawing.

#### Inspection:

All materials, workmanship and finished construction shall be subject to continuous inspection and approval of Engineer in charge. Materials rejected by Engineer in charge shall be expressly removed from site and shall be replaced by Contractor immediately.

#### Clean-Up:

Upon the completion of concrete work, all forms, equipment, construction tools, protective coverings and any debris, scraps of wood, etc. resulting from the work shall be removed and the premises left clean.

#### Acceptance Criteria:

Any concrete work shall satisfy the requirements given below individually and collectively for it to be acceptable.

- a) Properties of constituent materials;

- b) Characteristic compressive strength;
- c) Specified mix proportions;
- d) Minimum cement content;
- e) Maximum free-water/cement ratio;
- f) Workability;
- g) Temperature of fresh concrete;
- h) Density of fully compacted concrete;
- i) Cover to embedded steel;
- j) Curing;
- k) Tolerances in dimensions;
- l) Tolerances in levels;
- m) Durability;
- n) Surface finishes;
- o) Special requirements such as;
  - i) Water tightness
  - ii) Resistance to aggressive chemicals
  - iii) Resistance to freezing and thawing
  - iv) Very high strength
  - v) Improved fire resistance
  - vi) Wear resistance
  - vii) Resistance to early thermal cracking

The Engineer in charge's decision as to the acceptability or otherwise of any concrete work shall be final and binding on the Contractor.

For work not accepted, the Engineer in charge may review and decide whether remedial measures are feasible so as to render the work acceptable. The Engineer in charge shall in that case direct the Contractor to undertake and execute the remedial measures. These shall be expeditiously and effectively implemented by the Contractor. Nothing extra shall become payable to the Contractor by the Employer for executing the remedial measures.

## 2.24 Water stops:

### 2.24.1 Material:

The material for the PVC water stops shall be a plastic compound with the basic resin of polyvinyl chloride and additional resins, plasticizers, inhibitors, which satisfies the performance characteristics specified below as per IS:12200. Testing shall be in accordance with IS: 8543.

- |      |                        |   |                                 |
|------|------------------------|---|---------------------------------|
| a)   | Tensile strength       | : | 3.6 N/mm <sup>2</sup> minimum   |
| b)   | Ultimate elongation    | : | 300% minimum                    |
| c)   | Tear resistance        | : | 4.9 N/mm <sup>2</sup> minimum   |
| d)   | Stiffness in flexure   | : | 2.46 N/mm <sup>2</sup> minimum  |
| e)   | Accelerated extraction |   |                                 |
| i)   | Tensile strength       | : | 10.50 N/mm <sup>2</sup> minimum |
| ii)  | Ultimate elongation    | : | 250% minimum                    |
| (f)  | Effect of Alkali       | : | 7 days                          |
| i)   | Weight increase        | : | 0.10% maximum                   |
| ii)  | Weight decrease        | : | 0.10% maximum                   |
| iii) | Hardness change        | : | ± 5 points                      |
| (g)  | Effect of Alkali       | : | 28 days                         |
| i)   | Weight increase        | : | 0.40% maximum                   |

- ii) Weight decrease : 0.30% maximum
- iii) Dimension change :  $\pm 1\%$

PVC water stops shall be either of the bar type, serrated with center bulb and end grips for use within the concrete elements or of the surface (kicker) type for external use.

PVC water stops shall be of approved manufacture. Samples and the test certificate shall be got approved by the Engineer in charge before procurement for incorporation in the works. Alternatively, G.I. sheet of 18 gage (1.3mm) thick and 200mm wide can be used by the contractor as construction joints.

Alternatively, contractors can use G.I sheet 200mm wide and 18 gauge thick as constructions joints.

#### **2.24.2 Workmanship:**

Water stops shall be cleaned before placing them in position. Oil or grease shall be removed thoroughly using water and suitable detergents.

Water stops shall be procured in long lengths as manufactured to avoid joints as far as possible. Standard L or T type of intersection pieces shall be procured for use depending on their requirement. Any non-standard junctions shall be made by cutting the pieces to profile for jointing. Lapping of water stops shall not be permitted. All jointing shall be of fusion welded type as per manufacturer's instructions.

Water stops shall be placed at the correct location, level and suitably supported at intervals with the reinforcement to ensure that it does not deviate from its intended position during concreting and vibrating. Care shall also be taken to ensure that no honey-combing occurs because of the serrations and end grips, by placing concrete with smaller size aggregates in this region. Projecting portions of the water stops embedded in concrete shall be thoroughly cleaned of all mortar/ concrete coating

before resuming further concreting operations. The projecting water stop shall also be suitably supported at intervals with the reinforcement to maintain its intended position during concreting so as to ensure that it does not bend leading to formation of pockets. In addition, smaller size aggregates shall be used for concreting in this region also.

## **2.25 Preformed Fillers and Joint Sealing Compound:**

### **2.25.1 Materials:**

Preformed filler for expansion/isolation joints shall be non-extruding and resilient type of bitumen impregnated fibers conforming to IS:1838 (Part I).

Bitumen coat to concrete/masonry surfaces for fixing the preformed bitumen filler strip shall conform to IS:702. Bitumen primer shall conform to IS:3384.

Sealing compound for filling the joints above the preformed bitumen filler shall conform to Grade 'A' as per IS:1834.

### **2.25.2 Workmanship:**

The thickness of the preformed bitumen filler shall be 25mm for expansion joints and 50mm for isolation joints around foundation supporting rotatory equipment's. Contractor shall procure the strips of the desired thickness and width in lengths as manufactured. Assembly of small pieces/thicknesses of strips to make up the specified size shall not be permitted.

The concrete/masonry surface shall be cleaned free from dust and any loose particles. When the surface is dry, one coat of industrial blown type bitumen of grade 85/25 conforming to IS: 702 shall be applied hot by brushing at the rate of 1.20 kg/m<sup>2</sup>. When the bitumen is still hot the preformed bitumen filler shall be pressed and held in position till it completely adheres. The surface of the filler against which



further concreting/masonry work is to be done shall similarly be applied with one coat of hot bitumen at the rate of 1.20 kg/m<sup>2</sup>.

Sealing compound shall be heated to a pouring consistency for enabling it to run molten in a uniform manner into the joint. Before pouring the sealing compound, the vertical faces of the concrete joint shall be applied hot with a coat of bitumen primer conforming to IS: 3384 in order to improve the adhesive quality of the sealing compound.

Expansion joints between beams/slabs shall be provided with 100mm wide x 4mm thick mild steel plate at the soffit of RCC beams/slabs to support and prevent the preformed joint filler from dislodging. This plate shall be welded to an edge angle of ISA 50 x 50 x 6mm provided at the bottom corner, adjacent to the expansion joint of one of the beams/slabs, by intermittent fillet welding. Steel surfaces shall be provided with 2 coats of red oxide zinc chrome primer and 3 coats of synthetic enamel paint finish.

CONCRETE POUR CARD					
POUR NO.:			DATE:		
DRG. NO.:			STRUCTURE:		
CONCRETE GRADE/QUANTITY/:			MAX. AGGREGATE SIZE /		
SLUMP:			START /COMPLETION TIME:		
SL. NO	ITEM			YES/NO	Remarks If Any
1.	BEFORE CONCRETING	CENTRELINES CHECKED		YES/NO	
2.		FORMWORK AND STAGING CHECKED FOR ACCURACY, STRENGTH & FINISH		YES/NO	
3		REINFORCEMENT CHECKED		YES/NO	
4		COVER TO REINFORCEMENT CHECKED		YES/NO	
5		VERIFIED TEST CERTIFICATE FOR CEMENT /STEEL		YES/NO	
6		ADEQUACY OF MATERIALS / EQUIPMENT FOR POUR		YES/NO	
7		EMBEDDED PARTS (LOCATION & PLUMB) CHECKED	CIVIL	YES/NO	
			MECH.	YES/NO	
			ELEC.	YES/NO	
8	SOFFIT(S) & POUR TOP(T) LEVELS CHECKED BEFORE (B) & AFTER (A) FORM REMOVAL			S(B) T(B) S(A) T(A)	
9	CONSTRUCTION JOINTS LOCATION & TYPE EXPANSION JOINTS – LOCATION AND TYPE				
10	CEMENT CONSUMPTION IN KGS.				
10A	REINFORCEMENT CONSUMPTION DIAWISE IN KGS				
11	NUMBER OF CUBES AND IDENTIFICATION MARKS				
12	TEST CUBE RESULTS (7 DAYS /28 DAYS)				
13	CONCRETE CONDITION ON FORM REMOVAL			V.GOOD/ GOOD,FAIR,POOR	

Contractor's Representative  
Representative

Engineer- in-charge's

NOTES:

1. EACH POUR TO HAVE SEPARATE CARDS, IN TRIPPLICATE ONE EACH FOR CLIENT, CONTRACTOR & SITE OFFICE.
- a) UNDER REMARKS, INDICATE DEVIATIONS FROM DWGS. & SPECIFICATIONS, CONGESTION IN REINFORCEMENT IF ANY, UNUSUAL OCCURRENCES SUCH AS FAILURE OF EQUIPMENTS, SINKING OF SUPPORTS / PROPS. HEAVY RAINS AFFECTING CONCRETING, POOR COMPACTION, IMPROPER CURING, OTHER DEFICIENCIES, OBSERVATIONS ETC.

# ***SPECIFICATIONS***

***: SECTION -4:***

***: BUILDING ITEMS:***

## SECTION - 4: BUILDING ITEMS.

### Applicable Codes and Specifications

The following codes and standards are included in this section, as part of these specifications. However, respective IS codes for the works not mentioned here shall also be applicable for those particular items of work.

- IS: 110 - Ready mixed paint, brushing, gray filler, for Enamels for use over primers
- IS: 269 - Specification for 33 grade ordinary Portland cement
- IS: 280 - Specification for mild steel wire for general Engineering purposes
- IS: 287 - Recommendations for maximum permissible Moisture content of timber used for different purposes
- IS: 383 - Specif. for coarse & fine aggregates from natural sources for concrete
- IS: 412 - Expanded metal steel sheets for general purposes
- IS: 419 - Specification for putty for use on window frames
- IS: 428 - Distemper, oil emulsion, color as required
- IS: 459 - Specification for unreinforced corrugated and semi-corrugated asbestos cement sheets
  
- IS: 702 - Specification for industrial bitumen
- IS: 710 - Specification for marine plywood
- IS: 712 - Specification for building limes
- IS: 730 - Specification for hook bolts for corrugated sheet Roofing
- IS: 733 - Wrought aluminum and aluminum alloys, bars, Rods and sections for general engineering purposes
- IS: 777 - Specification for glazed earthenware tiles
- IS: 1003 - Specification for timber paneled and glazed shutters (Parts 1 & 2)
- IS: 1038 - Specification for steel doors, windows and ventilators
- IS: 1077 - Specification for common burnt clay building bricks
- IS: 1081 - Code of practice for fixing and glazing of metal (steel & aluminum) doors, windows and ventilators.
  
- IS: 1124 - Method of test for determination of water absorption, apparent specific gravity and porosity of natural building stones
- IS: 1237 - Specification for cement concrete flooring tiles
- IS: 1322 - Bitumen felts for water proofing and damp proofing
- IS: 1346 - Code of practice for water proofing of roofs with bitumen felts

- IS:1361 - Specification for steel windows for industrial buildings
- IS: 1443 - Code of practice for laying and finishing of cement concrete flooring tiles
- IS: 1477 - Code of practice for painting of ferrous metals in buildings (Parts 1 & 2)
- IS: 1542 - Specification for sand for plaster
- IS: 1580 - Specification for bituminous compounds for water-proofing and caulking purposes
- IS: 1597 - Code of practice for construction of stone masonry: Part 1 Rubble stone masonry
- IS: 1661 - Code of practice for application of cement and cement-lime plaster finishes
- IS: 1834 - Specification for hot applied sealing compound for joint in concrete
- IS: 1838 - Specification for preformed fillers for expansion joint in concrete Pavements and structures (none extruding and resilient type): Part 1 Bitumen impregnated fiber.
- IS: 1948 - Specification for aluminum doors, windows and ventilators
- IS: 1949 - Specification for aluminum windows for industrial buildings
- IS: 2074 - Ready mixed paint, air drying, red oxide- zinc chrome, priming
- IS: 2114 - Code of practice for laying in-situ terrazzo floor finish
- IS: 2116 - Specification for sand for masonry mortars
- IS: 2185 - Specification for concrete masonry units (Parts 1,2& 3)
- IS: 2202 - Specification for wooden flush door shutters (Solid core type): Parts 1&2
- IS: 2212 - Code of practice for brickwork
- IS: 2250 - Code of practice for preparation and use of masonry mortars
- IS: 2338 - Code of practice for finishing of wood and wood based materials (Parts 1 & 2)
- IS: 2395 - Code of practice for painting concrete, masonry and plaster surfaces (Parts 1 & 2)
- IS: 2402 - Code of practice for external rendered finishes
- IS: 2571 - Code of practice for laying in-situ cement concrete flooring
- IS: 2572 - Code of practice for construction of hollow concrete block masonry
- IS: 2645 - Specification of integral cement waterproofing compounds
- IS: 2690 - Specification for burnt clay flat terracing tiles: Part 1 Machine made
- IS: 2691 - Specification for burnt clay facing bricks
- IS: 2750 - Specification for steel scaffoldings
- IS: 2835 - Flat transparent sheet glass
- IS: 2932 - Specification for enamel, synthetic, exterior type (a) undercoating, (b) finishing

- IS: 3007 - Code of practice for laying of asbestos cement sheets - corrugated and (Part 1 & 2) semi-corrugated sheets
- IS: 3067 - Code of practice of general design details and preparatory work for Damp-proofing and water- proofing of buildings
- IS: 3068- Specification for broken brick (burnt clay) coarse aggregates for use in Lime concrete.
- IS: 3384 - Specification for bitumen primer for use in water-proofing and damp-proofing
- IS: 3462 - Specification for unbaked flexible PVC flooring
- IS: 3495 - Method of test for burnt clay building bricks: Part 1 to 4
- IS: 3536 - Specification for ready mixed paint, brushing, and wood primer, pink
- IS: 3696 - Safety code of scaffolds and ladders (Parts 1 & 2)
- IS: 4020 - Methods of test for wooden flush door: Type test
- IS: 4021 - Specification for timber door, window and ventilator frames
- IS: 4351 - Specification for steel door frames
- IS: 4443 - Code of practice for use of resin type chemical resistant mortars
- IS: 4457 - Specification for ceramic unglazed vitreous acid resisting tile
- IS: 4631 - Code of practice for laying epoxy resin floor toppings
- IS: 4832 - Specification for chemical resistant mortars (Part II)
- IS: 4860 - Specification for acid resistant bricks
- IS: 4948 - Specification for welded steel wire fabric for general use
- IS: 5318 - Code of practice for laying of flexible PVC sheet and tile flooring
- IS: 5410 - Cement paint, colour as required
- IS: 5411 - Specification for plastic emulsion paint (Parts 1 & 2)
- IS: 5437 - Wired and figured glass
- IS: 5491 - Code of practice for laying of in-situ granolithic concrete floor topping
- IS: 6042 - Code of practice for construction of light weight concrete block masonry
- IS: 6248 - Specification for metal rolling shutters and rolling grilles
- IS: 7193 - Specification for glass fiber base coal tar pitch and bitumen felts
- IS: 7452 - Specification for hot rolled steel sections for doors, windows and ventilators
- IS: 8042 - Specification for white Portland cement
- IS: 9197 - Specification for epoxy resin, hardeners and epoxy resin composites for floor topping
- IS: 9862 - Specification for ready mixed paint, brushing, bituminous, black, lead-free, acid, alkali, water and chlorine resisting

IS: 12200 - Code of practice for provision of water stops at transverse contraction joints in masonry and concrete dams

**Brickwork:**

**Materials:**

Bricks used in the works shall conform to the requirements laid down in IS: 1077. The class of the bricks shall be as specifically indicated in the respective items of work.

The nominal size of the modular brick shall be 200 mm x 100 mm x 100 mm with the permissible tolerances over the actual size of 190mm x90 mm x 90 mm as per IS: 1077. The nominal thickness of one brick and half brick walls using modular bricks shall be considered as 200 mm and 100 mm respectively. In the event of use of traditional bricks of nominal size 230 mmx115mmx75mm with tolerance upto  $\pm 3$  mm in each dimension, one brick and half brick walls shall be considered as 230 mm and 115 mm respectively.

Bricks shall be sound, hard, and homogenous in texture, well burnt in kiln without being vitrified, hand machine moulded, deep red, cherry or copper colored, of regular shape and size & shall have sharp and square edges with smooth rectangular faces. The bricks shall be free from pores, cracks, flaws and nodules of free lime. Hand Moulded bricks shall be Moulded with a frog and those made by extrusion process may not be provided with a frog. Bricks shall give a clear ringing sound when struck and shall have a minimum crushing strength of  $3N\text{sq.mm}$  unless otherwise specified in the Items of work prepared by the Contractor.

The average water absorption shall not be more than 20 percent by weight up to class 12.5 and 15 percent by weight for higher classes. Bricks which do not conform to this requirement shall be rejected. Over or under burnt bricks are not acceptable for use in the works. Sample bricks shall be submitted to the BMC for approval and bricks supplied shall conform to approved samples. If demanded by BMC, brick samples shall be got tested as per IS: 3495 by Contractor. Bricks rejected by BMC shall be removed from the site of works within 24 hours.

Mortar for brick masonry shall consist of cement and sand and shall be prepared as per IS: 2250. Mix shall be in the proportion of 1:5 for brickwork of thickness one brick or above and 1:4 for brickwork of thickness half brick or below, unless otherwise specified in the respective items of work prepared by the Contractor. Sand for masonry mortar shall conform to IS:218. 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 approved by BMC. If so directed by the BMC, sand shall be screened and washed till it satisfies the limits of deleterious materials.



For preparing cement mortar, the ingredients shall first be mixed thoroughly in dry condition. Water shall then be added and mixing continued to give a uniform mix of required consistency. Mixing shall be done thoroughly in a mechanical mixer, unless hand mixing is specifically permitted by the BMC. The mortar thus mixed shall be used as soon as possible, preferably within 30 minutes from the time water is added to cement. In case, the mortar has stiffened due to evaporation of water, this may be re-tempered by adding water as required to restore consistency, but this will be permitted only up to 30 minutes from the time of initial mixing of water to cement. Any mortar which is partially set shall be rejected and shall be removed from the site. Droppings of mortar shall not be re-used under any circumstances. The Contractor shall arrange for test on mortar samples if so directed by the BMC.

**Workmanship:**

Workmanship of brick work shall conform to IS: 2212. 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 shall be as specified in the respective item of work prepared by the Contractor. Brick work 200mm/230mm thick and over shall be laid in English Bond unless otherwise specified. 100mm/115mm thick brickwork 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 slightly pressed into the mortar and shoved into final position so as to embed the brick fully in mortar. Only full size bricks shall be used for the works and cut bricks utilized only as closers to make up required wall length or for bonding. Bricks shall be laid with frogs on top.

All brickwork shall be plumb, square 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. In case of one brick thick or half brick thick wall, at least one face should be kept smooth and plane, even if the other is slightly rough due to variation in size of bricks. For walls of thickness greater than one brick both faces shall be kept smooth and plane. 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 deg. But in no case the level difference between adjoining walls shall exceed one meter. Brickwork shall not be raised more than one meter per day.

Bricks 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 10mm/15mm by raking tools during the progress of work when the mortar is still green, so as to provide a proper key for the plastering/pointing respectively to be done later. When plastering or pointing 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. During inclement weather conditions, newly built brick masonry works shall be protected by tarpaulin or other suitable covering to prevent mortar being washed away by rain.

Brickwork shall be kept constantly moist on all the faces for at least seven days after 24 hrs of laying. The arrangement for curing shall be got approved from the E.I.C.

Double scaffolding having two sets of vertical supports shall be provided to facilitate execution of the masonry works. The scaffolding shall be designed adequately considering all the dead, live and possible impact loads to ensure safety of the workmen, in accordance with the requirements stipulated in IS:2750 and IS:3696 (Part I). Scaffolding shall be properly maintained during the entire period of construction. Single scaffolding shall not be used on important works and will be permitted only in certain cases as decided by the BMC. Where single scaffolding is adopted, only minimum number of holes, by omitting a header shall be left in the masonry for supporting horizontal scaffolding poles. All holes in the masonry shall be carefully made good before plastering, pointing.

In the event of usage of traditional bricks of size 230 mm x115mm x75mm, the courses at the top of the plinth and sills as well as at the top of the wall just below the roof/floor slabs and at the top of the parapet shall be laid with bricks on edge. All brickwork shall be built tightly against columns, floor slabs or other structural members.

To overcome the possibility of development of cracks in the brick masonry following measures shall be adopted. For resting RCC slabs, the bearing surface of masonry wall shall be finished on top with 12 mm thick cement mortar 1:3 and provided with 2 layers of Kraft paper Grade 1 as per IS:1397 or 2 layers of 50 micron thick polyethylene sheets.

RCC/steel beams resting on masonry wall shall be provided with reinforced concrete bed blocks of 50 mm thickness, projecting 50mm on either sides of the beam, duly

finished on top with 2 layers of Kraft paper Grade 1 as per IS:1397 or 2 layers of 50 micron thick polyethylene sheets.

Steel wire fabric shall be provided at the junction of brick masonry and concrete before taking up plastering work. Bricks for partition walls shall be stacked adjacent to the structural member to pre-deflect the structural member before the wall is taken up for execution. Further, the top most course of half or full brick walls abutting against either a de-shuttered slab or beam shall be built only after any proposed masonry wall above the structural member is executed to cater for the deflection of the structural element.

Reinforced cement concrete transoms and mullions of dimensions as indicated in the construction Drawings to be prepared by the Contractor are generally required to be provided in the half brick partition walls.

Where the drawings prepared by the Contractor indicate that structural steel sections are to be encased in brickwork, the brickwork masonry shall be built closely against the steel section, ensuring a minimum of 20mm thick cement-sand mortar 1:4 over all the steel surfaces. Steel sections partly embedded in brickwork shall be provided with bituminous protective coating to the surfaces at the point of entry into the brick masonry.

Facing bricks of the type specified conforming to IS: 2691 shall be laid in the positions indicated on the Drawings prepared by the Contractor and all facing brickwork shall be well bonded to the backing bricks/RCC surfaces. The level of execution of the facing brickwork shall at any time be lower by at least 600 mm below the level of the backing brickwork. Facing bricks shall be laid over 10 mm thick backing of cement mortar. The mortar mix, thickness of joint and the type of pointing to be carried out shall be as specified in the item of works prepared by the Contractor. The pattern of laying the bricks shall be as specifically indicated in the Drawings prepared by the Contractor. For facing brickwork, double scaffolding shall be used. Faced works shall be kept clean and free from damage, discoloration etc., at all times.

#### **Uncoursed Random Rubble Masonry, in Foundation, Plinth and Superstructure.**

##### **Materials:**

Stones for the works shall be of the specified variety, which are hard, durable, fine grained and uniform in colour (for superstructure work) free from veins, flaws and other defects. Quality and work shall conform to the requirements specified in IS: 1597 (Part-I). The percentage of water absorption shall not exceed 5 percent as per

test conducted in accordance with IS: 1124. The Contractor shall supply sample stones to the BMC for approval. Stones shall be laid with its grains horizontal so that the load transmitted is always perpendicular to the natural bed.

Cement-sand mortar for stone masonry works shall be in the proportion of 1:6. Materials and preparation of mortar shall be as specified in clause 7.2.1.

**Workmanship:**

For All Works below ground level the masonry shall be random rubble uncoursed with ordinary quarry dressed stones for the hearting and selected quarry dressed stones for the facing.

For all works above ground level and in superstructure the masonry shall be random rubble uncoursed, well bonded, faced with hammer dressed stones with squared quoins at corners. The bushings on the face shall not be more than 40 mm on an exposed face and on the face to be plastered it shall not project by more than 12 mm nor shall it have depressions more than 10 mm from the average wall surface.

Face stones shall extend back sufficiently and bond well with the masonry. The depth of stone from the face of the wall inwards shall not be less than the height or breadth at the face. The length of the stone shall not exceed three times the height and the breadth on base shall not be greater than three-fourths the thickness of wall nor less than 150 mm. The height of stone may be up to a maximum of 300 mm. Face stones or hearting stones shall not be less than 150 mm in any direction. Chips and spalls shall be used wherever necessary to avoid thick mortar joints and to ensure that no hollow spaces are left in the masonry. The use of chips and spalls in the hearting shall not exceed 20 percent of the quantity of stone masonry. Spalls and chips shall not be used on the face of the wall and below hearting stones to bring them to the level of face stones.

The maximum thickness of joints shall not exceed 20 mm. All joints shall be completely filled with mortar. When plastering or pointing is not required to be done, the joints shall be struck flush and finished as the work proceeds. Otherwise, the joints shall be raked to a minimum depth of 20 mm by a raking tool during the progress of the work while the mortar is still green.

Through or bond stones shall be provided in walls up to 600 mm thick and in case of walls above 600 mm thickness, a set of two or more bond stones overlapping each other by at least 150 mm shall be provided in a line from face to back. In case of highly absorbent types of stones (porous lime stone and sand stone, etc.) the bond stone shall extend about two-thirds into the wall and a set of two or more bond

stones overlapping each other by at least 150 mm shall be provided. Each bond stone or a set of bond stones shall be provided for every 0.5 sq.m of wall surface.

All stones shall be sufficiently wetted before laying to prevent absorption of water from the mortar. All connected walls in a structure shall be normally raised uniformly and regularly. However, if any part of the masonry is required to be left behind, the wall shall be raked back (and not saw toothed) at an angle not exceeding 45deg. Masonry work shall not be raised by more than one meter per day. Green work shall be protected from rain by suitable covering. Masonry work shall be kept constantly moist on all the faces for a minimum period of seven days for proper curing of the joints.

Type of scaffolding to be used shall be as specified in clause 7.2.2.

#### **Coursed Rubble Masonry (First Sort) for Superstructure:**

##### **Materials:**

The Material specification for the work shall be as per clause 7.3.1.

##### **Workmanship:**

All Courses shall be laid truly horizontal and shall be of the same height in any course. The height of course shall not be less than 150 mm and not more than 300 mm. The width of stone shall not be less than its height.

Face stones shall tail into the work for not less than their height and at least 1/3<sup>rd</sup> the number of stones shall tail into the work for a length not less than twice their height but not more than three-fourths the thickness of the wall whichever is smaller. These should be laid as headers and stretchers alternately to break joints by at least 75 mm.

The face stones shall be squared on all joints and beds; the bed joints being hammer or chisel dressed true and square for at least 80 mm back from the face and the side joints for at least 40 mm. The face of the stone shall be hammer dressed so that the bushing shall not be more than 40 mm on an exposed face and 10 mm on a face to be plastered. No portion of the dressed surface shall show a depth of gap more than 6 mm from a straight edge placed on it. The remaining unexposed portion of the stone shall not project beyond the surface of bed and side joints.

No spalls or pinning shall be allowed on the face. All bed joints shall be horizontal and side joints shall be vertical and no joints shall be more than 10 mm in thickness. When plastering or pointing is not required to be done, the joints shall be struck

flush and finished as the work proceeds. Otherwise, the joints shall be raked to a minimum depth of 20 mm by a raking tool, during the progress of the work while the mortar is still green.

Hearting shall consist of flat bedded stones carefully laid on their proper beds and solidly bedded in mortar. The use of chips shall be restricted to the filling of interstices between the adjacent stones in hearting and these shall not exceed 10 percent of the quantity of the stone masonry. Care shall be taken so that no hollow spaces are left anywhere in the masonry.

The requirement regarding through or bond stones shall be as specified in clause 7.3.2 with the further stipulation that these shall be provided at 1.5 m to 1.8m apart clear in every course but staggered at alternate courses.

The quoins which shall be of the same height as the course, in which they occur, shall not be less than 450 mm in any direction. Quoin stones shall be laid as stretchers and headers alternately. They shall be laid square on their beds, which shall be rough chisel dressed to a depth of at least 100 mm from the face. These stones shall have a minimum uniform chisel draft of 25mm width at four edges, all the edges being in the same plane.

Type of scaffolding to be used shall be as per Clause 7.2.2. Requirements of execution of the work and curing shall be as stipulated in clause 7.3.2.

### **Concrete Block Masonry:**

#### **Materials**

Masonry units of hollow and solid concrete blocks shall conform to the requirements of IS: 2185 (Part I).

Masonry units of hollow and solid light-weight concrete blocks shall conform to the requirements of IS: 2185 (Part 3).

Masonry units of autoclaved cellular concrete blocks shall conform to the requirements of IS: 2185 (Part 3).

The height of the concrete masonry units shall not exceed either its length or six times its width.

The nominal dimensions of concrete block shall be as under.

Length 400, 500 or 600 mm

Height 100 or 200 mm

Width 100 to 300 mm in 50 mm increments

Half blocks shall be in lengths of 200, 250 or 300mm to correspond to the full-length blocks.

Actual dimensions shall be 10mm short of the nominal dimensions.

The maximum variation in the length of the units shall not be more than  $\pm 5$  mm and maximum variation in height or width of the units shall not be more than  $\pm 3$ mm.

Concrete blocks shall be either hollow blocks with open or closed cavities or solid blocks. Concrete blocks shall be sound, free of cracks, chipping or other defects which impair the strength or performance of the construction. Surface texture shall as specify. The faces of the units shall be flat and rectangular, opposite faces shall be parallel and all arises shall be square.

The bedding surfaces shall be at right angles to the faces of the block.

The concrete mix for the hollow and solid concrete blocks/light weight concrete blocks shall not be richer than one part of cement to six parts of combined aggregates by volume. Concrete blocks shall be of approved manufacture, which satisfy the limitations in the values of water absorption, drying shrinkage and moisture movement, as specified for the type of block as per relevant IS code. Contractor shall furnish the test certificates and also supply the samples for the approval of BMC.

**Workmanship:**

The type of the concrete block, thickness and grade based on the compressive strength for use in load bearing and/or non-load bearing walls shall be as specified.

The minimum nominal thickness of non-load bearing internal walls shall be 100mm.

The minimum nominal thickness of external panel walls in framed construction shall be 200 mm.

The workmanship shall generally conform to the requirements of IS: 2572 for concrete block masonry, IS: 6042 for light weight concrete block masonry and IS:6041 for autoclaved cellular concrete block masonry works.

From considerations of durability, generally concrete block masonry shall be used in superstructure works above the damp-proof course level.

Concrete blocks shall be embedded with a mortar which is relatively weaker than the mix of the blocks in order to avoid the formation of cracks. Cement mortar of

proportion 1:6 shall be used for the works. Preparation of mortar shall be as specified in clause 7.2.1.

The thickness of both horizontal and vertical joints shall be 10mm. The first course shall be laid with greater care, ensuring that it is properly aligned, leveled and plumb since this will facilitate in laying succeeding courses to obtain a straight and truly vertical wall. For the horizontal (bedding) joint, mortar shall be spread over the entire top surface of the block including front and rear shells as well as the webs to a uniform layer of 10mm. For vertical joints, the mortar shall be applied on the vertical edges of the front and rear shells of the blocks. The mortar may be applied either to the unit already placed on the wall or on the edges of the succeeding unit when it is standing vertically and then placing it horizontally, well pressed against the previously laid unit to produce a compacted vertical joint. In case of two cell blocks with slight depression on the vertical sides these shall also be filled up with mortar to secure greater lateral rigidity. To assure satisfactory bond, mortar shall not be spread too far ahead of actual laying of the block as the mortar will stiffen and lose its plasticity. Mortar while hardening shrinks slightly and thus pulls away from the edges of the block. The mortar shall be pressed against the units with a jointing tool after it has stiffened to effect intimate contact between the mortar and the unit to obtain a weather tight joint. The mortar shall be raked to a depth of 10mm as each course is laid to ensure good bond for the plaster.

Dimensional stability of hollow concrete blocks is greatly affected by variations of moisture content in the units. Only well dried blocks should be used for the construction. Blocks with moisture content more than 25% of maximum water absorption permissible shall not be used. The blocks should not be wetted before or during laying in the walls. Blocks should be laid dry except slightly moistening their surfaces on which mortar is to be applied to obviate absorption of water from the mortar.

As per the design requirements and to effectively control cracks in the masonry, RCC bound beams/studs, joint reinforcement shall be provided at suitable locations. Joint reinforcement shall be fabricated either from mild steel wires conforming to IS: 280 or welded wire fabric high strength deformed basis.

For jambs of doors, windows and openings, concrete blocks shall be provided. If hollow units are used, the hollows shall be filled with concrete of mix 1:3:6. Hold fasts of doors/windows should be arranged so that they occur at block course level.

At intersection of walls, the courses shall be laid up at the same time with a true masonry bond between at least 50% of the concrete blocks. The sequence for construction of partition walls and treatment at the top of load bearing walls for the



RCC slab shall be as detailed under clause 7.2 for the brick work. Curing of the mortar joints shall be carried out for at least 7 days. The walls should only be lightly moistened and shall not be allowed to become excessively wet. Double scaffolding as per clause 7.2.2 shall be adopted for execution of block masonry work. Cutting of the units shall be restricted to a minimum. All horizontal and vertical dimensions shall be in respectively, adopting modular co-ordination for walls, opening locations for doors, windows etc.

Concrete blocks shall be stored at site suitably to avoid any contact with moisture from the ground and covered to protect against wetting.

**Damp - Proof Course:**

**Materials and Workmanship:**

Where Specified, all the walls in a building shall be provided with damp-proof course cover at plinth to prevent water from rising up the wall. The damp-proof course shall run without a break throughout the length of the wall, even under the door or other openings. Damp-proof course shall consist of 50 mm thick cement concrete of 1:2:4 nominal mix with approved water-proofing compound admixture conforming to IS: 2645 in proportion as directed by the manufacturer. Concrete shall be with 10 mm downgraded coarse aggregates.

The surface of brick work, stone masonry work shall be leveled and prepared before laying the cement concrete. Side shuttering shall be properly fixed to ensure that slurry does not leak through and is also not disturbed during compaction. The upper and side surface shall be made rough to afford key to the masonry above and to the plaster.

Damp-proof course shall be cured properly for at least seven days after which it shall be allowed to dry for taking up further work.

**Miscellaneous Inserts, Bolts etc.**

All the miscellaneous inserts such as bolts, pipes, plate embedment etc., shall be accurately installed in the building works at the correct location and levels, all as detailed in the construction Drawings to be prepared by the Contractor. Contractor shall prepare and use templates for this purpose, if so directed by the BMC. In the event, of any of the inserts are improperly installed, Contractor shall make necessary arrangements to remove and reinstall at the correct locations, levels, all as directed by the BMC.

## **Wood Work for Doors, Windows, Ventilators & Partitions**

### **Materials**

Timber to be used shall be first class Teak wood as per IS: 4021. Timber shall be of the best quality and well-seasoned by a suitable process before being planned to the required sizes. The maximum permissible moisture content shall be from 10 to 16 percent for timber 50mm and above in thickness and 8 to 14 percent of timber less than 50mm in thickness for different regions of the country as stipulated in IS:287. Timber shall be close grained, of uniform colour and free from decay, fungal growth, boxed heart, pitch pockets or streaks on the exposed edges, borer holes, splits and cracks.

Flush door shutters of the solid core type with plywood face panels shall conform to IS: 2202 (Part 1) and with particle board/hard board face panels shall conform to IS: 2202 (Part 2).

Transparent sheet glass shall conform to the requirements of IS: 2835. Wired and figured glass shall be as per IS: 5437.

Builder's hardware for fittings and fixtures shall be of the best quality from approved manufacturers.

### **Workmanship:**

The workmanship and finish of wood work in doors, windows, ventilators and partitions shall be of a very high order. Contractor shall ensure that work is executed in a professional manner by skilled carpenters for good appearance, efficient and smooth operation of the shutters.

All works shall be executed as per the detailed Drawings prepared by the Contractor and/or as directed by the BMC.

All members of the door, window, and ventilator shall be straight without any warp or bow and shall have smooth well-planned faces. The right angle shall be checked from the inside surfaces of the respective members of the frame. Frames shall have mortise and tenon joints which shall be treated with an approved adhesive and provided with metal or wood pins. The vertical members of the door frame shall project 50 mm below the finished floor level. The finished dimension of frames shall be rebated on the solid for keying with the plaster and for receiving the shutters. The depth of rebate for housing the shutter shall be 15 mm. The size of the frames shall be as specified in the respective items of work prepared by the Contractor. The workmanship shall generally conform to the requirements specified in IS:4021.

The face of the frames abutting the masonry or concrete shall be provided with a coat of coal tar.

Three hold fasts using 25 mm x 6 mm mild steel flats 225 mm long with split ends shall be fixed on each side of door and window frames, one at the center and the other two at 300 mm from the top and bottom of the frame. For window and ventilator frames less than 1 m in height, two hold fasts on each side shall be fixed at quarter points.

Timber paneled shutters for doors, windows and ventilators shall be constructed in the form of framework of stiles and rails with panel insertion. The panels shall be fixed by either providing grooves in the stiles and rails or by beading. Glazing bars shall be as detailed in the Drawings prepared by the Contractor. The stiles and rails shall be joined by mortise and tenon joints at right angles. All members of the shutter shall be straight without any warp or bow and shall have smooth, well-planned faces at right angles to each other. The right angle for the shutter shall be checked by measuring the diagonals and the difference shall not be more than  $\pm 3$  mm. Timber panels made from more than one piece shall be jointed with a continuous tongued and grooved joint, glued together and reinforced with metal dowels. The workmanship shall generally conform to the requirements specified in IS: 1003 (Parts 1 & 2). The thickness of the shutter, width/thickness of the stiles/rails/panel type shall be as specified. Marine plywood panels conforming to IS:710 shall be used for doors where specified.

Details of the wooden flush door shutters, solid core type with specific requirement of the thickness, core, face panels, viewing glazed panel, Venetian louver opening, teak wood lapping etc. shall be as specified. Panels of shutter shall be of marine plywood conforming to IS:710. Flush door shutters shall be from reputed manufacturers and Contractor shall submit test results as per IS:4020, if so desired by the BMC.

Glazing of door, window, ventilator and partitions shall be with either flat transparent sheet glass, wired or figured glass. Transparent sheet glass shall be of 'B' quality as per IS:2835. The thickness and type of glazing to be provided shall be as specified.

The material of the fittings and fixtures either of chromium plated steel, cast brass, copper oxidized or anodized aluminum shall be as specified. The number, size and type of the fittings and fixtures shall be as specified.

Woodwork shall not be provided with the finishes of painting/varnishing etc. unless it has been approved by the BMC. The type of finish and the number of coats shall be

as stipulated in the respective items of work prepared by the Contractor. Preparation of the wood surfaces and application of the finishes shall be in accordance with clause 7.32.

Wooden hand railing and architraves shall be of the size and shape with the fixing arrangement as indicated in the Drawings prepared by the Contractor.

The framework of the partitions with mullions and transoms shall be with the sections of dimensions as specified. Panels of double/single glazing plywood shall be fixed as per details specified. Partitions shall be fixed rigidly between the floor and structural columns/beams including provision of necessary shims for wedging etc. Finished work shall be of rigid construction, erected truly plumb to the lines and levels, at locations as per the construction Drawings prepared by the Contractor.

Any carpentry work which shows defects due to inadequate seasoning of the timber or bad workmanship shall be removed and replaced by Contractor with work as per Specifications.

#### **Steel Doors, Windows and Ventilators:**

##### **Materials:**

Hot rolled steel sections for the fabrication of steel doors, windows and ventilators shall conform to IS: 7452, which are suitable for, single glazing.

Pressed steel door frames for steel flush doors shall be out of 1.25mm thick mild steel sheets of profiles as per IS: 4351.

Transparent sheet glass shall conform to the requirements of IS: 2835. Wired and figured glass shall be as per IS: 5437.

Builder's hardware of fittings and fixtures shall be of the best quality from the approved manufacturers.

##### **Workmanship:**

All steel doors, windows and ventilators shall be of the type as specified in the respective items of work prepared by the Contractor and of sizes as indicated in the Drawings prepared by the Contractor prepared by the Contractor. Steel doors, windows and ventilators shall conform to the requirements as stipulated in IS: 1038. Steel windows shall conform to IS: 1361, if so specified.

Doors, windows and ventilators shall be of an approved manufacture. Fabrication of the unit shall be with rolled section, cut to correct lengths and metered. Corners

shall be welded to form a solid fused welded joint conforming to the requirements of IS: 1038. Tolerance in overall dimensions shall be within  $\pm 1.5\text{mm}$ . The frames and shutters shall be free from warp or buckle and shall be square and truly plain. All welds shall be dressed flush on exposed and contact surfaces. Punching of holes, slots and other provisions to install fittings and fixtures later shall be made at the correct locations as per the requirements. Samples of the units shall be got approved by the BMC before further manufacture, purchase by the Contractor.

Type and details of shutters, hinges, glazing bar requirement, couplings, locking arrangement, fittings and fixtures shall be as described in the respective items of work and / or as shown in the Drawings prepared by the Contractor for single or composite units.

For windows with fly proof mesh as per the item of work prepared by the Contractor, rotor operator arrangement, for the operation of the glazed shutters from the inside shall be provided.

Pressed steel door frames shall be provided with fixing lugs at each jamb, hinges, lock-strike plate, mortar guards, angle threshold, shock-absorbers of rubber or similar material as per the requirements of IS: 4351. Pressed steel doorframes shall be fixed as 'built-in' as the masonry work proceeds. After placing it plumb at the specified location, masonry walls shall be built up solid on either side or each course grouted with mortar to ensure solid contact with the doorframe, without leaving any voids. Temporary struts across the width shall be fixed, during erection to prevent bow/sag of the frame. Door shutters of flush welded construction shall be 45 mm thick, fabricated with two outer skins of 1.25mm thick steel sheets, 1mm thick steel sheet stiffeners and steel channels on all four edges. Double shutters shall have meeting stile edge beveled or rebated. Provision of glazed viewing panel, louvers shall be made as per the items of works and/or Drawings prepared by the Contractor. Shutters shall be suitably reinforced for lock and other surface hardware and to prevent sagging & twisting. Single sheet steel door shutters shall be fabricated out of 1.25mm thick steel sheets, mild steel angles and stiffeners as per the Drawings prepared by the Contractor.

Doors, windows and ventilators shall be fixed into the prepared openings. They shall not be 'built-in' as the masonry work proceeds, to avoid distortion and damage of the units. The dimensions of the masonry opening shall have 10mm clearance around the overall dimensions of the frame for this purpose. Any support of scaffolding members on the frames, glazing bars is prohibited.

Glazing of the units shall be either with flat transparent glass or wired / figured glass of the thickness as specified in the items of works prepared by the Contractor. All glass panels shall have properly squared corner and straight edges. Glazing shall be provided on the outside of the frames.

Fixing of the glazing shall be either with spring glazing clips and putty conforming to IS:419 or with metal beads. Pre-formed PVC or rubber gaskets shall be provided for fixing the beads with the concealed screws. The type of fixing the glazing shall be as indicated in the items of work and/or in Drawings prepared by the Contractor.

Steel doors, windows and ventilators shall be provided with finish of either painting as specified or shall be hot dip galvanized with thickness of the zinc coating as stipulated all as described in the respective items of works prepared by the Contractor.

The material of the Builders hardware of fittings and fixtures of chromium plated steel, cast brass, brass copper oxidized or anodized aluminum shall be as specified in the items of works prepared by the Contractor. The number, size and type of fittings and fixtures shall be as in the Drawings items of works prepared by the Contractor.

Installation of the units with fixing lugs, screws, mastic caulking compound at the specified locations shall generally conform to the requirements of IS:1081. Necessary holes etc required for fixing shall be made by the Contractor and made good after installation. Workmanship expected is of a high order for efficient and smooth operation of the units.

#### **Aluminum Doors, Windows, Ventilators & Partitions:**

##### **Materials:**

Aluminum alloy used in the manufacture of extruded sections for the fabrication of doors, windows, ventilators shall conform to designation HE9-WP of IS: 733.

Transparent sheet glass shall conform to the requirements of IS: 2835. Wired and figured glass shall be as per IS: 5437.

Builder's hardware of fittings & fixtures shall be of the best quality from approved manufacturers.

##### **Workmanship:**

All aluminum doors, windows, ventilators and partitions shall be of the type and size as specified. The doors, windows, ventilators shall conform to the requirements of IS: 1948. Aluminum windows shall conform to IS: 1949, if so specified.

All aluminum units shall be supplied with anodized finish. The minimum anodic film thickness shall be 0.015 mm. Doors, windows and ventilators shall be of an approved manufacture. Fabrication of the units shall be with the extruded sections, cut to correct lengths, mitered and welded at the corners to a true right angle conforming to the requirements of IS: 1948. Tolerance in overall dimensions shall be within  $\pm$  1.5mm. The frames and shutters shall be free from warp or buckle and shall be square and truly plane. Punching of holes, slots and other provisions to install fittings or fixtures later shall be made at the correct locations, as per the requirements. Aluminum swing type doors, aluminum sliding windows, partitions shall be as specified.

IS:1948 and IS:1949 referred to incorporates the sizes, shapes, thicknesses and weight per running meter of extruded sections for the various components of the units. However, new sizes, shapes, thicknesses with modifications to suit snap-fit glazing clips etc. are being continuously being added by various leading manufacturers of extruded sections, which are available in the market. As such, the sections of the various components of the unit proposed by the Contractor will be reviewed by the BMC and will be accepted only if they are equal to or marginally more than that given in the codes as specified.

The framework of the partitions with mullions and transom shall be with anodized aluminum box sections. Anodized aluminum box sections shall be in-filled with timber of class 3 (silver oak or any other equivalent) as per IS: 4021. Panels of double/single glazing plywood shall be fixed as per details indicated in the Drawings to be prepared by the Contractor. Partitions shall be fixed rigidly between the floor and the structural columns/beams including provision of necessary shims for wedging etc. Finished work shall be of rigid construction, erected truly plumb to the lines and levels, at locations as per the construction Drawings to be prepared by the Contractor.

Specific provisions as stipulated for steel doors, windows, ventilators under clause 7.9.2 shall also be applicable for this item work. Glazing beads shall be of the snap-fit type suitable for the thickness of glazing proposed as indicated in the items of works prepared by the Contractor. A layer of clear transparent lacquer shall be applied on aluminum sections to protect them from damage during installation. This lacquer coating shall be removed after the installation is completed.

**Steel Rolling Shutters:****Materials and Workmanship:**

Rolling shutters shall be of an approved manufacture, conforming to the requirements specified in IS: 6248.

The type of rolling shutter shall be self-coiling type (manual) for clear areas upto 12 m<sup>2</sup>, gear operated type (mechanical) for clear areas up to 35 m<sup>2</sup> and electrically operated type for areas up to 50 sq.m. Mechanical type of rolling shutters shall be suitable for operation from both inside and outside with the crank handle or chain gear operating mechanism duly considering the size of wall/column. Electrical type of rolling shutter shall also be provided with a facility for emergency mechanical operation.

Rolling shutters shall be supplied duly considering the type, specified clear width,height of the opening and the location of fixing as indicated in the Drawings prepared by the Contractor. Shutters shall be built up of interlocking laths 75 mm width between rolling centers formed from cold rolled steel strips. The thickness of the steel strip shall not be less than 0.90 mm for shutters up to 3.50m width and not less than 1.20 mm for shutters above 3.50 m width. Each lath section shall be continuous single piece without any welded joint. The guide channels out of mild steel sheets of thickness not less than 3.15 mm shall be of either rolled, pressed or built-up construction. The channel shall be of size as stipulated in IS:6248 for various clear widths of the shutters.

Hood covers shall be of mild steel sheets not less than 0.90 mm thick and of approved shape. Rolling shutters shall be provided with a central hasp and staple safety device in addition to one pair of lever locks and sliding locks at the ends.

All component parts of the steel rolling shutter (excepting springs and insides of guide channels) shall be provided with one coat of zinc chrome primer conformity to IS:2074 at the shop before supply. These surfaces shall be given an additional coat of primer after erection at the site along with the number of coats and type of finish paint as specified in the respective items of works prepared by the Contractor. Painting shall be carried out as per clause 7.33.

In case of galvanized rolling shutter, the lath sections, guides, lock plate, bracket plates, suspension shaft and the hood cover shall be hot dip galvanized with a zinc coating containing not less than 97.5 percent pure zinc. The weight of the zinc coating shall be at least 610gms/m<sup>2</sup>.



Guide channels shall be installed truly plumb at the specified location. Bracket plate shall be rigidly fixed with necessary bolts and holdfasts. Workmanship of erection shall ensure strength and rigidity of rolling shutter for trouble free and smooth operation.

**Rubble Sub-Base:**

**Materials:**

Stones used for rubble packing under floors on grade, foundations etc., shall be clean, hard, durable rock free from veins, flaws, laminations, weathering and other defects. Stones shall generally conform to the requirements stipulated in IS: 1597 (Part I).

Stones shall be as regular as can be obtained from quarries. Stones shall be of height equal to the thickness of the packing proposed with a tolerance of  $\pm 10$  mm. Stones shall not have a base area less than 250 sq cm nor more than 500 sq.cm, and the smallest dimension of any stone shall not be less than half the largest dimension. The quality and size of stones shall be subject to the approval of the BMC.

**Workmanship:**

Stones shall be hand packed carefully and laid with their largest base downwards resting flat on the prepared sub-grade and with their height equal to the thickness of the packing. Stones shall be laid breaking joints and in close contact with each other. All interstices between the stones shall be wedged-in by small stones of suitable size, well driven in by crow bars and hammers to ensure tight packing and complete filling-in of the interstices. The wedging shall be carried out simultaneously with the placing in position of rubble packing and shall not lag behind. After this, any interstices between the smaller wedged stones shall be unfilled with clean hard sand by brooming so as to fill the joints completely.

The laid rubble packing shall be sprinkled with water and compacted by using suitable rammers.

**Base Concrete:**

The thickness and grade of concrete and reinforcement shall be as specified in items of works prepared by the contractor.

Before placing the blinding concrete, the sub-base of rubble packing shall be properly wetted and rammed. Concrete for the base shall then be deposited between

the forms, thoroughly tamped and the surface finished level with the top edges of the forms. Two or three hours after the concrete has been laid in position, the surface shall be roughened using steel wire brush to remove any scum or laitance and swept clean so that the coarse aggregates are exposed. The surface of the base concrete shall be left rough to provide adequate bond for the floor finish to be provided later.

### **Terrazzo and Plain Cement Tiling Work:**

#### **Materials:**

Terrazzo tiles and cement tiles shall generally conform in all respects to standards stipulated in IS:1237. Tiles shall be of the best quality manufactured adopting hydraulic pressure of not less than  $14\text{N/mm}^2$ .

The type, quality, size, thickness colour etc, of the tiles for flooring, dado, skirting shall be as specified.

The aggregates for terrazzo topping shall consist of marble chips which are hard, sound and dense. Cement to be used shall be either ordinary Portland cement or white cement with or without coloring pigment. The binder mix shall be with 3 parts of cement to 1 part of marble powder by weight. The proportion of cement shall be inclusive of any pigments. For every one part of cement-marble powder binder mix, the proportion of aggregates shall be 1.75 parts by volume, if the chips are between 1mm to 6mm and 1.50 parts by volume if the chips are between 6mm to 25mm.

The minimum thickness of wearing layer of terrazzo tiles shall be 5mm for tiles with chips of size varying from 1mm up to 6mm or from 1mm up to 12mm. This shall be 6mm for tiles with chips varying from 1mm up to 25mm. The minimum thickness of wearing layer of cement, colored cement tiles shall be 5mm. This shall be 6mm for heavy duty tiles. Pigment used in the wearing layer shall not exceed 10 percent of the weight of cement used in the mix.

#### **Workmanship**

Laying and finishing of tiles shall conform to the requirements of workmanship stipulated in IS: 1443.

Tiling work shall be commenced only after the door and window frames are fixed and plastering of the walls/ceiling is completed. Wall plastering shall not be carried out upto about 50 mm above the level of proposed skirting, dado.

The base concrete shall be finished to a reasonably plane surface about 40 to 45mm below the level of finished floor. Before the tiling work is taken up, the base

concrete or structural slab shall be cleaned of all loose materials, mortar droppings, dirt, laitance etc. using steel wire brush and well wetted without allowing any water pools on the surface. A layer of 25mm average thickness of cement mortar consisting of one part of cement to 6 parts of sand shall be provided as bedding for the tiles over the base concrete. The thickness of bedding mortar shall not be less than 10mm at any place. The quantity of water to be added for the mortar shall be just adequate to obtain the workability for laying. Sand for the mortar shall conform to IS:2116 and shall have minimum fineness modulus of 1.5. The surface shall be left rough to provide a good bond for the tiles. The bedding shall be allowed to harden for a day before laying of the tiles. Neat cement slurry using 4.4 kg of cement per m<sup>2</sup> of floor area shall be spread over the hardened mortar bedding over such an area at a time as would accommodate about 20 tiles. Tiles shall be fixed in this slurry one after the other, each tile being gently tapped with a wooden mallet till it is properly bedded and in level with the adjoining tiles. The joints shall be in straight lines and shall normally be 1.5mm wide. On completion of laying of the tiles in a room, all the joints shall be cleaned and washed fairly deep with a stiff broom/wire brush to a minimum depth of 5mm. The day after the tiles have been laid, the joints shall be filled with cement grout of the same shade as the colour of the matrix of the tile. For this purpose, white cement or grey cement with or without pigments shall be used. The flooring should be kept moist and left undisturbed for 7 days for the bedding/joints to set properly. Heavy traffic shall not be allowed on the floor for at least 14 days after fixing of the tiles.

About a week after laying the tiles, each and every tile shall be lightly tapped with a small wooden mallet to find out if it gives a hollow sound; if it does, such tiles along with any other cracked or broken tiles shall be removed and replaced with new tiles to proper line and level. The same procedure shall be followed again after grinding the tiles and all damaged tiles replaced, properly jointed and finished to match. For the purpose of ensuring that such replaced tiles match with those laid earlier, it is necessary that the Contractor shall procure sufficient quantity of extra tiles to meet this contingency.

Wherever a full tile cannot be provided, tiles shall be cut to size and fixed. Floor tiles adjoining the wall shall go about 10mm under the plaster, skirting or dado.

Tile skirting and dado work shall be executed only after laying tiles on the floor. For dado and skirting work, the vertical wall surface shall be thoroughly cleaned and wetted. Thereafter it shall be evenly and uniformly covered with 10mm thick backing of 1:4 cement sand mortar. For this work the tiles as obtained from the factory shall be of the size required and practically full polished. The back of each tile to be fixed

shall be covered with a thin layer of neat cement paste and the tile shall then be gently tapped against the wall with a wooden mallet. Fixing shall be done from the bottom of the wall upwards. The joints shall be in straight lines and shall normally be 1.5mm wide. Any difference in the thickness of the tiles shall be evened out in the backing mortar or cement paste so that the tile faces are in conformity & truly plumb. Tiles for use at the corners shall be suitably cut with beveled edges to obtain a neat and true joint. After the work has set, hand polishing with carborundum stones shall be done so that the surface matches with the floor finish.

Wall plastering of the strip left out above the level of skirting dado shall be taken up after the tiles are fixed.

Chequered terrazzo tiles for flooring and for stair treads shall be delivered to site after the first machine grinding.

Machine grinding and polishing shall be commenced only after a lapse of 14 days of laying. The sequence and three numbers of machine grinding operations, usage of the type of carborundum stones, filling up of pin holes, watering etc. shall be carried out all as specified in IS:1443.

Tiles shall be laid to the levels specified. Where large areas are to be tiled the level of the central portion shall be kept 10mm higher than that at the walls to overcome optical illusion of a depression in the central portion. Localized deviation of  $\pm 3$ mm in any 3m length is acceptable in a nominally flat floor.

#### **In-Situ Terrazzo Work:**

##### **Materials:**

The requirements of marble aggregates for terrazzo topping shall be as per clause 7.14.1.

Cement shall first be mixed with the marble powder in dry state. The mix thus obtained shall be mixed with the aggregates in the specified proportions. Care shall be taken not to get the materials into a heap which results in the coarsest chips falling to the edges and cement working to the center at the bottom. Materials shall be kept, as far as possible, in an even layer during mixing. After the materials have been thoroughly mixed in the dry state, water shall be added, just adequate to

obtain plastic consistency for the desired workability for laying. The mix shall be used in the works within 30 minutes of the addition of water to the cement.

**Workmanship:**

The thickness, type, quality, size and colour of chips etc. for the in-situ terrazzo finish for flooring/dado/skirting shall be as specified in the respective items of works prepared by the Contractor. Laying and finishing of in-situ work shall conform to the requirements of workmanship stipulated in IS: 2114.

In-situ terrazzo finish shall be laid over hardened concrete base. The finish layer consists of an under layer and terrazzo topping. The under layer shall be of cement concrete of mix 1:2:4 using 10mm downgraded coarse aggregates. The combined thickness of under layer and topping shall not be less than 30 mm for flooring and 20mm for dado/skirting work.

The minimum thickness of topping shall be 6mm if chips used are between 1mm to 4mm, 9mm if chips are between 4mm to 7mm and 12mm if chips are between 7mm to 10mm. If chips larger than 10mm size are used, the minimum thickness shall be one and one third the maximum size of chips.

Both the under layer and later the topping shall be divided into panels not exceeding 2 m<sup>2</sup> for laying so as to reduce the possibility of development of cracks. The longer dimension of any panel shall not exceed 2m. Dividing strips shall be used to separate the panels. When the dividing strips are not provided, the bays shall be laid alternately, allowing an interval of at least 24 hours between laying adjacent bays.

Dividing strips shall be either of aluminum, brass or other material as indicated in the items of works prepared by the Contractor. Aluminum strips should have a protective coating of bitumen. The thickness of the strips shall not be less than 1.5mm and width not less than 25mm for flooring work.

Concrete base shall be finished to a reasonably plane surface to a level below the finished floor elevation equal to the specified thickness of terrazzo finish. Before spreading the underlayer, the base concrete surface shall be cleaned of all loose materials, mortar droppings, dirt, laitance etc. and well wetted without allowing any water pools on the surface. Dividing strips or screed strips, if dividing strips are not provided shall be fixed on the base and leveled to the correct height to suit the thickness of the finish. Just before spreading the under layer the surface shall be smeared with cement slurry at 2.75 Kg/m<sup>2</sup>. Over this slurry, the under layer shall be spread and leveled with a screening board. The top surface shall be left rough to provide a good bond for the terrazzo topping.

Terrazzo topping shall be laid while the under layer is still plastic and normally between 18 to 24 hours after the under layer is laid. Cement slurry of the same colour as the topping shall be brushed on the surface immediately before laying is commenced. The terrazzo mix shall be laid to a uniform thickness and compacted thoroughly by tamping and with a minimum of toweling. Straight edge and steel floats shall be used to bring the surface true to the required level in such a manner that the maximum amount of marble chips come up and spread uniformly all over the surface.

The surface shall be left dry for air-curing for a period of 12 to 18 hours. Thereafter it shall be cured by allowing water to stand in pools for a period of not less than 4 days.

Machine grinding and polishing shall be commenced only after a lapse of 7 days from the time of completion of laying. The sequence and four numbers of machine grinding operations, usage of the type of carborundum stones, filling up of pinholes, wet curing, watering etc shall be carried out all as specified in IS: 2114.

#### **Shahabad / Tandur/ Kota Stone Slab work:**

##### **Materials:**

The slabs shall be of approved selected quality, hard, sound, dense and homogenous in texture, free from cracks, decay, weathering and flaws. The percentage of water absorption shall not exceed 5 percent as per test conducted in accordance with IS: 1124.

The slabs shall be hand or machine cut to the required thickness. Tolerance in thickness for dimensions of tile more than 100mm shall be  $\pm 5$ mm. This shall be  $\pm 2$ mm on dimensions less than 100mm. Slabs shall be supplied to the specified size with machine cut edges or fine chisel dressed to the full depth. All angles and edges of the slabs shall be true and square, free from any chipping giving a plane surface. Slabs shall have the top surface machine polished (first grinding) before being brought to site. The slabs shall be washed clean before laying.

##### **Workmanship:**

The type, size, thickness and colour/shade etc. of the slabs for flooring/ dado/ skirting shall be as specified in the respective items of works prepared by the Contractor.

Preparation of the concrete base, laying and curing shall be as per clause 7.14.2.

Dado / skirting work shall be as per clause 7.14.2. The thickness of the slabs for dado/skirting work shall not be more than 25mm. Slabs shall be so placed that the back surface is at a distance of 12mm. If necessary, slabs shall be held in position temporarily by suitable method. After checking for verticality, the gap shall be filled and packed with cement sand mortar of proportion 1:3. After the mortar has acquired sufficient strength, the temporary arrangement holding the slab shall be removed.

Grinding and polishing shall be as per clause 7.14.2 except that first grinding with coarse grade carborundum shall not be done and cement slurry with or without pigment shall not applied before polishing.

#### **Carborundum Tile Finish:**

##### **Materials:**

Carborundum tiles shall generally conform in all respects to the standards stipulated in IS: 1237 for heavy duty tiles. Tiles shall be of the best quality manufactured adopting hydraulic pressure of not less than 14 N/mm<sup>2</sup>.

The topping shall be uniform and of thickness not less than 6mm. The quantity of Carborundum grit shall be not less than 1.35 kg/sq.m used with cement with or without pigment. The Carborundum grit shall pass through 1.18mm mesh and shall be retained on 0.60 mm mesh.

##### **Workmanship:**

Requirements as detailed for terrazzo/cement tile finish under clause 7.14.2 shall be applicable for Carborundum tile flooring.

#### **Glazed Tile Finish:**

##### **Materials:**

Glazed earthenware tiles shall conform to the requirements of IS: 777. Tiles shall be of the best quality from an approved manufacturer. The tiles shall be flat, true to shape and free from flaws such as crazing, blisters, pinholes, specks or welts. Edges and underside of the tiles shall be free from glaze and shall have ribs or indentations

for a better anchorage with the bedding mortar. Dimensional tolerances shall be as specified in IS: 777.

**Workmanship:**

The total thickness of glazed tile finish including the bedding mortar shall be 20 mm in flooring, dado & skirting. The minimum thickness of bedding mortar shall be 12mm for flooring and 10mm for dado & skirting work.

The bedding mortar shall consist of 1 part of cement to 3 parts of sand mixed with just sufficient water to obtain proper consistency for laying. Sand for the mortar shall conform to IS: 2116 and shall have minimum fineness modulus of 1.5.

Tiles shall be soaked in water for about 10 minutes just before laying. Where full size tiles cannot be fixed, tiles shall be cut to the required size using special cutting device and the edges rubbed smooth to ensure straight and true joints.

Colored tiles with or without designs shall be uniform and shall be preferably procured from the same batch of manufacture to avoid any differences in the shade.

Tiles for the flooring shall be laid over hardened concrete base. The surface of the concrete base shall be cleaned of all loose materials, mortar droppings etc well wetted without allowing any water pools on the surface. The bedding mortar shall then be laid evenly over the surface, tamped to the desired level and allowed to harden for a day. The top surface shall be left rough to provide a good bond for the tiles. For skirting and dado work, the backing mortar shall be roughened using a wire brush.

Neat cement slurry using 3.3 kg cement per m<sup>2</sup> of floor area shall be spread over the hardened mortar bed over such an area as would accommodate about 20 tiles. Tiles shall be fixed in this slurry one after the other, each tile being gently tapped with a wooden mallet till it is properly bedded and in level with the adjoining tiles. For skirting and dado work, the back of the tiles shall be smeared with cement slurry for setting on the backing mortar. Fixing of tiles shall be done from the bottom of the wall upwards. The joints shall be in perfect straight lines and as thin as possible but shall not be more than 1mm wide. The surface shall be checked frequently to ensure correct level & required slope. Floor tiles near the walls shall enter skirting, dado to a minimum depth of 10mm. Tiles shall not sound hollow when tapped. All the joints



shall be cleaned of grey cement with wire brush to a depth of at least 3mm and all dust, loose mortar etc. shall be removed. White cement with or without pigment shall then be used for flush pointing the joints. Curing shall then be carried out for a minimum period of 7 days for the bedding and joints to set properly. The surface shall then be cleaned using a suitable detergent, fully washed and wiped dry.

Specials consisting of coves, internal and external angles, cornices, beads and their corner pieces shall be of thickness not less than the tiles with which they are used.

### **In-Situ Cement Concrete Floor Topping:**

#### **Materials:**

The mix proportion for the in-situ concrete floor topping shall be 1:2.5:3.5 (one part cement: two and half parts sand: three and half parts coarse aggregates) by volume unless otherwise specified.

The aggregates shall conform for the requirements of IS: 383.

Coarse aggregates shall have high hardness surface texture and shall consist of crushed rock of granite, basalt, trap or quartzite. The aggregate crushing value shall not exceed 30 percent. The grading of the aggregates of size 12.5mm and below shall be as per IS: 2571.

Grading of the sand shall be within the limits indicated in IS: 2571.

#### **Workmanship:**

The thickness of the floor topping shall be as specified in the items of work prepared by the Contractor. The minimum thickness of the floor topping shall be 25mm.

Preparation of base concrete structural slab before laying the topping shall be as per clause 7.13. The surface shall be rough to provide adequate bond for the topping.

Mixing of concrete shall be done thoroughly in a mechanical mixer unless hand mixing is specifically permitted by the BMC. The concrete shall be as stiff as possible and the amount of water added shall be the minimum necessary to give just sufficient plasticity for laying and compacting. The mix shall be used in the work within 30 minutes of the addition of water for its preparation.

Floor finish shall be laid in suitable panels to reduce the risk of cracking. No dimension of a panel shall exceed 2 meters and the length of a panel shall not

exceed one and a half times its breadth. Topping shall be laid in alternate panels; the intermediate panels being cast after a gap of at least one day. Construction joints shall be plain vertical butt joints.

Screed strips shall be fixed dividing the area into suitable panels. Immediately before depositing the concrete topping, neat cement slurry at  $2.75 \text{ kg/m}^2$  of area shall be thoroughly brushed into the prepared surface. Topping shall then be laid, very thoroughly tamped, struck off level and floated with wooden float. The surface shall then be tested with a straight edge and mason's spirit level to detect any inequalities and these shall be made good immediately.

Finishing of the surface by Trowelling shall be spread over a period of one to six hours depending upon the temperature and atmospheric conditions. The surface shall be trowelled 3 times at intervals so as to produce a smooth uniform and hard surface. Immediately after laying, the first Trowelling just sufficient to give a level surface shall be carried out avoiding excessive Trowelling at this stage. The surface shall be re-trowelled after sometime to close any pores and to scrap off excess water or laitance, which shall not be trowelled back into the topping. Final Trowelling shall be done well before the concrete has become too hard but at a time when considerable pressure is required to make any impression on the surface. Sprinkling of dry cement or cement-sand mixture for absorbing moisture shall not be permitted.

Immediately after the surface is finished, it shall be protected suitably from rapid drying due to wind/sunlight. After the surface has hardened sufficiently to prevent any damage to it, the topping shall be kept continuously moist for a minimum period of 10 days.

It is preferable to lay the topping on hardened base concrete, as against being laid monolithically with a lesser thickness, since proper levels and slopes with close surface tolerances is achievable in practice, owing to its greater thickness. Further, as this would be laid after all other building operations are over, there will be no risk of any damages or discolorations to the floor finish which are difficult to repair satisfactorily.

#### **In-Situ Granolithic Concrete Floor Topping:**

##### **Materials and Workmanship:**

The Requirements of materials and workmanship shall be all as per clause 7.19 for in-situ cement concrete floor topping except that the mix proportion of the concrete shall be 1:1:2 (cement: sand: coarse aggregates) by volume.

The minimum thickness of granolithic floor topping on hardened concrete base shall be 40mm.

**Floor Hardener Topping:**

**Materials & Workmanship:**

Floor Hardener topping shall be provided either as integrally finished over the structural slab/grade slab or lay monolithically with the concrete/granolithic floor finish on top of hardened concrete base.

Floor hardener of the metallic or non-metallic type suitable for the performance of normal / medium/ heavy duty function of the floor, the quantum of ingredients and the thickness of topping shall be as specified in the respective items of work prepared by the Contractor. For monolithic application with the floor finish/slab the thickness of the layer shall be 15mm. The topping shall be laid within 2 to 3 hours after concrete is laid when it is still plastic but stiffened enough for the workmen to tread over it by placing planks. The surface of the concrete layer shall be kept rough for providing adequate bond for the topping. Laitance shall be removed before placing the topping. The topping shall be screened and thoroughly compacted to the finished level. Trowelling to a smooth finish shall be carried out as per clause 7.19.2. After the surface has hardened sufficiently, it shall be kept continuously moist for at least 10 days. The procedure for mixing the floor hardener topping shall be as per manufacturer's instructions.

Surface shall be prevented from any damages due to subsequent building operations by covering with 75 mm thick layer of sand.

**PVC Sheet/Tile Flooring:**

**Materials:**

PVC floor covering shall be of either unbaked homogeneous flexible type in the form of sheets/tiles conforming to IS: 3462 or homogeneous PVC asbestos tiles conforming to IS: 3461. Surface of the sheets/tiles shall be free from any physical defects such as pores, blisters, cracks etc. which affects the appearance and serviceability. Tiles/sheets shall meet with the tolerance limits in dimensions specified in the IS. Contractor shall submit the test certificates, if so desired by the BMC.

Each tile/sheet shall be legibly and indelibly marked with the name of the manufacturer or his trade mark, IS certificate mark, and batch number.

The adhesive to be used for laying the PVC flooring shall be rubber based and of the make as recommended and approved by the manufacturer of PVC sheets/tiles.

The type, size, colour, plain or mottled and the pattern shall be as specified in the respective items of work prepared by the Contractor.

**Workmanship:**

PVC Floor covering shall be provided over an under bed of cement concrete floor finish over the base concrete or structural slab. It is essential that the sub-floor and the under bed are perfectly dry before laying the PVC flooring. This shall be ensured by methods of testing as stipulated in Appendix-A of IS: 5318.

The surface of the under bed shall have trowelled finish without any irregularities, which creates poor adhesion. Surface shall be free of oil or grease and thoroughly cleaned of all dust, dirt and wiped with a dry cloth.

PVC sheets/tiles shall be brought to the temperature of the area in which they are to be laid by stacking in a suitable manner within or near the laying area for a period of about 24 hours. Where air-conditioning is installed, the flooring shall not be laid on the under bed until the A/C units have been in operation for at least 7 days. During this period, the temperature range shall be between 20deg.C and 30deg.C and this shall be maintained during the laying operations and also for 48 hours thereafter.

Layout of the PVC flooring shall be marked with guidelines on the under bed and PVC tiles/sheets shall be first laid for trial, without using the adhesive, according to the layout.

The adhesive shall be applied by using a notched trowel to the surface of the under bed and to the backside of PVC sheets/tiles. When the adhesive has set sufficiently for laying, it will be tacky to the touch, which generally takes about 30 minutes. The time period need be carefully monitored since a longer interval will affect the adhesive properties. Adhesive shall be uniformly spread over only as much surface area at one time which can be covered with PVC flooring within the stipulated time.

PVC sheet shall be carefully taken and placed in position from one end onwards slowly so that the air will be completely squeezed out between the sheet and the background surface and no air pockets are formed. It shall then be pressed with a suitable roller to develop proper contact. The next sheet shall be laid edge to edge with the sheet already laid, so that there is minimum gap between joints. The alignment shall be checked after each row of sheet is completed and trimmed if considered necessary.

Tiles shall be laid in the same manner as sheets and preferably, commencing from the center of the area. Tiles should be lowered in position and pressed firmly on to the adhesive with minimum gap between the joints. Tiles shall not be slide on the

surface. Tiles shall be rolled with a light wooden roller of about 5kg to ensure full contact with the underlay. Work should be constantly checked to ensure that all four edges of adjacent tiles meet accurately.

Any excess adhesive which may squeeze up between sheets/tiles shall be wiped off immediately with a wet cloth. Suitable solvents shall be used to remove hardened adhesive.

A minimum period of 24 hours shall be given after laying for the development of proper bond of the adhesive. When the flooring is thus completed, it shall be cleaned with a wet cloth soaked in warm soap solution.

Metallic edge strips shall be used to protect the edges of PVC sheets/tiles which are exposed as in doorways/stair treads.

Hot sealing of joints between adjacent PVC sheet flooring to prevent creeping of water through the joints shall be carried out, using special equipment as per manufacturer's instructions.

#### **Acid Resisting Brick/Tiling Work:**

##### **Materials:**

The ceramic unglazed vitreous acid resisting tiles shall conform to the requirements of IS: 4457. Acid resistant bricks shall conform to the requirements of IS: 4860.

The finished tile/brick when fractured shall appear fine grained in texture, dense and homogeneous. Tile/brick shall be sound, true to shape, flat, free from flaws and any manufacturing defects affecting their utility. Tolerance in dimensions shall be within the limits specified in the respective IS.

The tiles/bricks shall be bedded and jointed using chemical resistant mortar of the resin type conforming to IS: 4832 (Part II). Method of usage shall generally be as per the requirements of IS: 4443.

##### **Workmanship:**

The resin shall have viscosity for readily mixing with the filler by manual methods. The filler shall have graded particles which permit joint thickness of 1.5 mm.

The base concrete surface shall be free from dirt and thoroughly dried. The surface shall be applied with a coat of bitumen primer conforming to IS: 3384. The primed

surface shall then be applied with a uniform coat of bitumen conforming to IS: 1580. Tiles or bricks shall be laid directly without the application of bitumen, if epoxy or polyester resin is used for the mortar. Just adequate quantity of mortar which can be applied within the pot life as specified by the manufacturer shall be prepared at one time for bedding and jointing. Rigid PVC, Stainless steel, Chromium plated tools shall be used for mixing and laying. For laying the floor 6 to 8 mm thick mortar shall be spread on the back of the tile/brick. Two adjacent sides of the tile/brick shall be smeared with 4 to 6 mm thick mortar. Tile/brick shall be pressed into the bed and pushed against the floor and with the adjacent tile/brick, until the joint in each case is 2 to 3 mm thick. Excess mortar shall then be trimmed off and allowed to harden fully. Similar procedure shall be adopted for the work on walls by pressing the tile/brick against the prepared wall surfaces and only one course shall be laid at a time until the initial setting period.

The mortar joints shall be cured for a minimum period of 72 hours with 20 to 25% hydrochloric acid or 30 to 40% sulphuric acid. After acid curing, the joints shall be washed with water and allowed to thoroughly dry. The joints shall then be filled with mortar to make them smooth and plane. Acid curing is not required to be carried out if epoxy or polyester resin is used for the mortar.

Resin mortars are normally self-curing. The area tiled shall not be put to use before 48 hours in case epoxy, polyester and furan type of resin is used for the mortar. If phenolic or cashew nut shell liquid resin is used for the mortar, the area tiled shall not be put to use for 7 to 28 days respectively, without heat treatment. This period shall be 2 to 6 days respectively, if heat treatment is given with infrared lamp.

#### **Epoxy Lining Work:**

##### **Materials:**

The epoxy resin and hardener formulation for laying of joint less lining work in floors and walls of concrete tanks, trenches etc. shall be as per the requirements of IS:9197.

The epoxy composition shall have the chemical resistance to withstand the following conditions of exposure:

Hydrochloric acid up to 30% concentration

Sodium hydroxide up to 50% concentration

Liquid temperature up to 60deg.C

Ultraviolet radiation

Alternate wetting and drying

Sand shall conform to grading zone III or IV of IS: 383.

The hardener shall be of the liquid type such as Aliphatic Amine or an Aliphatic/Aromatic Amine Adduct for the epoxy resin. The hardener shall react with epoxy resin at normal ambient temperature.

Contractor shall furnish test certificates for satisfying the requirements of the epoxy formulation if so directed by the BMC.

**Workmanship:**

The minimum thickness of epoxy lining shall be 4 mm. It is essential that the concrete elements are adequately designed to ensure that water is excluded to permeate to the surface, over which the epoxy lining is proposed. The epoxy lining shall be of the trowel type to facilitate execution of the required thickness for satisfactory performance.

The concrete surfaces over which epoxy lining is to be provided shall be thoroughly cleaned of oil or grease by suitable solvents, wire brushed to remove any dirt/dust and laitance. The surfaces shall then be washed with dilute hydrochloric acid and rinsed thoroughly with plenty of water or dilute ammonia solution. The surfaces shall then be allowed to dry. It is essential to ensure that the surfaces are perfectly dry before the commencement of epoxy application. Just adequate quantity of epoxy resin which can be applied within the pot life as specified by the manufacturer shall be prepared at one time for laying and jointing. Rigid PVC/stainless steel/chromium plated tools shall be used for laying. Trowelling shall be carried out to obtain uniformly the specified thickness of lining.

Lining shall be allowed to set without disturbance for a minimum period of 24 hours. The facility shall be put to use only after a minimum period of 7 days of laying of the lining.

**Water-Proofing:**

**General:**

The work shall include waterproofing for the building roofs, terraces, toilets, floor slabs, walls, planters, chhajjas, sills and any other areas and at any other locations and situations as directed by the Employers Representative.

The waterproofing treatment shall be carried out on top of lime concrete (brick bat coba) laid to slope on roof surfaces. The brick bat-coba shall be covered as specified below.

The work shall be carried out by an experienced specialist Sub-Contractor who shall be appointed only after prior approval of the BMC.

**Modified Bituminous Membrane:**

Modified Bituminous Membrane shall be "SUPER THERMOLAY" 4 mm thick weighing 4 Kg/sq.m, manufactured using APP Polymer modified bitumen with a central core of non-woven polyester reinforcement (200 gms/sqm) and with top and bottom layers of thermo fusible film (top layer could also be sand finished) made by STP Limited in collaboration with Bitumen Company Limited. "PLYFLEX" of Bitumen Company Limited, Saudi Arabia supplied by STP Limited shall also be acceptable or other equivalent specification.

**Waterproofing of Roofs with Lime Concrete:**

**Materials:**

Broken brick coarse aggregates prepared from well over burnt bricks shall be well graded having a maximum size of 25mm and shall generally conform to IS:3068.

Lime shall be class C lime (fat lime) or factory made hydrated lime conforming to IS:712.

**Workmanship:**

Lime concrete shall be prepared by thoroughly mixing the brick aggregates inclusive of brick dust obtained during breaking with the slaked lime in the proportions of 2 1/2 (two and a half) parts of brick aggregates to 1 part of slaked lime by volume.

Water shall be added just adequate to obtain the desired workability for laying.

Washing soap and alum shall be dissolved in the water to be used. The quantity of these materials required per cum of lime concrete shall be 12kg of washing soap and 4kg of alum. Brick aggregates shall be soaked thoroughly in water for a period of not less than six hours before use in the concrete mix. Lime concrete shall be used in the works within 24 hours after mixing.

The roof surface over which the water-proof treatment is to be carried out shall be cleaned of all foreign matter by wire brushing, dusting and made thoroughly dry.

Preparation of surfaces shall be as stipulated in IS: 3067.

The slope of the finished waterproofing treatment shall be not less than 1 in 60 for efficient drainage. This shall be achieved either wholly in the lime concrete layer.



The average thickness of lime concrete, slope and the finish on top of machine-made burnt clay flat terracing tiles conforming to IS:2690 (part I) shall be as specified in the items of work to be prepared by the Contractor. Cement concrete flooring tiles in lieu of clay terracing tiles shall be provided if so specified in the items of work prepared by the Contractor, duly considering the traffic the terrace will be subjected to.

The minimum compacted thickness of lime concrete layer shall be 75mm and average thickness shall not be less than 100mm. In case, the thickness is more than 100mm, it shall be laid in layers not exceeding 100mm to 125mm. Laying of lime concrete shall be commenced from a corner of the roof and proceeded diagonally towards center and other sides duly considering the slopes specified for effectively draining the rain-water towards the down take points. Lime concrete fillet for a minimum height of 150mm shall be provided all along the junction of the roof surface with the brick masonry wall, parapet, column projections. These shall then be finished on top with provision of clay terracing tiles, cement concrete tiles.

After the lime concrete is laid it shall be initially rammed with a rammer weighing not more than 2 Kg and the finish brought to the required evenness and slope. Alternatively, bamboo strips may be used for the initial ramming. Further consolidation shall be done using wooden THAPIES with rounded edges. The beating will normally have to be carried on for at least seven days until the THAPI makes no impression on the surface and rebounds readily from it when struck. Special care shall be taken to properly compact the lime concrete at its junction with parapet walls or column projections. During compaction by hand-beating, the surface shall be sprinkled liberally with lime water (1 part of lime putty and 3 to 4 parts of water) and a small proportion of sugar solution for obtaining improved water-proofing quality of the lime concrete. On completion of beating, the mortar that comes on the top shall be smoothed with a trowel or float, if necessary, with the addition of sugar solution and lime putty. The sugar solution may be prepared in any one of the following ways as directed by the BMC.

a) By mixing about 3 Kg of Jaggery and 1.5 Kg of BAEL fruit to 100 liters of water.

b) By mixing about 600 gm of KADUKAI (the dry nuts shall be broken to small pieces and allowed to soak in water), 200 gm of jaggery and 40 liters of water for 10 sq.m of work. This solution shall be brewed for about 12 to 24 hours and the resulting liquor decanted and used for the work.

The lime concrete after compaction shall be cured for a minimum period of seven days or until it hardens by covering with a thin layer of straw or hessian which shall be kept wet continuously. Machine made flat terracing tiles shall be of the size and

thickness as specified. Tiles shall be soaked in water for at least one hour before laying. Bedding for the tiles shall be 12mm thick in cement mortar 1:3. Tiles shall be laid, open jointed with 4 to 6 mm wide joints, flat on the mortar and lightly pressed and set to plane surface true to slope, using a trowel and wooden straight edge. They shall be laid with their longitudinal lines of joints truly parallel and generally at right angles to the direction of run-off gradient. Transverse joints in alternate rows shall come directly in line with each other. Transverse joints in adjacent courses shall break joints by at least 50 mm. The joints shall be completely filled and flush pointed with cement mortar 1:2 mixed with water proofing compound as per manufacturer's instructions. Curing shall be carried out for a minimum period of seven days. Finishing on top with cement concrete tiles or in-situ cement concrete floor topping shall be carried out in similar fashion as described for clay tiles in above paragraph. Tiles to be used shall be supplied after the first machine grinding of the surface.

#### **Waterproofing of Roofs/Terraces etc.:**

##### **(A) Water proofing of Horizontal Surfaces:**

The waterproofing shall be applied as follows:

A coat of Blown Bitumen 85/25 shall be applied at the rate of 1.45 kg/sq.km

A roll of Modified Bituminous Membrane shall be unrolled over the primed surface and completely bonded to the substrate by pressing down evenly for the full width of the roll using a wooden roller. Torching shall be done, where recommended by the manufacturer and were directed by the BMC, as the unrolling progresses.

The side overlaps shall be minimum 100 mm whereas the end overlaps shall be minimum 150 mm; both shall be bonded and sealed by flame torching. Care shall be taken that the membrane is lapped with the treatment along the vertical surface and roof gutter treatment for at least 500 mm. The membrane shall be properly overlapped & terminated at all openings, rainwater down takes etc. to ensure that such junctions do not become sources of leakage.

Top of membrane finally shall be painted with anti glouse reflective paint.

##### **(B) Waterproofing of Vertical Surfaces at Roof Level and Gutters:**

The Water proofing shall be applied as described in (a) above.

Modified Bituminous membrane shall be unrolled and bonded to the substrate after applying a coat of bitumen and by pressing down evenly for the full width of the roll. Light torching shall be done to ensure complete bonding.

The membrane shall be overlapped with treatment for the horizontal surface by at least 500 mm.

The membrane shall be taken up to a pre-cut chase anchored and sealed.

**Khurras and Rainwater down Pipes:**

Down pipes shall be isolated from RCC work with 6 mm polyethylene foam fixed with adhesive (Araldite) and sealed with silicone sealant prior to laying membrane. A water proofing flashing composed of one layer of Hessian based self-finished felt Type 3 Grade 1 and two layers of aluminum foil of 0.075 mm thickness shall be provided. This flashing shall be carried into the down take pipes for at least 150 mm and sealed with hot bitumen. The Contractor shall closely coordinate the work with the agency providing and fixing the rainwater down take pipes.

**Testing:**

The treated area (flat and horizontal only) shall be tested by allowed water to stand on the treated areas to a depth of 150 mm for a minimum period of 72 hours.

The treated area (flat and horizontal) shall have continuous slope towards the rainwater outlets and no water shall pond anywhere on the surface.

**Cement Plastering Work:**

**Materials:**

The proportions of the cement mortar for plastering shall be 1:3 (one part of cement to three parts of sand). Cement and sand shall be mixed thoroughly in dry condition and then just enough water added to obtain a workable consistency. The quality of water and cement shall be as per relevant IS standards. The quality and grading of sand for plastering shall conform to IS: 1542. The mixing shall be done thoroughly in a mechanical mixer unless hand mixing is specifically permitted by the BMC. If so desired by the BMC sand shall be screened and washed to meet the Specifications. The mortar thus mixed shall be used as soon as possible preferably within 30 minutes from the time water is added to cement. In case the mortar has stiffened due to

evaporation of water this may be re-tempered by adding water as required to restore consistency but this will be permitted only up to 30 minutes from the time of initial mixing of water to cement. Any mortar which is partially set shall be rejected and removed forthwith from the site. Droppings of plaster shall not be re-used under any circumstances.

**Workmanship:**

Preparation of surfaces and application of plaster finishes shall generally conform to the requirements specified in IS:1661 and IS:2402.

Plastering operations shall not be commenced until installation of all fittings and fixtures such as door/window panels, pipes, conduits etc. are completed.

All joints in masonry shall be raked as the work proceeds to a depth of 10mm/20mm for brick/stone masonry respectively with a tool made for the purpose when the mortar is still green. The masonry surface to be rendered shall be washed with clean water to remove all dirt, loose materials, etc., Concrete surfaces to be rendered shall be roughened suitably by hacking or bush hammering for proper adhesion of plaster and the surface shall be evenly wetted to provide the correct suction. The masonry surfaces should not be too wet but only damp at the time of plastering. The dampness shall be uniform to get uniform bond between the plaster and the masonry surface.

Interior plain faced plaster - This plaster shall be laid in a single coat of 13mm thickness. The mortar shall be dashed against the prepared surface with a trowel. The dashing of the coat shall be done using a strong whipping motion at right angles to the face of the wall or it may be applied with a plaster machine. The coat shall be trowelled hard and tight forcing it to surface depressions to obtain a permanent bond and finished to smooth surface. Interior plaster shall be carried out on jambs, lintel and sill faces etc. as shown in the drawing and as directed by the BMC.

Plain Faced Ceiling plaster - This plaster shall be applied in a single coat of 6mm thickness. Application of mortar shall be as stipulated in above paragraph.

Exterior plain faced plaster - This plaster shall be applied in 2 coats. The first coat or the rendering coat shall be approximately 14mm thick. The rendering coat shall be applied as stipulated above except finishing it to a true and even surface and then lightly roughened by cross scratch lines to provide bond for the finishing coat. The rendering coat shall be cured for at least two days and then allowed to dry. The second coat or finishing coat shall be 6 mm thick. Before application of the second coat, the rendering coat shall be evenly damped. The second coat shall be applied

from top to bottom in one operation without joints and shall be finished leaving an even and uniform surface. The mortar proportions for the coats shall be as specified in the respective item of work. The finished plastering work shall be cured for at least 7 days.

Interior plain faced plaster 20mm thick if specified for uneven faces of brick walls or for random coursed rubble masonry walls shall be executed in 2 coats similar to the procedure stipulated in above paragraph.

Exterior Sand Faced Plaster- This plaster shall be applied in 2 coats. The first coat shall be approximately 14mm thick and the second coat shall be 6mm thick. These coats shall be applied as stipulated above. However, only approved quality white sand shall be used for the second coat and for the finishing work. Sand for the finishing work shall be coarse and of even size and shall be dashed against the surface and sponged. The mortar proportions for the first and second coats shall be as specified in the respective items of work.

Wherever more than 20mm thick plaster has been specified, which is intended for purposes of providing beading, bands, etc. this work shall be carried out in two or three coats as directed by the BMC duly satisfying the requirements of curing each coat (rendering floating) for a minimum period of 2 days and curing the finished work for at least 7 days.

In the case of pebble faced finish plaster, pebbles of approved size and quality shall be dashed against the final coat while it is still green to obtain as far as possible a uniform pattern all as directed by the BMC.

Where specified in the Drawings to be prepared by the Contractor prepared by the Contractor, rectangular grooves of the dimensions indicated shall be provided in external plaster by means of timber battens when the plaster is still in green condition. Battens shall be carefully removed after the initial set of plaster and the broken edges and corners made good. All grooves shall be uniform in width and depth and shall be true to the lines and levels as per the Drawings to be prepared by the Contractor prepared by the Contractor.

Curing of plaster shall be started as soon as the applied plaster has hardened sufficiently so as not to be damaged when watered. Curing shall be done by continuously applying water in a fine spray and shall be carried out for at least 7 days.

For waterproofing plaster, the Contractor shall provide the water-proofing admixture as specified in manufacturer's instruction while preparing the cement mortar.

For external plaster, the plastering operations shall be commenced from the top floor and carried downwards. For internal plaster, the plastering operations for the walls shall commence at the top and carried downwards. Plastering shall be carried out to the full length of the wall or to natural breaking points like doors/windows etc. Ceiling plaster shall be completed first before commencing wall plastering.

Double scaffolding to be used shall be as specified in clause 7.2.2.

The finished plaster surface shall not show any deviation more than 4mm when checked with a straight edge of 2m length placed against the surface.

To overcome the possibility of development of cracks in the plastering work following measures shall be adopted.

Plastering work shall be deferred as much as possible so that fairly complete drying shrinkage in concrete and masonry works takes place.

Steel wire fabric shall be provided at the junction of brick masonry and concrete to overcome reasonably the differential drying shrinkage/thermal movement.

Ceiling plaster shall be done, with a trowel cut at its junction with wall plaster. Similarly trowel cut shall be adopted between adjacent surfaces where discontinuity of the background exists.

#### **Cement Pointing:**

##### **Material:**

The cement mortar for pointing shall be in the proportion of 1:3 (one part of cement to three parts of fine sand). Sand shall conform to IS: 1542 and shall be free from clay, shale, loam, alkali and organic matter and shall be of sound, hard, clean and durable particles. Sand shall be approved by BMC and if so, directed it shall be washed/screened to meet specification requirements.

##### **Workmanship:**

Where pointing of joints in masonry work is specified, the joints shall be raked at least 15mm/20mm deep in brick/stone masonry respectively as the work proceeds when the mortar is still green.

Any dust/dirt in the raked joints shall be brushed out clean and the joints shall be washed with water. The joints shall be damp at the time of pointing. Mortar shall be filled into joints and well pressed with special steel trowels. The joints shall not be disturbed after it has once begun to set. The joints of the pointed work shall be neat. The lines shall be regular and uniform in breadth and the joints shall be raised, flat,

sunk or 'V' as may be specified in the respective items of work. No false joints shall be allowed.

The work shall be kept moist for at least 7 days after the pointing is completed. Whenever colored pointing has to be done, the coloring pigment of the colour required shall be added to cement in such proportions as recommended by the manufacturer and as approved by the BMC.

#### **Water-Proofing Admixtures;**

Water-proofing admixture shall conform to the requirements of IS: 2645 and shall be of approved manufacture. The admixture shall not contain calcium chloride. The quantity of the admixture to be used for the works and method of mixing etc. shall be as per manufacturer's instructions and as directed by the BMC.

#### **Painting of Concrete, Masonry & Plastered Surfaces:**

##### **Materials:**

Oil bound distemper shall conform to IS: 428. The primer shall be alkali resistant primer of the same manufacture as that of the distemper.

Cement paint shall conform to IS: 5410. The primer shall be a thinned coat of cement paint. Lead free acid, alkali and chlorine resisting paint shall conform to IS: 9862.

Colour wash shall be made by addition of a suitable quantity of mineral pigment, not affected by lime, to the prepared white wash to obtain the shade tint as approved by the BMC.

All the materials shall be of the best quality from an approved manufacturer. Contractor shall obtain prior approval of the BMC for the brand of manufacture and the colour shade. All materials shall be brought to the site of works in sealed containers.

##### **Workmanship:**

Contractor shall obtain the approval of the BMC regarding the readiness of the surfaces to receive the specified finish, before commencing the work on painting. Painting of new surfaces shall be deferred as much as possible to allow for thorough drying of the sub- strata.

The surfaces to be treated shall be prepared by thoroughly brushing them free from dirt, mortar droppings and any loose foreign materials. Surfaces shall be free from oil, grease and efflorescence. Efflorescence shall be removed only by dry brushing

of the growth. Cracks shall be filled with Gypsum. Workmanship of painting shall generally conform to IS: 2395. Surfaces of doors, windows etc. shall be protected suitably to prevent paint finishes from splashing on them.

**White Wash:**

The prepared surfaces shall be wetted and the finish applied by brushing. The operation for each coat shall consist of a stroke of the brush first given horizontally from the right and the other from the left and similarly, the subsequent stroke from bottom upwards and the other from top downwards, before the first coat dries. Each coat shall be allowed to dry before the next coat is applied. Minimum of 2 coats shall be applied unless otherwise specified. The dry surface shall present a uniform finish without any brush marks.

**Colour Wash:**

Colour wash shall be applied in the same way as for white wash. A minimum of 2 coats shall be applied unless otherwise specified. The surface shall present a smooth and uniform finish without any streaks. The finished dry surface shall not show any signs of peeling, powdery and come off readily on the hand when rubbed.

**Cement Paint:**

The prepared surfaces shall be wetted to control surface suction and to provide moisture to aid in proper curing of the paint. Cement paint shall be applied with a brush with stiff bristles. The primer coat shall be a thinned coat of cement paint. The quantity of thinner shall be as per manufacturer's instructions. The coats shall be vigorously scrubbed to work the paint into any voids for providing a continuous paint film free from pinholes for effective water proofing in addition to decoration. Cement paint shall be brushed in uniform thickness and the covering capacity for two coats on plastered surfaces shall be 3 to 4 kg/m<sup>2</sup>. A minimum of 2 coats of the same colour shall be applied. At least 24 hours shall be left after the first coat to become sufficiently hard before the second coat is applied. The painted surfaces shall be thoroughly cured by sprinkling with water using a fog spray at least 2 to 3 times a day. Curing shall commence after about 12 hours when the paint hardens. Curing shall be continued for at least 2 days after the application of final coat. The operations for brushing each coat shall be as detailed above.

**Oil bound Distemper:**

The prepared surfaces shall be dry and provided with one coat of alkali resistant primer by brushing. The surface shall be finished uniformly without leaving any brush marks and allowed to dry for at least 48 hours. A minimum of two coats of oil bound



distemper shall be applied, unless otherwise specified. The first coat shall be of a lighter tint. At least 24 hours shall be left after the first coat to become completely dry before the application of the second coat. Broad, stiff, double bristled distemper brushes shall be used for the work. The operations for brushing each coat shall be as detailed above.

**Acid, Alkali Resisting Paint:**

A minimum of 2 coats of acid/alkali resisting paint shall be applied over the prepared dry surfaces by brushing. Primer coat shall be as per manufacturer's instructions.

**Plastic Emulsion Paint:**

The prepared surface shall be dry and provided with one coat of primer which shall be a thinned coat of emulsion paint. The quantity of thinner shall be as per manufacturer's instructions. The paint shall be laid on evenly and smoothly by means of crossing and laying off. The crossing and laying off consists of covering the area with paint, brushing the surface hard for the first time over and then brushing alternately in opposite directions two or three times and then finally brushing lightly in a direction at right angles. In this process, no brush marks shall be left after the laying off is finished. The full process of crossing and laying off constitutes one coat. The next coat shall be applied only after the first coat has dried and sufficiently become hard which normally takes about 2 to 3 hours. A minimum of 2 finishing coats of the same colour shall be applied unless otherwise specified. Paint may also be applied using rollers. The surface on finishing shall present a flat velvety smooth finish and uniform in shade without any patches.

**Acrylic Emulsion Paint:**

Acrylic emulsion paint shall be applied in the same way as for plastic emulsion paint. A minimum of 2 finishing coats over one coat of primer shall be provided unless otherwise specified.

**Painting & Polishing of Wood Work:**

**Materials:**

- Wood primer shall conform to IS: 3536.
- Filler shall conform to IS: 110.
- Varnish shall conform to IS: 337.
- French polish shall conform to IS: 348.

- Synthetic enamel paint shall conform to IS: 2932.

All the materials shall be of the best quality from an approved manufacturer. Contractor shall obtain prior approval of the BMC for the brand of manufacture and the colour/shade. All materials shall be brought to the site of works in sealed containers.

**Workmanship:**

The type of finish to be provided for woodwork of painting or polishing, the number of coats, etc. shall be as specified in the respective items of work to be prepared by the Contractor. Primer and finish paint shall be compatible with each other to avoid cracking and wrinkling. Primer and finish paint shall be from the same manufacturer. Painting shall be either by brushing or spraying. Contractor shall procure the appropriate quality of paint for this purpose as recommended by the manufacturer. The workmanship shall generally conform to the requirements of IS:2338 (Part I). All the wood surfaces to be painted shall be thoroughly dry and free from any foreign matter. Surfaces shall be smoothed with abrasive paper using it across the grains and dusted off. Wood primer coat shall then be applied uniformly by brushing. The number of primer coats shall be as specified in the item of work to be prepared by the Contractor. Any slight irregularities of the surface shall then be made-up by applying an optimum coat of filler conforming to IS:110 and rubbed down with an abrasive paper for obtaining a smooth surface for the undercoat of synthetic enamel paint conforming to IS:2932. Paint shall be applied by brushing evenly and smoothly by means of crossing and laying off in the direction of the grain of wood. After drying, the coat shall be carefully rubbed down using very fine grade of sand paper and wiped clean before the next coat is applied. At least 24 hours shall elapse between the applications of successive coats. Each coat shall vary slightly in shade and this shall be got approved by the BMC. The number of coats of paint to be applied shall be as specified in the item of work to be prepared by the Contractor. All the wood surfaces to be provided with clear finishes shall be thoroughly dry and free from any foreign matter. Surfaces shall be smoothed with abrasive paper using it in the direction of the grains and dusted off. Any slight irregularities of the surface shall be made up by applying an optimum coat of transparent liquid filler and rubbed down with an abrasive paper for obtaining a smooth surface. All dust and dirt shall be thoroughly removed. Over this prepared surface, varnish conforming to IS:337 shall be applied by brushing. Varnish should not be retouched once it has begun to set. Staining if required shall be provided as directed by the BMC. When two coats of varnish is specified, the first coat should be a hard-drying undercoat or flattening varnish which shall be allowed to dry hard before applying the finishing coat.

The number of coats to be applied shall be as specified. For works where clear finish of French polish is specified the prepared surfaces of wood shall be applied with the polish using a pad of woolen cloth covered by a fine cloth. The pad shall be moistened with polish and rubbed hard on the surface in a series of overlapping circles to give an even finish over the entire area. The surface shall be allowed to dry before applying the next coat. Finishing shall be carried out using a fresh clean cloth over the pad, slight dampening with methylated spirit and rubbing lightly and quickly in circular motions. The finished surface shall have a uniform texture and high gloss. The number of coats to be applied shall be as specified.

### **Painting of Steel Work:**

#### **Materials:**

- Red-oxide – zinc chrome primer shall conform to IS: 2074.
- Synthetic enamel paint shall conform to IS: 2932.
- Aluminum paint shall conform to IS: 2339.

All the materials shall be of the best quality from an approved manufacturer. Contractor shall obtain prior approval of the BMC for the brand of manufacture and the colour/shade. All the materials shall be brought to the site in sealed containers.

#### **Workmanship:**

Painting work shall be carried out only on thoroughly dry surfaces. Painting shall be applied either by brushing or by spraying. Contractor shall procure the appropriate quality of paint for this purpose as recommended by the manufacturer. The workmanship shall generally conform to the requirement of IS: 1477 (Part 2).

The type of paint, number of coats etc. shall be as specified in the respective items of work. Primer and finish paint shall be compatible with each other to avoid cracking and wrinkling. Primer and finish paint shall be from the same manufacturer. All the surfaces shall be thoroughly cleaned of oil, grease, dirt, rust and scale. The methods to be adopted using solvents, wire brushing, power tool cleaning etc., shall be as per IS: 1477 (Part – I) and as indicated in the item of work. It is essential to ensure that immediately after preparation of the surfaces; the first coat of red oxide-zinc chrome primer shall be applied by brushing and working it well to ensure a continuous film without holidays. After the first coat becomes hard dry, a second coat of primer shall be applied by brushing to obtain a film free from `holidays. After the second coat of primer is hard dry, the entire surface shall be wet rubbed cutting down to a smooth uniform surface. When the surface becomes dry, the undercoat of synthetic enamel paint of optimum thickness shall be applied by brushing with minimum of brush marks. The coat shall be allowed too hard-dry. The

under coat shall then be wet rubbed cutting down to a smooth finish, taking adequate care to ensure that at no place the undercoat is completely removed. The surface shall then be allowed to dry. The first finishing coat of paint shall be applied by brushing and allowed to hard-dry. The gloss from the entire surface shall then be gently removed and the surface dusted off. The second finishing coat shall then be applied by brushing. At least 24 hours shall elapse between the applications of successive coats. Each coat shall vary slightly in shade and this shall be got approved by the BMC.

**Flashing:**

**Materials:**

Anodized Aluminum sheets shall be 1.00mm thick with anodic film thickness of 0.025 mm.

Galvanized mild steel sheets shall be 1.00mm thick with zinc coating of 800 gms/sq.m.

Bitumen felt shall be either Hessian base self-finished bitumen felt Type-3 Grade I conforming to IS:1322 or glass fiber base self-finished felt Type-2 Grade 1 conforming to IS:7193.

**Workmanship:**

The type of the flashing and method of fixing shall be as specified.

Flashing shall be of the correct shape and size as indicated in the construction Drawings to be prepared by the Contractor and they shall be properly fixed to ensure their effectiveness.

Flashing shall be of long lengths so as to provide minimum number of joints. The minimum overlap at joints shall be 100mm.

Fixing of the flashing shall be either by bolting with bitumen washers or by tucking into the groove 75 mm wide x 65 mm deep in masonry concrete along with cement mortar 1:4 filleting as indicated in the Drawings to be prepared by the Contractor.

Curing of the mortar shall be carried out for a minimum period of 4 days.

Bitumen felt flashing of the type as specified shall be provided with 2 coats of bituminous paint at the rate of 0.10 liter/m<sup>2</sup> after the installation.

**Thermal Insulation for Ceiling**

Thermal insulation shall be "Thermocole" TF type or similar approved or Resin bonded fiber glass boards.

**Fixing:****“Thermocole” Boards:**

Soffit of R.C. Slab shall be thoroughly cleaned with wire brush and 85/25 industrial grade hot bitumen conforming to IS: 702 shall be applied uniformly over the surface at the rate of 1.5 Kg.m<sup>2</sup>.

Thermocole boards (T.F. variety) of 50mm thickness shall be stuck by means of the same grade of hot bitumen. The boards shall be further secured with screws, washers and plugs. The joints of the boards shall be sealed with bitumen.

**Fiber Glass Boards:**

Timber pegs 50mm x 50mm x 50mm shall be fixed to the slab at 600mm centers with 6mm x 65mm long wood screws. 20-gauge G.I. lacing wire shall be tied to the pegs.

‘Crown’ 200 fiberglass boards 50mm thick shall be stuck to the pegs with CPRX compound or any other suitable adhesive and be held in position by the 20-gauge G.I. lacing wires. The insulation boards shall be covered with 20mm – 24 gauge hexagonal G.I. chicken wire mesh, nailed to the timber pegs and 30 gauge aluminum sheets shall be fixed over the chicken wire mesh with 50mm overlap and secured to the timber pegs by screws. If the insulation is specified to rest on top of the false ceiling, it shall be properly installed and anchored to the framework. In case additional battens are required for proper installation, Contractor shall include its cost in the rate for insulation.

**Plaster of Paris Board for False Ceiling:****Materials:****Plaster of Paris Boards:**

- The plaster of Paris boards to be used in the false ceiling shall be of an approved manufacture or manufactured at site by methods and materials approved by BMC.
- The plaster of Paris shall be of the calcium-sulphate hemi-hydrate variety and shall contain not less than 35 percent Sulphur trioxide and other requirements as per IS:2547 (Part I) However, its fineness shall be such that the residue, after drying, and sieving on I.S. sieve designation 3.35mm for 5 minutes shall not be more than 1 percent by weight. Initial setting time shall not be less than 13 minutes. The average compressive strength of plaster determined by testing 5 cm cubes 24 hours after removal from molds and drying in an oven at 40 Deg. C till the weight of the cubes is constant, shall not be less than 84 Kg per sq.cm.

- The plaster of Paris boards reinforced with hessian cloth or coir shall be prepared in suitable sizes as shown on the drawings or as directed by BMC. Wooden forms of height equal to the thickness of boards shall be placed on truly level and smooth surface such as a glass sheet. The edges of the boards shall be truly square. The glass sheet or surface on which form is kept and the form sides shall be given a thin coat of non-staining oil to facilitate the easy removal of the board. Plaster of Paris shall be evenly spread into the form up to about half the depth and hessian cloth or coir shall be pressed over the plaster of Paris layer. The weight of hessian cloth or coir in the board shall be 250gm per sq.m. The ends of the hessian/coir reinforcement shall be turned over at all edges to form a double layer for a width of 50mm. The hessian cloth shall be of an open web texture so as to allow the plaster below and above to intermix with each other and form an integral board. The form shall then be filled with plaster of Paris which shall be uniform pressed and then wire cut to an even and smooth surface. The board shall then be allowed to set initially for an hour or so and then removed from the form and allowed to dry and harden for about a week. The board after drying and hardening shall give a ringing sound when struck. The boards shall be true and exact to shape and size and the exposed face shall be truly plane and smooth.
- The size of boards shall generally be 600mm x 600 mm x 12 mm thick. Boards shall be kept dry in transit and stored flat in a clean dry place and shall not be exposed to moisture. The boards shall always be carried on edges.

**Timber Frame Work:**

Timber for frame work of false ceiling grid and hangers shall be of good quality and well-seasoned. It shall have uniform colour, reasonably straight and close grains and shall be free from knots, cracks and sapwood. It shall be treated with approved anti-termite preservative as directed by the BMC. Extreme care shall be taken so that the preservative treatment does not stain the ceiling boards. In case metal hangers are used, these shall be M.S. flats or bars, having two coats of red oxide zinc chromate paint primer, as shown on drawings or as approved by BMC.

**Metal Frame Work:**

The metal frame work may be made of sections of light metal, such as anodized aluminum, mild steel or as shown on the drawings. The shape of cross-section shall be such as to facilitate proper suspension and proper fixing of the ceiling boards covering them and shall be structurally sound and rigid.

**Construction:**

- Contractor shall ensure that the frame to support the ceiling is designed for structural strength and the sizes, weight and strength of ceiling boards to be fixed and other loads due to live load, air-conditioning ducts, grills, electrical wiring and

lighting fixtures, thermal insulation, etc. as shown on the drawings. Contractor shall also submit a detailed drawing to show the grid work, sizes of grid members, method of suspension, position of openings for air-conditioning and lighting, access doors, etc.

- Structural design of timber member for the frame shall be in accordance with IS: 883, and metal sections shall be of appropriate size and thickness and shall be of approved manufacture, all as approved by BMC.
- The false ceiling grid work shall be carried out as per the approved drawings or as directed by BMC. In case of timber grid work, the grid work shall consist of teak wood runners of minimum size 60mm deep x 40mm wide along one direction at 1.2m center to center and secondary runners of size 50mm deep x 40 mm wide at 60mm center to center perpendicular to the main runners.
- The timber grid work shall be suspended with the help of wooden hangers or metal hangers at 1.2m center to center in both the directions. Wooden hangers shall be adopted for flat R.C. roof slab structures whereas metal hangers for flat R.C. roof or structural steel floors / tresses. Metal hangers shall be fabricated from mild steel / galvanized flats of 35mm x 6mm size or bars of 10mm dia. Threaded at the lower end and anchored securely in the roof concrete or welded to inserts provided on the underside of slabs, beams etc. All M.S. hangers shall be given two coats of red oxide zinc chromate paint primer. In case the roof work is of A.C. sheeting supported on purlins and trusses; hangers shall be suspended from roof steel work. The arrangement of metal hangers shall be such that the level of false ceiling can be adjusted during fixing of the ceiling frame work. The ceiling frame work shall be secured to hangers by means of washers and nuts. The ends of main runners shall preferably be embedded into the masonry work.
- The metal frame work when it is anodized aluminum false ceiling grid system shall consist of aluminum main member of special T-Profile of 38mm x 38mm x 1.5mm thick, interlocking with each other to form frames of various sizes, 600mm x 600 mm or as shown on the drawing. The main members shall be suspended from the roof structures by means of steel hangers as described for timber frame work and supported at the walls by means of anodized aluminum wall angles.
- In the case of timber frame work, all the edges of the plaster of Paris board shall be fixed to frame members by means of counter sunk and rustles screws of 2.74 mm size, 40mm long at a spacing of 100mm to 150 mm c.c and 12mm from the edge of the board. Holes for screws shall be drilled and screws slightly countersunk into the boards. The boards shall be fixed to wooden framework with a joint clearance of about 3mm. The joints shall always be in perfect line and plane.
- In case of aluminum grid system, boards shall be just placed into the frames formed by the main 'T' members and the cross members fitted with the clips for locking boards. Contractor shall take utmost care so as not to force the boards in position

and a slight gap shall be provided so as not to make a tight joint. The boards shall be cut with a saw, if required, to any shape and size.

- As the work of false ceiling may be inter-connected with the work of air-conditioning ducts and lighting, Contractor shall fully co-operate with the other agencies entrusted with the above work, who may be working simultaneously. Contractor shall provide necessary openings in the false ceiling work for air-conditioning, lighting and other fixtures. Additional framing, if required, for the above opening shall also be provided at no extra cost to Employer. Removable or hinged type inspection or access trap doors shall be provided at locations specified by BMC.

#### **Finishing:**

It is essential that false ceiling work should be firm and in perfect line and level and all boards free from distortion, bulge, and other defects. All defective boards and other material shall be removed from site immediately and replaced, and ceiling restored to original finish to the satisfaction of BMC. The workmanship shall be of highest order and all joinery work for timber work shall be in the best workmanship manner. The joints for aluminum frame work shall be of inter-locking type so that when the cross member is in place, it cannot be lifted out. The countersunk heads of screws and all joints shall be filled with plaster of Paris and finished smooth. After filling the joints, a thick skin of the finishing material shall be spread about 50mm wide on either side of the joint and on to it shall be trowelled dry a reinforcing scrim cloth about 10mm wide. If metal scrim is used, a stiffer plaster will be necessary to enable the Trowelling of the scrim down to the board.

#### **Fire Stopping:**

In case of fire protective ceilings, fire resisting barriers at suitable intervals shall be provided. These shall completely close the gap between the false ceiling and soffit of the structural slab. The material of the barrier shall be as indicated by BMC (Reference may be made to the British Standards Institutions CP 290: Code of Practice for suspended ceiling and lining of dry construction using metal fixing system, for guidance).

#### **False or Cavity Floor;**

##### **Frame Work:**

The false floor shall consist of a framework of suitable structural member designed to carry the loads specified. This frame work shall be supported on suitably designed stools placed at 600mm center to center in both directions. The stools shall consist of a mild steel base plate with a mild steel stud having adjustable lock nut and coupling at the center and another mild steel plate at top serving as a prop head.



The above framework shall be suitably designed to accommodate 35mm thick, 600mm square panels. The base plate shall be fixed to the reinforced concrete floor with an approved adhesive compound or with 4 Nos. 6mm dia. Anchor fasteners. Bedding of 1:2 or richer cement sand mortar shall be provided locally under the base plates of stools to provide a level surface.

The prop head shall be provided with mild steel lugs welded on top and each placed perpendicular to the other for proper positioning and supporting the main and cross members. The stools shall be capable of adjustment to accommodate concrete floor level irregularities up to plus or minus 15mm. The framing members shall be completely removable and shall remain in position without screwing or bolting to the prop heads. All steel framework including steel stools shall be given a coat of zinc chromate primer and two coats of enamel paint of approved colour and shade.

#### Floor Panels:

The floor panels shall be made of 600mm x 600mm x 35 mm thick medium density unvineared/ non-prelaminated teak wood particle boards having a density of not more than 800 kg/cu.m bonded with boiling water proof phenol formaldehyde synthetic resin and shall be of fire resistant, termite resistant and moisture proof quality, generally conforming to IS:3087-specification for wood particle boards (Medium Density )for general purposes.

The thermal conductivity of the boards shall not exceed 0.12 kCal/hrs.sq.m/deg.C.m. The panel size given above may be suitably modified near electrical panel equipment and also to suit room dimensions with panel size not more than 600mm under any circumstances. Exposed 2mm thick vinyl edging shall be provided on all edges of individual panels. Each panel shall be given a coat or primer and two coats of approved fire-resistant paint from underside. The particle boards shall be faced with 600mm x 600 mm x 2mm thick approved make flooring tiles conforming to IS:3462 – “Specification for unbaked flexible PVC flooring” and of approved colour and shade. The completed panel shall be completely removable and shall remain in position without screwing or bolting to the on the inner side with stickers for easy identification and reassembly whenever required. Suitable backing material shall be provided on the underside of the particle board to prevent warping and /or to cater to specified loading. Suitable removable covers shall be provided to serve as outlets for the cables.

#### Imposed Loading:

The finished floor shall be capable of supporting uniformly distributed loads of 500 to 1000 Kg. per m<sup>2</sup> of floor area as specified in data sheet. A point load of 450 Kg on

600 sq.mm on any part of the panel or a line load of 725 Kg on 100mm strip across the panel length shall not result in a deflection greater than 2.5mm.

**Finish:**

The finished floor shall be true to lines and levels and present a neat flush surface.

**Vendor Drawing:**

Vendor shall prepare and submit a layout drawing for false floor giving all details including supporting system for approval. If so called for, vendor shall also submit his calculations for the supporting system with all relevant data assumed, to the BMC for his approval. Work shall be carried out on approved drawings only.

**Fire Proof Doors:**

**Material and Workmanship:**

The design of fire proof doors and the materials to be used in their fabrication have to be such that they shall be capable of providing the effective barrier to the spread of fire. The materials, fabrication and erection of fire proof doors shall confirm to IS:3614 (Part-1). The fire proof doors shall be obtained from an approved manufacturer. Specific approval for such purchase shall be obtained beforehand. Sample approval shall also be obtained from testing authority as per the standard IS: 3614 (Part-2) for the specified degree of fire rating in hours. All fire proof doors shall have specified sizes and confirm to the description in the respective items of work.

Fire proof door shutters shall be of zinc coated weldable steel (confirming to BS: 6687) or stainless steel (conforming to IS: 304) sheet (18G minimum) fixed in a frame work of rolled channel. The shutter shall consist of an insulating material like mineral wool in required thickness to satisfy the specified fire rating. Normally the thickness of door shutter shall not be less than 35mm for two hour fire rating and 46 mm for four hour fire rating. The shutter with the required insulating material shall be mounted on angle iron frame or the special made frame from zinc coated (16G minimum) weldable steel sheet. The shutter shall be fixed to frame by means of suitable hinges and shall have a three way latching system. All the doors shall be provided with a coat of primer and one coat of synthetic enamel paint to attain the specified fire rating. All other accessories like hinges, door lock, hold fasts, etc.

shall be provided as approved by TAC (Tariff Advisory Committee). All these accessories shall be compatible with the material used for door and shutter.

# ***SPECIFICATIONS***

***: SECTION - 5:***

***: STRUCTURAL STEEL WORK:***

## SECTION - 5 :

### STRUCTURAL STEEL WORK

#### Applicable Codes and Specifications:

The supply, fabrication, erection and painting of structural steel works shall comply with the following specifications, standards and codes unless otherwise specified herein. All standards, specifications and codes of practices referred to herein shall be the latest editions including all applicable official amendments and revisions.

IS : 808	Dimensions for Hot Rolled Steel sections
IS : 814	Covered Electrodes for Manual Metal Arc Welding of Carbon and Carbon Manganese Steel
IS : 800	Code of Practice for General Construction in Steel
IS : 801	Code of Practice for Use of Cold Formed Light Gauge Steel Structural Members in General Building Construction
IS : 806	Code of Practice for Use of Steel Tubes in General Building Construction
IS : 7205	Safety Code for Erection of Structural Steel Work
IS : 7215	Tolerances for Fabrication of Steel Structures
IS : 4000	High Strength Bolts in Steel Structure – Code of Practice
AISC	Specifications for Design, Fabrication and Erection of Buildings
IS : 1161	Steel Tubes for structural purposes
IS:10 IS:102	Ready Mixed paint, Brushing, Red Lead, Non-setting, Priming.
IS:110	Ready Mixed paint, brushing, grey filler for enamels for use over primers.
IS:117	Ready Mixed paint, Brushing, Finishing, and Exterior Semigloss for general purposes, to Indian Standard colours.
IS:158	Ready Mixed paint, Brushing, Bituminous, Black, Lead free, Acid, Alkali and heat resisting.
IS:159	Ready Mixed paint, Brushing, Acid resisting for protection against acid fumes, colour as required.
IS:341	Black Japan, Types A, B and C

IS:2339	Aluminum paint for general purposes, in Dual container
IS:2932	Specification for enamel, synthetic, exterior, type 1, (a) Undercoating, (b) finishing
IS:2933	Specification for enamel, exterior, type 2, (a) Undercoating, (b) finishing.
IS:5905	Sprayed aluminum and zinc coatings on Iron and Steel.
IS:6005	Code of practice for phosphating of Iron and Steel.
IS:9862	Specification for ready mixed paint, brushing, bituminous, black, lead free, acid, alkali, water & chlorine resisting.
IS:13183	Aluminum paint, Heat resistant.
SIS-05-5900	(Swedish Standard)
IS : 1239	Mild steel tubes, tubulars and other Wrought steel fittings
	Part 1 – Mild steel tubes
	Part 2 – Mild steel tubulars and other wrought steel pipe fittings
IS : 1363 (Parts 1 to 3)	Hexagon Head Bolts, Screws and Nuts of product Grade C (Size range M5 to M64)
IS : 1367 (All parts)	Technical Supply Conditions for Threaded Fasteners
IS : 1852	Rolling and Cutting Tolerances for Hot Rolled Steel Products
IS : 1977	Structural Steel (Ordinary Quality)
IS : 2062	Steel for General Structural Purposes
IS : 2074	Ready Mixed Paint, Air drying, Red Oxide Zinc Chrome and Priming
IS : 3502	Steel Chequered Plate
IS : 3757	High Strength Structural Bolts
IS : 5369	General Requirements for Plain Washers and Lock Washers

IS : 5372	Taper Washers for Channels
IS : 5374	Taper Washer for 1 Beams
IS : 6610	Heavy Washers for Steel Structures
IS : 8500	Structural Steel-micro alloyed (medium and high strength qualities)
IS : 803	Code of practice for design, fabrication and erection of vertical mild steel cylindrical welded storage tanks
IS : 816	Code of Practice for use of Metal Arc Welding for General construction in Mild Steel
IS : 822	Code of Procedure for Inspection of Welds
IS : 1182	Recommended Practice for Radiographic examination of Fusion – Welded Butt Joints in Steel Plates
IS : 1200	Method of Measurement in Building Civil Works
IS : 1477	Code of Practice for Painting of (Parts 1&2) Ferrous Metals in Buildings
IS : 2595	Code of Practice for Radiographic Testing
IS : 3658	Code of Practice for Liquid Penetrate Flaw Detection
IS : 5334	Code of Practice for Magnetic Particle Flaw Detection of Welds
IS : 9595	Recommendations for Metal Arc Welding of Carbon and Carbon Manganese Steel

**Steel Materials:**

Steel materials shall comply with the referred to in **Sub-Clause 4.1**.

All materials used shall be new, unused and free from defects.

Steel conforming to IS: 1977 shall be used only for the following:

Fe310-0 (St 32-0)	For general purposes such as door/window frames, grills, steel gates, handrails, fence posts, tee bars and other non-structural use.
Fe410-0 (St 42-0)	For structures not subjected to dynamic loading other than wind loads such as: Platform roofs, foot over bridges, building, factory sheds etc.

Fe510-0  (St 42-0)	Grade steel shall not be used
	a) If welding is to be employed for fabrication b) If site is in severe earthquake zone c) If plastic theory of design is used

**Drawings prepared by the VENDOR/CONTRACTOR:**

The VENDOR/CONTRACTOR shall prepare all fabrication and erection drawings for the entire work. All the drawings for the entire work shall be prepared in metric units. The drawings shall preferably be of one standard size and the details shown there in shall be clear and legible.

All fabrication drawings shall be submitted to the Engineer-In-Charge for approval.

No fabrication drawings will be accepted for Engineer In charge's approval unless checked and approved by the VENDOR/Contractor's qualified structural engineer and accompanied by an erection plan showing the location of all pieces detailed. The VENDOR/CONTRACTOR shall ensure that connections are detailed to obtain ease in erection of structures and in making field connections.

Fabrication shall be started by the VENDOR/CONTRACTOR only after Engineer In charge's approval of fabrication drawings. Approval by the Engineer-In-Charge of any of the drawings shall not relieve the VENDOR/CONTRACTOR from the responsibility for correctness of engineering and design of connections, workmanship, fit of parts, details, material, errors or omissions or any and all work shown thereon. The Engineer In charge's approval shall constitute approval of the size of members, dimensions and general arrangement but shall not constitute approval of the connections between members and other details.

The drawings prepared by the VENDOR/CONTRACTOR and all subsequent revisions etc. shall be at the cost of the VENDOR/CONTRACTOR for which no separate payment will be made.

**Fabrication:**

**General:**

All workmanship and finish shall be of the best quality and shall conform to the best-approved method of fabrication. All materials shall be finished straight and shall be machined/ground smooth true and square where so specified. All holes and edges shall be free of burrs. Shearing and chipping shall be neatly and accurately done and all portions of work exposed to view shall be neatly finished. Unless otherwise approved by the Engineer-



In-Charge, reference may be made to relevant IS codes for providing standard fabrication tolerance. Material at the shops shall be kept clean and protected from weather.

**Connections:**

Shop/field connections shall be as per approved fabrication drawings. In case of bolted connections, taper washers or flat washers or spring washers shall be used with bolts as necessary. In case of high strength friction grip bolts, hardened washers to be used under the nuts or the bolt heads whichever are turned to tighten the bolts. The length of the bolt shall be such that at least one thread of the bolt projects beyond the nut, except in case of high strength friction grip bolts where this projection shall be at least three times the pitch of the thread.

In all cases where bearing is critical, the unthreaded portion of bolt shall bear on the members assembled. A washer of adequate thickness may be provided to exclude the threads from the bearing thickness, if a longer grip bolt has to be used for this purpose.

All connections and splices shall be designed for full strength of members or loads. Column splices shall be designed for the full tensile strength of the minimum cross section at the splice.

All bolts, nuts, washers, electrodes, screws etc., shall be supplied/brought to site 10% in excess of the requirement in each category and size. Rates shall cover the cost of this extra quantity.

All members likely to collect rainwater shall have drain holes provided.

**Straightening:**

All materials shall be straight and, if necessary, before being worked shall be straightened and/or flattened by pressure and shall be free from twists. Heating or forging shall not be resorted to without the prior approval of the Engineer-In-Charge in writing.

**Rolling and Forming:**

Plates, channels, R.S.J. etc., for circular bins, bunkers, hoppers, gantry girders, etc., shall be accurately laid off and rolled or formed to required profile/shape as called for on the drawings. Adjacent sections shall be match-marked to facilitate accurate assembly, welding and erection in the field.

**High Strength Friction Grip Bolting:**

Inspection after tightening of bolts shall be carried out as stipulated in the appropriate standards depending upon the method of tightening and the type of bolt used.

**Welding:**

Welding procedure shall be submitted to the Engineer-In-Charge for approval. Welding shall be entrusted to qualified and experienced welders who shall be tested periodically and graded as per IS 817, IS: 7310 (Part 1) and IS: 7318 (Part 1).

While fabricating plated beams and built up members, all shop splices in each component part shall be made before such component part is welded to other parts of the members. Wherever weld reinforcement interferes with proper fit-up between components to be assembled off welding, these welds shall be ground flush prior to assembly.

Approval of the welding procedure by the Engineer-In-Charge shall not relieve the Contractor of his responsibility for correct and sound welding without undue distortion in the finished structure.

No welding shall be done when the surface of the members is wet nor during periods of high wind.

Each layer of a multiple layer weld except root and surfaces runs may be moderately panned with light blows from a blunt tool. Care shall be exercised to prevent scaling or flaking of weld and base metal from overweening.

No welding shall be done on base metal at a temperature below  $-5^{\circ}$  C. Base metal shall be preheated to the temperature as per relevant IS codes.

Electrodes other than low-hydrogen electrodes shall not be permitted for thickness of 32 mm and above.

All welds shall be inspected for flaws by any of the methods described under **Sub-clause 4.6.3**. The choice of the method adopted shall be agreed with the Engineer-In-Charge.

The correction of defective welds shall be carried out in a manner approved by the Engineer-In-Charge without damaging the parent metal. When a crack in the weld is removed, magnetic particle inspection or any other equally positive means approved by the Engineer-In-Charge shall be used to ensure that the whole of the crack and material up to 25 mm beyond each end of the crack has been removed. The cost of all such tests and operations incidental to correction shall be borne by the Contractor.

**Tolerances:**

The dimensional and weight tolerances for rolled shapes shall be in accordance with ARE: 1852 for indigenous steel and equivalent applicable codes for imported steel. The tolerances for fabrication of structural steel shall be as per ARE: 7215.

Cutting, punching, drilling, welding and fabrication tolerances shall be generally as per relevant IS codes.

**End Milling:**

Where compression joints are specified to be designed for bearing, the bearing surfaces shall be milled true and square to ensure proper bearing and alignment.

**Inspection:****General:**

The Contractor shall give due notice to the Engineer-In-Charge in advance of the works being made ready for inspection. All rejected material shall be promptly removed from the shop and replaced with new material for the Engineer In charge's inspection. The fact that certain material has been accepted at the Contractor's shop shall not invalidate final rejection at site by the Engineer-In-Charge if it fails to conform to the requirements of these specifications, to be in proper condition or has fabrication inaccuracies which prevent proper assembly nor shall it invalidate any claim which the Employer may make because of defective or unsatisfactory materials and/or workmanship.

No materials shall be painted or dispatched to site without inspection and approval by the ENGINEER INCHARGE unless such inspection is waived in writing by the ENGINEER-IN-CHARGE.

The Contractor shall provide all the testing and inspection services and facilities for shop work except where otherwise specified.

For fabrication work carried out in the field the same standard of supervision and quality control shall be maintained as in shop fabricated work. Inspection and testing shall be conducted in a manner satisfactory to the Engineer-In-Charge.

Inspection and tests on structural steel members shall be as set forth below.

**Material Testing:**

If mill test reports are not available for any steel materials the same shall be tested by the

Contractor to the Employer's Representative's satisfaction to demonstrate conformity with the relevant specification.

**Tests on Welds:**

**(a) Magnetic Particle Test:**

Where welds are examined by magnetic particle testing, such testing shall be carried out in accordance with relevant IS codes. If heat treatment is performed, the completed weld shall be examined after the heat treatment. All defects shall be repaired and retested. Magnetic particle tests shall be carried out using alternating current. Direct current may be used with the permission of the Engineer-In-Charge.

**(b) Liquid Penetrate Inspection:**

In the case of welds examined by Liquid Penetrate Inspection, such tests shall be carried out in accordance with relevant IS Code. All defects shown shall be repaired and rechecked.

**(c) Radiographic Inspection:**

All full strength butt welds shall be radiographed in accordance with the recommended practice for radiographic testing as per relevant IS code.

**Dimensions, Workmanship & Cleanliness:**

Members shall be inspected at all stages of fabrication and assembly to verify that dimensions, tolerances, alignment, surface finish and painting are in accordance with the requirements shown in the Contractor's approved fabrication drawings.

**Test Failure:**

In the event of failure of any member to satisfy inspection or test requirement, the Contractor shall notify the Engineer-In-Charge. The Contractor must obtain permission from the Engineer-In-Charge before any repair is undertaken. The quality control procedures to be followed to ensure satisfactory repair shall be subject to approval by the Engineer-In-Charge.

The Engineer-In-Charge has the right to specify additional testing as he deems necessary, and the additional cost of such testing shall be borne by the Employer, only in case of successful testing.

The Contractor shall maintain records of all inspection and testing which shall be made available to the Engineer-In-Charge.

**Shop Matching:**

For structures like bunkers, tanks, etc. Shop assembly is essential. For other steel work,

such as columns along with the tie beams, bracings may have to be shop assembled to ensure satisfactory fabrication, obtaining of adequate bearing areas etc., if so desired by the Engineer-In-Charge. All these shop assemblies shall be carried out by the Contractor.

**Drilling Holes for other works:**

As a part of this Contract, holes in members required for installing equipment or steel furnished by other manufacturers or other contractors shall be drilled by the ~~VENDOR~~ CONTRACTOR at no extra cost of the EMPLOYER. The information for such extra holes will be supplied by the EMPLOYER, ENGINEER-IN-CHARGE.

**Marking of Members:**

After checking and inspection, all members shall be marked for identification during erection. This mark shall correspond to distinguishing marks on approved erection drawings and shall be legibly painted and stamped on it. The erection mark shall be stamped with a metal dye with figures at least 20 mm high and to such optimum depth as to be clearly visible.

All erection marks shall be on the outer surface of all sections and near one end, but clear of bolt holes. The marking shall be so stamped that they are easily discernible when sorting out members. The stamped marking shall be encircled boldly by a distinguishable paint to facilitate easy location.

Erection marks on like pieces shall be in identical locations. Members having lengths of 7.0 m or more shall have the erection mark at both ends.

**Errors:**

Any error in shop fabrication which prevents proper assembling and fitting up of parts in the field by moderate use of drift pins or moderate amount of reaming will be classified by the Engineer-In-Charge as defective workmanship. Where the Engineer-In-Charge rejects such material or defective workmanship, the same shall be replaced by materials and workmanship conforming to the Specifications by the Contractor, at no cost to the Employer.

**Painting of Steel Work:**

All fabricated steel material, except those galvanized shall receive protective paint coating as specified in specification, which is described below.

**Materials:**

Red-oxide – zinc chrome primer shall conform to IS: 2074.

Synthetic enamel paint shall conform to IS: 2932.

Aluminum paint shall conform to IS: 2339.

All the materials shall be of the best quality from an approved manufacturer. Contractor shall obtain prior approval of the Engineer-In-Charge for the brand of manufacture and the colour/shade. All the materials shall be brought to the site in sealed containers.

**Workmanship:**

Painting work shall be carried out only on thoroughly dry surfaces. Painting shall be applied either by brushing or by spraying. Contractor shall procure the appropriate quality of paint for this purpose as recommended by the manufacturer. The workmanship shall generally conform to the requirement of IS: 1477 (Part 2).

The type of paint, number of coats etc. shall be as specified in the respective items of work. Primer and finish paint shall be compatible with each other to avoid cracking and wrinkling. Primer and finish paint shall be from the same manufacturer. All the surfaces shall be thoroughly cleaned of oil, grease, dirt, rust and scale. The methods to be adopted using solvents, wire brushing, power tool cleaning etc., shall be as per IS: 1477 (Part – I) and as indicated in the item of work. It is essential to ensure that immediately after preparation of the surfaces; the first coat of red oxide-zinc chrome primer shall be applied by brushing and working it well to ensure a continuous film without holidays. After the first coat becomes hard dry, a second coat of primer shall be applied by brushing to obtain a film free from 'holidays'.

After the second coat of primer is hard dry, the entire surface shall be wet rubbed cutting down to a smooth uniform surface. When the surface becomes dry, the undercoat of synthetic enamel paint of optimum thickness shall be applied by brushing with minimum of brush marks. The coat shall be allowed to hard dry. The under coat shall then be wet rubbed cutting down to a smooth finish, taking adequate care to ensure that at no place the undercoat is completely removed. The surface shall then be allowed to dry.

The first finishing coat of paint shall be applied by brushing and allowed to hard dry. The gloss from the entire surface shall then be gently removed and the surface dusted off. The second finishing coat shall then be applied by brushing.

At least 24 hours shall elapse between the applications of successive coats. Each coat shall vary slightly in shade and this shall be got approved by the Engineer-In-Charge.

**Acceptance of Steel, its Handling & Storage:**

The Contractor shall carefully check the steel to be erected at the time of acceptance. Any fabrication defects observed should be brought to the notice of the Engineer-In-Charge.

No dragging of steel shall be permitted. All steel shall be stored 300mm above ground on suitable packing to avoid damage. It shall be stored in the order required for erection, with erection marks visible. All storage areas shall be prepared and maintained by the Contractor. Steel shall not be stored in the vicinity of areas where excavation or grading will be done and, if so stored temporarily, this shall be removed by the Contractor well before such excavation and/or grading commences to a safe distance to avoid burial under debris. Scratched or abraded steel shall be given a coat of primer in accordance with the Specifications for protection after unloading and handling prior to erection. All milled and machined surfaces shall be properly protected from rust/corrosion by suitable coating and also from damage.

**Anchor Bolts & Foundations:**

The Contractor shall carefully check the location and layout of anchor bolts embedded in foundations constructed, to ensure that the structures can be properly erected as shown on the drawings. Any discrepancy in the anchor bolts/foundation shall be reported to the Engineer-In-Charge.

Leveling of column bases to the required elevation may be done either by providing shims or three nuts on the upper threaded portion of the anchor bolt. All shim stock required for keeping the specified thickness of grout and in connection with erection of structures on foundations, crane brackets or at any other locations shall be of good M.S. plates and shall be supplied by the Contractor at his cost.

A certain amount of cleaning of foundations and preparing the area is considered normal and shall be carried out by the Contractor at no extra cost. Here beams bear in pockets or on walls; bearing plates shall be set and leveled as part of the work. All grouting under column base plates or beam bearing plates will be carried out by the Contractor.

**Assembly & connections:**

Field connections may be effected by riveting, bolting, welding or by use of high strength friction grip bolts as shown on the design and erection drawings.

All field connection work shall be carried as per the drawings. All bolts, nuts, washers, rivets, electrodes required for field connections shall be supplied by the Contractor free of

cost. All assembling shall be carried on a level platform. Drifts shall be used only for drawing the work to proper position and must not be used to such an extent as to damage the holes. Size of drifts larger than the normal diameter of hole shall not be used. Any damaged holes or burrs must be rectified to the satisfaction of the Engineer-In-Charge.

Corrections of minor misfits and reasonable amount of reaming and cutting of excess stock from rivets shall be considered as a part of erection. Any error in the shop, which prevents proper fit on a moderate amount of reaming and slight chipping or cutting, shall be immediately reported to the Engineer-In-Charge.

**Erection:**

All structural steel shall be erected as shown on the drawings prepared by the Contractor. Proper size steel cable slings, etc., shall be used for hoisting. Guys shall not be anchored to existing structures, foundations, etc., unless so permitted by the Engineer-In-Charge in writing. Care shall be taken to see that ropes in use are always in good condition.

Steel columns in the basement, if any, are to be lowered and erected carefully with the help of a crane and/or derrick without damaging the basement walls or floor.

Structural steel frames shall be erected plumb and true. Frames shall be lifted at points such that they are not liable to buckle and deform. Trusses shall be lifted only at node points. In the case of trusses, roof girders, all of the purlins and wind bracing shall be placed simultaneously and the columns shall be erected truly plumb on screed bars over the pedestals. All steel columns and beams shall be checked for plumb and level individually before and after connections are made. Temporary bracings shall be introduced wherever necessary to take care of all loads to which the structure may be subjected, including erection equipment and the operation thereof. Such bracings shall be left in place as long as may be required for safety and stability.

Chequered plates shall be fixed to supporting members by tack welding or by countersunk bolts as shown/specified in relevant drawings and/or as approved by the Engineer-In-Charge. The edges shall be made smooth and no burrs or jagged ends shall be left. While splicing, care should be taken so that there is continuity in pattern between the two portions. Care should also be taken to avoid distortion of the plate while welding. The erection of chequered plates shall include:

- a) Welding of stiffening angles/vertical stiffening ribs



- b) Cutting to size and making holes to required shape wherever necessary to allow service piping and/or cables to pass through
- c) Splicing as shown in relevant drawings
- d) Smoothing of edges
- e) Fixing of chequered plates by tack welding or by countersunk bolts
- f) Providing lifting hooks for ease of lifting.

As erection progresses, the work shall be securely bolted to take care of all dead load, wind, seismic and erection stresses. No riveting or welding or final bolting shall be done until the structure has been properly aligned and approved by the Engineer-In-Charge. No cutting, heating or enlarging of the holes shall be carried out without the prior written approval of the Engineer-In-Charge. The Contractor shall furnish test certificates.

**Inspection:**

The Engineer-In-Charge shall have free access to all parts of the job during erection and all erection shall be subjected to his approval. In case of faulty erection, all dismantling and re-erecting required will be at the Contractor's cost. No paint shall be applied to rivet heads or field welds or bolts until these have been approved by the Engineer-In-Charge.

**Tolerances:**

**General:**

Tolerances mentioned below shall be achieved after the entire structure or part thereof is in line, level and plumb.

**Columns:**

Deviation of column axes at foundation top level with respect to true axes:	
(a) In longitudinal direction	±5 mm
(b) In lateral direction	±5 mm
Deviation in the level of bearing surface of columns at foundation top with respect to true level ±5mm.	
Out of plumbness (verticality) of column axis from true vertical axis, as measured at column top:	
(a) For columns up to and including 15 meters	±1/1000 of column height in mm or ±15 mm whichever is less
(b) For columns exceeding	±1/1000 of column height in mm or ±20 mm whichever is less
Deviation in straightness in longitudinal transverse planes of column at any height	±1/1000 of column height in mm or ±10 mm whichever is less
Point along the height	
Difference in erected position of adjacent Pairs of	±10 mm

columns along length or across width of building prior to connecting trusses, beams with respect to true distance	
Width of building prior to connecting trusses, beams with respect to true distance	±10 mm
Deviation in any bearing or seating level with respect to true level	±5 mm
Deviation in differences in bearing level of a member on adjacent pair of columns both across and along the building	±10 mm

**Trusses and Beams:**

Shift at the center of span of top chord member with respect to the vertical plane passing through the center of bottom chord.	±1/250 of height of truss in mm or ±15 mm whichever is less
Lateral shift of top chord of truss at the center of span from the vertical plane passing through the center of supports of the truss	±1/1500 of height of truss in mm or ±15 mm whichever is less
Lateral shift in location of truss from its true vertical position	±10 mm
Lateral shift in location of purlin true position	±5 mm
Deviation in difference of bearing levels of trusses or beams from	1. ±20 mm for trusses 2. For beams : the true difference
Depth < 1800mm :	±6mm
Depth > 1800mm :	±10mm
Deviation in sag in chords and diagonals of truss between node points	1/1500 of length in mm or 10mm whichever is smaller
Deviation in sweep of trusses, beams etc. horizontal plan	1/1000 of span in mm subject to a maximum of 10 mm

**Crane Girders & Rails**

Shift in the center line of crane rail respect to center line of web of with crane girder	±5 mm
Shift in plan of alignment of crane rail with respect to true axis of crane rail at any point	±1 mm
Difference in alignment of crane rail in plan measured between any two points 2 meters apart	±1 mm
Deviation in crane track with respect to true gauge	
For track gauges upto and including 15 meters	±5 mm
For track gauges more than 15 meters	± [5 + 0.25 (S-15)] where S in meters is true gauge
Deviation in the crane rail level at any point from true level	±1/200 of the gauge distance or ±10mm whichever is less
Difference in the crane rail actual levels between any two points 2 meters apart along the rail length	±2 mm
Difference in levels between crane track Rails at	
(a) Supports of crane girders	±15 mm
(b) Mid span of crane girders	± 20 mm
Relative shift of crane rail surfaces at a joint in plane and elevation surfaces for smooth transition	2 mm

Relative shift in the location of crane stops (end buffer along the crane tracks with track gauge S	1/1000 of track gauge subject to maximum of 20 mm S in
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**Painting:**

After steel has been erected, all bare and abraded spots, rivet heads, field welds, bolt heads and nuts shall be spot painted with primer. Before paint is applied, the surface shall be dry and free from dust, dirt, scale and grease. All surfaces inaccessible after erection shall receive two coats of the approved paint before erection.

**Clean up of Work site:**

During erection, the Contractor shall at all times keep the working and storage areas used by him free from accumulation of waste materials or rubbish. Before completion of erection, he shall remove or dispose of in a satisfactory manner all temporary structures, waste and debris and leave the premises in a condition satisfactory to the Engineer-In-Charge.

# ***SPECIFICATIONS***

***SECTION -6:***

***WATER SUPPLY AND SEWERAGE WORKS***

## SECTION -6 :

### WATER SUPPLY AND SEWERAGE WORKS

#### Applicable Codes:

The following standards and codes are made a part of this Employer's Requirement. All standards, codes of practice referred to herein shall be the latest editions including all official amendments and revisions.

IS: 210	:	Specification for grey iron castings
IS: 269	:	Specification for ordinary and low heat Portland cement
IS: 383	:	Specification for coarse and fine aggregates from natural sources for concrete
IS: 432	:	Specification for mild steel and medium tensile steel bars and hard drawn steel wire for concrete reinforcement
IS: 456	:	Code of Practice for plain and reinforced concrete
IS: 458	:	Concrete Pipes (with and without reinforcement).
IS: 516	:	Methods of tests for strength of concrete
IS: 554	:	Dimensions for pipe threads where pressure tight joints are required on the threads.
IS: 651	:	Salt glazed stoneware pipes and fittings.
IS: 774	:	Flushing Cisterns for water closets and urinals (valueless siphonic type)
IS: 775	:	Cast iron brackets and supports for wash basins and sinks.
IS: 781	:	Sand-cast brass screw-down bib taps and stop taps for water services.
IS: 783	:	Code of practice for laying of concrete pipes.
IS: 1068	:	Electroplated coatings of nickel and chromium of iron and steel.
IS: 1077	:	Specification for common burnt clay building bricks

IS: 1786	:	Specification for high strength deformed steel bars and wires for concrete reinforcement
IS: 1239	:	Mild steel tubes (Part I) and mild steel tubular and other wrought steel pipe fittings (Part II)
IS : 1536	:	Centrifugally cast (spun) iron pressure pipes for water, gas and sewage.
IS : 1626	:	Asbestos cement building pipes, gutters and fittings (spigot and socket types).
IS : 1703	:	Copper Alloy float valves (horizontal plunger type) for water supply purposes.
IS : 1726	:	Cast iron manhole covers and frames.
IS : 1729	:	Sand cast iron spigot and socket soil, waste and ventilating pipes, fittings and accessories.
IS : 1742	:	Code of practice for buildings drainage
IS : 2116	:	Specification for sand for masonry mortars
IS : 2212	:	Code of practice for brickwork
IS : 2250	:	Code of practice for preparation and use of masonry mortars
IS : 2326	:	Automatic flushing cisterns for urinals
IS : 2470	:	Code of practice for design and construction of septic tanks (Parts I & II)
IS : 2556	:	Vitreous sanitary appliances (Part I to Part XV)
IS : 2963	:	Specification for copper alloy waste fittings for wash basins and sinks
IS : 3006	:	Specification for chemically resistant glazed stoneware pipes and fittings
IS : 3311	:	Waste plug and its accessories for sinks and wash basins
IS : 5455	:	Specification for cast iron steps for manholes
IS : 4127	:	Code of Practice for laying of glazed stoneware pipes
IS : 3495	:	Methods of tests of burnt clay building bricks

IS : 4111	:	Code of practice for ancillary structures in sewerage system manholes
IS : 5382	:	Specification for rubber sealing rings for gas mains, water mains and sewers
IS : 5329	:	Code of practice for sanitary pipe work above ground for buildings
IS : 5434	:	Non-ferrous alloy bottle traps for marine use

### **Cast Iron Soil Waste and Vent Pipes and Fittings:**

All cast iron pipes and fittings shall be of uniform thickness with strong and deep sockets, free from flaws, air holes, cracks, sand holes and other defects and conform to IS: 1536. The diameter approved shall be internal diameter of pipe. The pipes and fittings shall be true to shape, smooth and cylindrical and shall ring clearly when struck over with a light hand hammer. All pipes and fittings shall be properly cleaned of all foreign material before being fixed.

All plug bends of drainage pipes shall be provided with inspection and cleaning caps, covers, which shall be fixed with nuts and screws. Pipes shall be fixed to the wall by W.I. or M.S. holder bat clamps, unless projecting ears with fixing holes are provided at socket end of pipe. The pipes shall be installed, truly vertical or to the lines and slopes as indicated. The clamps shall be fixed to the walls by embedding their hooks in cement concrete blocks (1:2:4) 10 cm x 10 cm making necessary holes in the walls at proper places. All holes and breakages shall be made good. The clamps shall be kept 25 mm clear of the finished face of the walls to facilitate cleaning and painting of pipes.

The annular space between the socket and spigot shall be filled with a gasket of hemp or spun yarn soaked in neat cement slurry. The joint shall then be filled with stiff cement mortar 1:2 (1 cement: 2 fine sand) well pressed with caulking tool and finished smooth on top at an angle of 45°. The joint shall be kept wet for not less than 7 days by tying a piece of gunny bag kept moist. Joints shall be perfectly air tight as well as water tight.

C.I. pipes and fittings which are exposed shall be first cleaned and then painted with a coat of red lead primer. Two coats of zinc paint with white base and mixed with pigment of required colour to get the approved shade shall be given over the base

primer coat.

The thickness of fittings and their socket and spigot dimensions shall conform to the thickness and dimensions approved for the corresponding sizes of straight pipes.

The connection between the main pipe and branch pipes shall be made by using branches and bends with access for cleaning. Floor traps shall be provided with 25 mm dia. puff pipe where the length of the waste is more than 1800 mm or the floor trap is connected to a waste stack through bends.

All cast iron pipes and fittings including joints shall be tested by a smoke test to the satisfaction of the Employer's Representative and left in working condition after completion. The smoke test shall be carried out as stated under:

Smoke shall be pumped into the pipe at the lowest and from a smoke machine which consists of a bellow and a burner. The material usually burnt is greasy cotton waste which gives out a clear pungent smoke which is easily detectable by sight as well as by smell if there is a leak at any point of the pipeline. Water test and air test shall be conducted as stipulated in IS: 5329.

#### **Galvanized Mild Steel (G.I) Pipe:**

The pipes shall be galvanized mild steel welded pipes and seamless screwed and sockets tubes conforming to the requirements of IS: 1239, for medium grade. They shall be of the diameter (nominal bore) approved. The sockets shall be designated by the respective nominal bores of the pipes for which they are intended. The pipes and sockets shall be finished neatly, well galvanized on both inner and outer surfaces, and shall be free from cracks, surface flaws, laminations and other defects. All screws, threads shall be clean and well cut. The ends shall be cut cleanly and square with the axis of the tube.

All screwed tubes and sockets shall have pipe threads conforming to the requirements of IS.554. Screwed tubes shall have taper threads while the sockets shall have parallel threads.

The fittings shall be of malleable cast iron or mild steel tubes complying with all the appropriate requirements as approved for pipes. The fittings shall be designated by the respective nominal bores of the pipes for which they are intended. The fittings shall have screw threads at the ends conforming to the requirements of IS: 554.



Female threads on fittings shall be parallel and male threads (except on running nipples and collars of unions) shall be tapered.

The pipes and fittings shall be inspected at site before use to ascertain that they conform to the specification. The defective pipes shall be rejected. Where the pipes have to be cut or rethreaded, the ends shall be carefully filled out so that no obstruction to bore is offered. The ends of the pipes shall then be threaded conforming to the requirements of IS.554 with pipe dies and taps carefully in such a manner as will not result in slackness of joints when the two pieces are screwed together. The taps and dies shall be used only for straightening bent and damaged screw threads and shall not be used for turning of the threads so as to make them slack, water tight joint. The screw- thread of pipes and fittings shall be protected from damage until they are fitted. The pipes shall be cleaned and cleared of all foreign matter before being laid. In jointing the pipes, the inside of the socket and the screwed end of the pipes shall be oiled and rubbed over with white lead and a few turns of spun yarn wrapped around the screwed end of the pipe. The end shall then be screwed in the socket, tee, etc., with the pipe wrench. Care should be taken that all pipes and fittings are properly jointed so as to make the joints completely water tight and pipes are kept at all times free from dust and dirt during fixing. Burrs from the joint shall be removed after screwing. After laying, the open ends of the pipes shall be temporarily plugged to prevent access of soil or any other foreign matter. Any threads exposed after jointing shall be painted or in the case of underground piping thickly coated with approved anticorrosive paint to prevent corrosion.

For internal work the galvanized iron pipes and fittings shall run on the surface of the walls or ceiling (not in chase) unless otherwise specified. The fixing shall be done by means of standard pattern holder bat clamps, keeping the pipes about 1.5 cm clear of the wall. Pipes and fittings shall be fixed truly vertical, horizontal. When it is found necessary to conceal the pipes, chasing may be adopted or pipes fixed in the ducts of recesses etc. provided there is sufficient space to work on the pipes with the usual tools. The pipes shall not ordinarily be buried in walls or solid floors. Where unavoidable, pipes may be buried for short distances provided adequate protection is given against damage, but the joints in pipes shall not be buried. M.S. pipe sleeve shall be fixed at a place where a pipe is passing through a wall or floor for reception of the pipe and to allow freedom for expansion, contraction and other movements, maintenance. In case the pipe is embedded in walls or floors it should be

painted with anti-corrosive bitumastic paint of approved quality. The pipe should not come in contact with lime mortar or lime concrete as the pipe is affected by lime. Under the floors the pipes shall be laid in layer of sand filling or as approved by the Employer's Representative.

G.I. pipes with socket and spigot ends shall be provided with lead caulked joints wherever specified and the joints shall conform to the requirements of IS.3114.

The work of excavation and backfilling shall be done true to line and gradient in accordance with General Employer's Requirements for earthworks in trenches for pipes laid underground.

The pipes shall be laid on a layer of 10.0 cm sand and filled upto 15 cm above the pipes. A sand cushion of 15cm on either side of the pipe shall also be provided. The remaining portion of the trench shall then be filled with excavated earth. The surplus earth shall be got rid of as directed. When excavation is done in rock the bottom shall be cut deep enough to permit the pipes to be laid on a cushion of sand 75 mm minimum.

The pipes and fittings after they are laid and jointed shall be subjected to hydrostatic pressure test as approved by the Employer's Representative and shall satisfactorily pass the test. Pipe line system shall be tested in sections as the work proceeds, keeping the joints exposed for inspection. Pipes shall be slowly and carefully charged with water allowing all air to escape. All draw off taps shall then be closed and water pressure gradually raised to test pressure. Care shall be taken to ensure that pressure gauge is accurate and preferably should have been recalibrated before the test. Pump used having been stopped; the section of the pipeline shall maintain the test pressure for at least half an hour. Any joints or pipes found leaking shall be removed and replaced by the Contractor.

The G.I. pipe line shall be cut to the required length at the position where the meter and stop cock are required to be fixed. The ends of the pipes shall be threaded. The meter and stop cock shall be fixed in position by means of connecting pipe, G.I. nuts, sockets, etc. The stop cock shall be fixed near the inlet of the water meter. The paper disc inserted in the ripples of the meter shall be removed and meter installed exactly horizontally or vertically and with the arrow cast on the body of the meter pointing in the direction of flow. Care shall be taken that the factory seal of the

meter is not disturbed. Whenever the meter is to be fixed to a newly fitted pipe line, the pipe line will have to be completely washed before fixing the meter. For this purpose, a connecting piece of pipe equal to the length of the meter is to be fixed on the new pipe line. The water shall be allowed to flow completely to wash the pipe line and then the meter installed as described above by replacing the connecting piece.

**Stoneware pipes and fittings:**

All pipes with spigot and socket ends shall conform to IS: 651/3006 and shall be of grade 'A'. These shall be sound, free from visible defects such as fine cracks or hair cracks. The glaze of the pipes shall be free from crazing. The pipes shall give a sharp clear note when struck with a light hammer.

The following information shall be clearly marked on each pipe and fitting:

- (a) Internal diameter;
- (b) Grade;
- (c) Date of manufacture;
- (d) Name of manufacturer or his registered trade-mark or both.

All pipes and fittings shall have ISI mark.

Jointing of GSW pipes and fittings shall be done as per the requirements of the following Employer's Requirements and the relevant IS. After jointing, extraneous material if any shall be removed from the inside of the pipes and fittings and the newly made joints shall be thoroughly cured. In case, rubber sealing rings are used for jointing, these shall conform to IS: 5382.

**Spigot and Socket Joint (Cement Joint):**

The spigot of each pipe shall be slipped home well into the socket of the pipe previously laid and adjusted in the correct position. In each joint, spun yarn soaked in neat cement slurry or tarred gasket shall be passed around the joint and inserted in it by means of a caulking tool. More skeins of yarn or gasket shall be added if necessary and shall be well caulked. Yarn or gasket so rammed shall not occupy more than one-fourth of the depth of socket. Cement mortar (1:1) shall be slightly moistened and carefully inserted by hand into the remaining space of the joint after caulking of yarn or gasket. The mortar shall then be caulked into the joint with a caulking tool. More cement mortar shall be added until the space of joint has been

completely filled with tightly caulked mortar. The joint shall then be finished of neatly outside the socket at an angle of 45 degrees. The cement mortar joints shall be cured at least for seven days before testing.

The approximate quantity of cement required for each joint for certain common sizes of pipes are give below for guidance:

Nominal diameter of pipe (mm)	Cement (kg)
150	1.5
200	2.0
250	2.5
300	3.25
350	4.5
400	5.5
450	6.5

**Spigot and Socket Joint (Bituminous Joint):**

The general requirements for this type of joint shall be as specified in 5.12.1 the material for jointing shall consist of composition of asphalt and sand in the ratio of 1:7. Asphalt and sand shall be boiled together and filled into the socket in a molten state with the aid of special moulds.

**Spigot and Socket Joint (Rubber Ring Joint):**

The pipe with the rubber ring accurately positioned on the spigot shall be pushed well home into the socket of the previously laid pipe by means of uniformly applied pressure with the aid of a jack or similar appliance. The rubber rings conforming to IS: 5382 shall be used, and the manufacturer's instructions shall be deemed to form a part of this Employer's Requirements. The rubber rings shall be lubricated before making the joint and the lubricant shall be soft soap water or an approved lubricant supplied by the manufacturer.

**Cleaning of Pipes:**

As soon as a stretch of GSW pipes has been laid complete from manhole to manhole or for a length as approved by the Employer's Representative, the Contractor shall run through the pipes both backward and forward a double disc or solid or closed cylinder 50 mm less in diameter than the internal diameter of pipes. The open end of an incomplete stretch of pipeline shall be securely closed as approved by the

Employer's Representative to prevent entry of mud or silt etc. If as a result of the removal of any obstruction the Employer's Representative considers that damages may have been caused to the pipe lines, he shall be entitled to order the length to be tested immediately. Should such test prove unsatisfactory the Contractor shall repair the pipeline and carry out such further tests as are required by the Employer's Representative.

It shall also be ascertained by the Contractor that each length from manhole to manhole or the length as approved by the Employer's Representative is absolutely clear and without any obstruction by means of visual examination of the interior of the pipeline suitably illuminated by projected sunlight or otherwise.

After laying and jointing of GSW pipes is completed the pipe line shall be tested as per the following Employer's Requirements and as approved by the Employer's Representative. All equipment for testing at work site shall be supplied and erected by the Contractor. Water for testing of pipeline shall be arranged by him. Damage during testing shall be the Contractor's responsibility and shall be rectified by him to the full satisfaction of the Employer's Representative. Water used for test shall be removed from pipes and not released to the excavated trenches. After the joints have thoroughly set and have been checked by the Employer's Representative and before backfilling the trenches, the entire section of the sewer or storm water drain shall be proved by the Contractor to be water tight. Before commencing the hydraulic test, the pipelines shall be filled with water and maintained full for 24 hours by adding water, if necessary, under a head of 0.6 m of water. The test shall be carried out by suitably plugging the low end of the drain and the ends of connections, if any, and filling the system with water. A knuckle bend shall be temporarily jointed at the top end and a sufficient length of vertical pipe jointed to it so as to provide the required test head; or the top end may be plugged with a connection to a hose ending in a funnel which could be raised or lowered till the required head is obtained and fixed suitably for observation. The pipeline shall be subjected to a test pressure of at least 2.5 m head of water at the highest point of the section under test. The tolerance of two liters per centimeter of diameter per kilometer may be allowed during a period of 10 minutes. Any leakage including excessive sweating which causes a drop in the test water level will be visible and the defective part of the work should be removed and made good. If any damage is caused to the pipeline during the execution of work or while cleaning/testing the pipeline as specified. The Contractor shall be held responsible for the same and shall replace the damaged pipeline and re-test the same to the full satisfaction of the Employer's Representative.

Water for testing of pipeline shall be arranged by the Contractor.

**Stop Cock and Bib Cock:**

A bibcock (bib tap) is a draw off tap with a horizontal inlet and free outlet and stopcock (stop tap) is a valve with a suitable means of connections for insertion in a pipe line for controlling or stopping the flow. They shall be of specified size and shall be of the screw down type. The closing device should work by means of a disc carrying a renewable non-metallic washer, which shuts against water pressure on a seating at right angles to the axis of the threaded spindle which operates it. The handle shall be either crutch or butterfly type securely fixed to the spindle. The cocks shall open in anti-clockwise direction. When the bib cocks and stop cocks are required to be chromium plated, the chromium plating shall be of service Grade No. 2 conforming to IS.1068. In finish and appearance, the plated articles shall be free from plating defects such as blisters, pits, roughness and shall not be stained or discoloured.

These fittings shall be of brass heavy class; chromium plated (C.P.) and of approved manufacture and pattern with screwed or flanged ends as specified. The fittings shall in all respects comply with the requirements of IS.781. The standard size of brass fittings shall be designated by the nominal bore of the pipe to which the fittings are attached. A sample of each kind of fitting shall be approved by the Employer's Representative and all supplies made according to the approved samples.

All cast fittings shall be sound and free from laps, blow holes and fittings, both internal and external surfaces shall be clean, smooth and free from sand etc. Burning, plugging stopping or patching of the casting shall not be permitted. The bodies, bonnets, spindles and other parts shall be truly machined and when assembled the parts shall be axial, parallel and cylindrical with surfaces smoothly finished. The area of the waterway of the fittings shall not be less than the area of the nominal bore.

The fittings shall be fully examined and cleared of all foreign matter before being fixed. The fittings shall be fitted in the pipe line in a workman like manner. The joints between fittings and pipes shall be made leak- proof. The joints and fittings shall be leak proof when subjected to a pressure test approved by the Employer's Representative and the defective fittings and joints shall be replaced or redone.

**Soak Pit:**

Soak pit shall be constructed at the location specified by the Employer's

Representative. Earthwork excavation shall be carried out to the exact dimensions. Brick masonry lining with open joints shall be constructed in the pit upto 150 mm below the outlet pipeline. Brick masonry in cement mortar 1:6 shall be constructed above this level up to ground. Well burnt brick aggregates of nominal size 40 mm to 80 mm and coarse sand shall be filled within the chamber. Construction of pit lining and filling of the brick ballast shall progress simultaneously.

**Manholes:**

**Location:**

Manholes shall be constructed at places approved by the Employer's Representative.

**Excavation:**

Excavation, shoring, dewatering etc. for the pits of manholes, laying of pipes and fittings, specials shall be done in accordance with Employer's Requirements described elsewhere in the document.

**Bed Concrete:**

The bed concrete for manholes shall be done in accordance with Employer's Requirements described elsewhere in the document.

**Bricks:**

Bricks to be used for construction of manholes shall conform to the relevant Indian Standards. They shall be sound, hard, and homogeneous in texture, well burnt in kiln without being vitrified, table moulded, deep red, cherry or copper coloured, of regular shape and size and shall have sharp and square and parallel faces. The 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: 1077.

The size of the brick shall be 23.0 x 11.5 x 7.5 cm. unless otherwise specified; but tolerance upto  $\pm 3$  mm in each direction shall be permitted. Only full size brick shall

be used for masonry work. Brick bats 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 (1:2) 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. Retendering 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 5.15.5. 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 plumb and square 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 I.S. 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 shall be done on both faces of brick masonry in cement mortar (1:2) and 20 mm thick unless otherwise specified.

Plastering work shall be carried out in two layers, the first layer being 14 mm thick and the second layer being 6 mm thick. 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 M15 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.

#### **Cast Iron Steps:**

Cast iron steps shall be as per IS: 5455. 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 warping. The portion of the step which projects from the wall of the manhole shall have a raised chequered design to provide an adequate non-slip grip. C.I. steps shall weigh not less than 4.5 kg each and shall be of 150 mm x 375 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 degrees C and shall not be brittle as to chip off at temperature of 0 degree C.

Where the depth of invert of manhole exceeds 800 mm, cast iron steps of approved pattern shall be fixed in the brick work at the interval of 300 mm vertically and staggered at 380 mm horizontally centre to centre. In case of pipe diameter greater than 600 mm, box type C.I. steps weighing 19 kg each shall be provided at 300 mm vertically in channel of manhole.

**Frame and Covers:**

Frame and covers for manholes shall be of required type and dimensions as per the relevant drawings prepared by the Contractor. Following information shall be clearly marked on each cover.

- i. Year of manufacture,
- ii. Identification mark of the Employer: PROJECT DIRECTOR AND CHIEF ENGINEER.
- iii. Arrow showing direction of flow.

**(a) Cast Iron Frame and Cover:**

The cast iron frame and cover shall be of grey cast iron as per IS: 1726. The general requirements for casting and coating of CI frame and cover shall be as specified for CI steps in Clause 5.15.10. The covers shall have a raised chequered design to provide an adequate non-slip grip. The rise of the chequered shall not be less than 4 mm. The locking device for the cover shall be provided as approved by the Employer's Representative. The CI covers for the load test shall be selected at one for every lot of fifty or part thereof for each type and size manufactured and as approved by the Employer's Representative. The frame shall be fixed in cement concrete of M15 grade all round and finished with neat cement. The manhole frame shall have 560 mm diameter clear opening and shall weigh not less than 208 kg. Including cover. In case of rectangular CI frame and cover of 900 mm x 600 mm clear opening, the total weight shall not be less than 275 kg. In case of scraper manhole the frame shall have clear opening of 1200 mm x 900 mm and shall weigh not less than 900 kg including cover. The manhole cover and frame shall be painted with three coats of anti-corrosive paint after fixing in position.

**(b) Fiber Reinforced Concrete Frame and Cover:**

Fiber reinforced concrete frame and cover shall be capable of withstanding load of

35 tonnes. The frame shall be fixed in cement concrete of M15 grade all around and finished with neat cement. The fiber reinforced frame shall have clear opening of 560 mm diameter and weighing 102 kg. The cover shall have a minimum thickness of 100 mm and weighing 78 kg. The fiber shall constitute 1% of the weight of the concrete in the form of 50 mm to 100 mm long high tensile steel wires. For the cover, MS sheet lapping of 18 gauge shall be provided to avoid damage to the edges. Similarly for frame, MS angle/flat shall be provided along the edge. Both MS sheet and angle shall be painted with black bituminous paint. The cover should have suitable lifting arrangement. The fiber reinforced frame and cover shall be manufactured as approved.

(c) **Reinforced Cement Concrete Frame and Cover:**

Reinforced cement concrete frame and cover for manholes shall be of required dimensions and shape as shown on the drawing prepared by the Contractor. The frame and cover shall be cast in cement concrete of M25 grade. Minimum cover to the reinforcement shall be 40 mm. The edges of frame and covers shall be provided with mild steel angles to avoid damages to the corners. These angles shall be painted with black bituminous paint. The covers should have suitable lifting arrangement.

**Drop Manhole:**

When a sewer connects a main sewer, and where the difference in level between water line (peak flow levels) of main line and the invert level of branch lines is more than 600 mm or a drop of more than 600 mm is required to be given in the same sewer line and it is uneconomical or impractical to arrange the connection within 600 mm, a drop connection shall be provided for which a manhole shall be constructed as per relevant drawing, incorporating a vertical drop pipe from the higher sewer to the lower one. This pipe shall be provided outside the shaft and encased in concrete. A continuation of the branch sewer should be built through the shaft wall to form a rodding and inspection eye, which should be provided with a half blank flange. The diameter of the back drop should be at least as large as that of the incoming pipe. The drop pipe should terminate at its lower end with a plain or duck-foot bend turned so as to discharge its flow at 45 degrees or less to the direction of the flow in the main sewer. The pipe unless of cast iron should be surrounded with 150 mm thick concrete.

In the case of sewers over 450 mm in diameter the drop in level may be

accomplished by one of the following approved methods:

- (a) A cascade;
- (b) A ramp;
- (c) By drops in previous manholes.

**RCC Manhole:**

M25 grade of concrete used for construction of RCC manhole shall have minimum cement content of 360 kg/cum of concrete. Minimum cover to the reinforcement shall be 50 mm.

**Vent Shafts:**

(a) **General:**

Vent shafts shall be erected at such places as approved by the Employer's Representative.

(b) **Mild Steel Vent Shaft:**

Mild steel vent shaft shall be of 150 mm diameter and 12.17 m height from ground level with C.I. ornamental cap. This shall be fixed firmly and encased in cement concrete of M15 grade as shown on relevant drawing with necessary mild steel bolts, plates etc. for foundation. The vent shaft shall be painted with one coat of silver paint over one coat of red lead oxide paint. The vent shaft shall be connected to manhole by 150 mm diameter glazed stoneware pipe encased by M10 concrete of 150 mm thickness all around as approved by the Employer's Representative.

(c) **RCC Vent Shaft:**

Reinforced cement concrete vent shaft shall be of M25 grade concrete, 200 mm diameter at bottom and tapered to 100 mm diameter at top (both inside clear openings) and 6 m height from ground level. The vent shaft shall be embedded in concrete of M10 grade and anchored by 2 nos. of 16 mm diameter and 600 mm long MS bars. The vent shaft shall be connected to manhole as specified in (b) above through a brick masonry flue chamber.

**Miscellaneous:**

If any damage is caused to the other services such as water supply pipeline, sewer, cable, etc. during the construction of manholes and erection of vent shafts, the Contractor shall be held responsible for the same and shall replace the damaged services to the full satisfaction of the Employer's Representative.

# ***SPECIFICATIONS***

***SECTION -7:***

***EARTHWORK***

## SECTION -7:

### EARTHWORK

#### Applicable Codes

The following Indian Standard Codes, unless otherwise specified herein, shall be applicable. In all cases, the latest revision of the codes shall be referred to.

IS 3764 - 1992	Excavation work - Code of Safety.
IS 2720	Methods of test for soils:
(Part-1) - 1983	Part 1 Preparation of dry soil samples for various tests.
(Part-2) - 1986	Part 2 Determination of Water Content.
(Part-4) - 1985	Part 4 Grain size analysis.
(Part-5) - 1985	Part 5 Determination of liquid and plastic limit.
(Part-7) - 1980	Part 7 Determination of water content - dry density relation using light compaction.
(Part-9) - 1971	Part 9 Determination of dry density - moisture by constant weight of soil method.
(Part-14) - 1983	Part 14 Determination of density index (relative density) of cohesion less soils.
(Part-22) - 1978	Part 22 Determination of organic matter.
(Part-26) - 1987	Part 26 Determination of pH Value.
(Part-27) - 1987	Part 27 Determination of total soluble sulphates.
(Part-28) - 1974	Part 28 Determination of dry density of soils in place by the sand replacement method.
(Part-33) - 1971	Part 33 Determination of the density in place by the ring and water replacement method.
(Part-34) - 1972	Part 34 Determination of density of soil in place by rubber balloon method.
(Part-38) - 1976	Part 38 Compaction control test ( Hilf Method ).

#### General:

The Contractor shall furnish all tools, plant, instruments, qualified supervisory personnel, labour, materials, any temporary works, consumables, any and everything

necessary, whether or not such items are specifically stated herein for completion of the work in accordance with the Employer's Requirements.

The Contractor shall survey the site before excavation and set out all lines and establish levels for various works such as grading, basement, foundations, plinth filling, roads, drains, cable trenches, pipelines etc. Such survey shall be carried out by taking accurate cross sections of the area perpendicular to established reference grid lines at 8m intervals or nearer, if necessary, based on ground profile and thereafter properly recorded.

The excavation shall be carried out to correct lines and levels. This shall also include, where required, proper shoring to maintain excavations and also the furnishing, erecting and maintaining of substantial barricades around excavated areas and warning lamps at night.

Excavated material shall be dumped in regular heaps, bunds, riprap with regular slopes within the lead specified and leveling the same so as to provide natural drainage. Rock/soil & murrum excavated shall be stacked properly as approved by the Employer's Representative. As a rule, all softer material shall be laid along the center of heaps, the harder and more weather resisting materials forming the casing on the sides and the top. Rock shall be stacked separately. Top soil shall be stock piled separately for later re-use.

**Clearing:**

The area to be excavated / filled shall be cleared of fences, trees, plants, logs, stumps, bush, vegetation, rubbish, slush, etc. and other objectionable matter. If any roots or stumps of trees are encountered during excavation, they shall also be removed. The material so removed shall be disposed off as approved by the Employer's Representative. Where earth fill is intended, the area shall be stripped of all loose/soft patches, top soil containing objectionable matter/materials before fill commences.

**Excavation:**

All excavation work shall be carried out by mechanical equipment unless, in the opinion of Employer's Representative, the work involved requires it to be carried out by manual methods.

Excavation for permanent work shall be taken out to such widths, lengths, depths and profiles as are shown on the drawings provided by the Contractor or such other lines and grades as may be agreed with the Employer's Representative. Rough excavation shall be carried out to a depth of 150mm above the final level. The



balance shall be excavated with special care.

Soft pockets shall be removed below the final level and extra excavation filled up with lean concrete as approved by the Employer's Representative. The final excavation should be carried out just prior to laying the blinding course.

To facilitate the permanent works the Contractor may excavate, and also backfill later, outside the lines shown on the drawings provided by the Contractor as agreed with the Employer's Representative. Should any excavation be taken below the specified elevations, the Contractor shall fill it up with concrete of the same class as in the foundation resting thereon, up to the required elevation at no cost to the Employer.

All excavations shall be to the minimum dimensions required for safety and ease of working. Prior approval of the Employer's Representative shall be obtained by the Contractor in each individual case, for the method proposed for the excavation, including dimensions, side slopes, dewatering, disposal, etc. This approval shall not in any way relieve the Contractor of his responsibility for any consequent loss or damage. The excavation must be carried out in the most expeditious and efficient manner. Side slopes shall be as steep as will stand safely for the actual soil conditions encountered. Every precaution shall be taken to prevent slips. Should slips occur, the slipped material shall be removed and the slope dressed to a modified stable slope.

**Rock:**

**General:**

'Rock' means a natural aggregate of mineral crystals, which for its excavation would normally require the use of heavy pneumatic hydraulic breaker and/or cutting equipment or explosives. The term shall exclude any material that can be removed by ordinary excavating machinery and which in any individual mass has a volume not exceeding  $1\text{m}^3$  or  $0.25\text{m}^3$  where the net width of excavation is less than 2 m. Ordinary excavating machinery means a hydraulic back hoe with rated output of 50 kW or less.

Before classification of material as rock the Contractor shall demonstrate to the satisfaction of the Employer's Representative his inability to excavate it without resort to heavy percussion tools complete with rock bits, hydraulic wedges or blasting. Excavation by the use of explosive will not normally be permitted except for pipeline.

Material shall not be classified as rock unless the Employer's Representative has agreed to such classification on the basis of such a demonstration before its

excavation. Excavations where rock has been encountered and classified as such shall not be backfilled before examination of the excavated faces by the Employer's Representative to enable the extent of the rock excavation to be determined.

#### **Excavation by the Use of Explosives**

Unless otherwise stated herein, I.S. Specification "IS: 4081: Safety Code for Blasting and related Drilling Operations" shall be followed. As far as possible all blasting shall be completed prior to commencement of construction. At all stages of excavation, precautions shall be taken to preserve the rock below and beyond the lines specified for the excavation, in the soundest possible condition. The quantity and strength of explosives used shall be such as will neither damage nor crack the rock outside the limits of excavation. All precautions, as directed by Employer's Representative, shall be taken during the blasting operations and care shall be taken that no damage is caused to adjoining buildings or structures as a result of blasting operations. In case of damage to permanent or temporary structures, Contractor shall repair the same to the satisfaction of Employer's Representative at his cost. As excavation approaches its final lines and levels, the depth of the charge holes and amount of explosives used shall be progressively and suitably reduced.

The contractor shall obtain a valid Blasting License from the authorities concerned. No explosive shall be brought near the work in excess of quantity required for a particular amount of firing to be done; and surplus left after filling the holes shall be removed to the magazine. The magazine shall be built as far possible from the area to be blasted. Employer's Representative's prior approval shall be taken for the location proposed for the magazine.

In no case shall blasting be allowed closer than 30 meters to any structure or to locations where concrete has just been placed. In the latter case the concrete must be at least 7 days old.

For blasting operations, the following points shall be observed.

- i) Contractor shall employ a competent and experienced supervisor and licensed blaster in-charge of each set of operation, who shall be held personally responsible to ensure that all safety regulations are carried out.
- ii) Before any blasting is carried out, Contractor shall intimate Employer's representative and obtain his approval in writing for resorting to such

operations. He shall intimate the hours of firing charges, the nature of explosive to be used and the precautions taken for ensuring safety.

- iii) Contractor shall ensure that all workmen and the personnel at site are excluded from an area within 200 m radius from the firing point, at least 15 minutes before firing time by sounding warning whistle. The area shall also be given a warning by sounding a distinguishing whistle.
- iv) The blasting of rock near any existing buildings, equipment or any other property shall be done under cover and Contractor has to make all such necessary muffling arrangements. Covering may preferably be done by MS plates with adequate dead weight over them. Blasting shall be done with small charges only and where directed by Employer's Representative; a trench shall have to be cut by chiseling prior to the blasting operation, separating the area under blasting from the existing structures.
- v) The firing shall be supervised by a Supervisor and not more than 6 (six) holes at a time shall be set off successively. If the blasts do not tally with the number fired, the misfired holes shall be carefully located after half an hour and when located, shall be exploded by drilling a fresh hole along the misfired hole (but not nearer than 600 mm from it) and by exploding a new charge.
- vi) A wooden tamping rod with a flat end shall be used to push cartridges home and metal rod or hammer shall not be permitted. The charges shall be placed firmly into place and not rammed or pounded. After a hole is filled to the required depth, the balance of the hole shall be filled with stemming, which may consist of sand or stone dust or similar inert material.
- vii) Contractor shall preferably detonate the explosives electrically.
- viii) The explosives shall be exploded by means of a primer, which shall be fired by detonating a fuse instantaneous detonator (F.I.D) or other approved cables. The detonators with F.I.D. shall be connected by special nippers.
- ix) In dry weather and normal dry excavation, ordinary low explosive gunpowder may be used. In damp rock, high explosive like gelatin with detonator and fuse wire may be used. Underwater or for excavation in rock with substantial accumulated seepage electric detonation shall be used.
- x) Holes for charging explosives shall be drilled with pneumatic drills, the drilling pattern being so planned that rock pieces after blasting will be suitable for handling without secondary blasting.

- xi) When excavation has almost reached the desired level, hand trimming shall have to be done for dressing the surface to the desired level.  
Any rock excavation beyond an over break limit of 75 mm shall be filled up as instructed by Employer's Representative, with concrete of strength not less than M10. Stopping in rock excavation shall be done by hand trimming.
- xii) Contractor shall be responsible for any accident to workmen, public or Employer's property due to blasting operations. Contractor shall also be responsible for strict observance of rules, laid by Inspector of explosives, or any other Authority duly constituted under the State and / or Union Government as applicable at the place of excavation.

**Stripping Loose Rock:**

All loose boulders, detached rocks partially and other loose material which might move therewith not directly in the excavation but so close to the area to be excavated as to be liable, in the opinion of Employer's Representative, to fall or otherwise endanger the workmen, equipment, or the work shall be stripped off and removed from the area of the excavation. The method used shall be such as not to render unstable or unsafe the portion, which was originally sound and safe.

Any material not requiring removal in order to complete the permanent works, but which, in the opinion of Employer's Representative, is likely to become loose or unstable later, shall also be promptly and satisfactorily removed.

**Classification of Strata:**

The decision regarding, classification of strata shall rest with the Engineer in charge and his decision shall be final and binding to the contractor.

All the materials encountered in the excavation shall be classified as under: -

**ORDINARY SOIL AND SOFT MURRUM:**

These will include all materials of an earthy or sandy nature, which can be easily ploughed or small shingle, and gravel, which can be easily removed.

**HARD MURRUM:**

This shall include all kinds of disintegrated rock or shale or inundated clay which can be removed with a shovel without difficulty and which do not require blasting.

**SOFT ROCK:**

This shall include all materials which is rock or hard conglomerate, all decomposed and whether rock, highly fissured rock old masonry and also soft rock boulders bigger than 1½ cubic meter and other varieties of rock. Which do not require blasting and which can be removed with the pie crowbars wedges and hammer.

**HARD ROCK:**

This shall include rocks, occurring in masses, which could best be removed by chiseling or by blasting.

**Fill, Backfilling and Site Grading:**

**General:**

All fill material shall be subject to the Employer's Representative's approval. If any material is rejected by Employer's Representative, the Contractor shall remove the same forthwith from the site. Surplus fill material shall be deposited/disposed off as directed by Employer's Representative after the fill work is completed.

No earth fill shall commence until surface water discharges and streams have been properly intercepted or otherwise dealt with to the approval of the Employer's Representative.

**Material:**

To the extent available, selected surplus spoil from excavations shall be used as backfill. Backfill material shall be free from lumps, organic or other foreign material.

All lumps of earth shall be broken or removed. Where excavated material is mostly rock, the boulders shall be broken into pieces not larger than 150 mm size, mixed with properly graded fine material consisting of murrum or earth to fill the voids and the mixture used for filling.

If fill material is required to be imported, the Contractor shall make arrangements to bring such material from outside borrow pits. The material and source shall be subject to the prior approval of the Employer's Representative. The approved borrow pit areas shall be cleared of all bushes, roots of trees, plants, rubbish, etc. Topsoil containing foreign material shall be removed. The materials so removed shall be disposed of as directed by Employer's Representative. The Contractor shall provide the necessary access roads to borrow areas and maintain the same if such roads do not exist.

**Filling in pits and trenches around foundations of structures, walls, etc.**

As soon as the work in foundations has been accepted and measured, the spaces around the foundations, structures, pits, trenches, etc., shall be cleared of all debris, and filled with earth in layers not exceeding 15 cm, each layer being watered, rammed and properly consolidated, before the succeeding one is laid. Each

layer shall be consolidated to the satisfaction of Employer's Representative. Earth shall be rammed with approved mechanical compaction machines. Usually no manual compaction shall be allowed unless the Employer's Representative is satisfied that in some cases manual compaction by tampers cannot be avoided. The final backfill surface shall be trimmed and leveled to a proper profile to the approval of the Employer's Representative.

**Plinth Filling:**

Plinth filling shall be carried out with approved material as described hereinbefore in layers not exceeding 15cm, watered and compacted with mechanical compaction machines. The Employer's Representative may, however, permit manual compaction by hand tampers where he is satisfied that mechanical compaction is not possible. The finished level of the filling shall be trimmed to the level/slope specified.

The thickness of each unconsolidated fill layer can in this case be up to a maximum of 300mm. The Contractor will determine the thickness of the layers in which fill has to be consolidated depending on the fill material and equipment used and the approval of the Employer's Representative obtained prior to commencing filling.

The compacted surface shall be properly shaped, trimmed and consolidated to an even and uniform gradient. All soft spots shall be excavated, then filled and consolidated.

**Sand Filling in Plinth and Other Places:**

Where backfilling is required to be carried out with local sand it shall be clean, medium grained and free from impurities. The filled-in-sand shall be kept flooded with water for 24 hours to ensure maximum consolidation. The surface of the consolidated sand shall be dressed to required level or slope. Construction of floors or other structures on sand fill shall not be started until the Employer's Representative has inspected and approved the fill.

**Filling in Trenches:**

Filling in trenches for pipes and drains shall be commenced as soon as the joints of pipe and drains have been tested and passed. The backfilling material shall be properly consolidated taking due care so that no damage is caused to the pipes.

Where the trenches are excavated in soil, the filling from the bottom of the trench to the level of the center line of the pipe shall be done by hand compaction with selected approved earth in layers not exceeding 8 cm; backfilling above the level of the center line of the pipes shall be done with selected earth by hand compaction, or other approved means in layers not exceeding 15 cm.

In case of excavation of trenches in rock, the filling up to a level 30 cm above the top of the pipe shall be done with fine materials such as earth, murrum, etc. The filling up to the level of the centerline of the pipe shall be done by hand compaction in layers not exceeding 8 cm whereas the filling above the centerline of the pipe shall be done by hand compaction or approved means in layers not exceeding 15 cm. The filling from a level 30 cm above the top of the pipe to the top of the trench shall be done by hand or other approved mechanical methods with broken rock filling of size not exceeding 15 cm mixed with fine material as available to fill up the voids. Filling of the trenches shall be carried out simultaneously on both sides of the pipe to avoid unequal pressure on the pipe.

**General Site Grading:**

Site grading shall be carried out as indicated in the drawings and as approved by the Employer's Representative. Excavation shall be carried out as specified in the Employer's Requirements. Filling and compaction shall be carried out as specified under Clause 2.7 and elsewhere unless otherwise indicated below.

If no compaction is called for, the fill may be deposited to the full height in one operation and leveled. If the fill has to be compacted, it shall be placed in layers not exceeding 225 mm and leveled uniformly and compacted as indicated in Clause 2.7 before the next layer is deposited.

To ensure that the fill has been compacted as specified, field and laboratory tests shall be carried out by the Contractor.

Field compaction tests shall be carried out in each layer of filling until the fill to the entire height has been completed. This shall hold good for embankments as well. The fill will be considered as incomplete if the desired compaction has not been obtained.

The Contractor shall protect the earth fill from being washed away by rain or damaged in any other way, the Contractor shall remove the affected material and make good.

If so specified, the rock as obtained from excavation may be used for filling and leveling to indicate grades without further breaking. In such an event, filling shall be done in layers not exceeding 50cms approximately. After rock filling to the approximate level, indicated above has been carried out, the void in the rocks shall be filled with finer materials such as earth, broken stone, etc. and the area flooded so that the finer materials fill up the voids. Care shall be taken to ensure that the finer fill material does not get washed out. Over the layer so filled, a 100 mm thick mixed layer of broken material and earth shall be laid and consolidation carried out

by a 12-ton roller. No less than twelve passes of the roller shall be accepted before subsequent similar operations are taken up.

**Fill Density:**

The compaction, under the plant road area and building plinths shall comply with minimum 95% compaction by Standard Proctor at moisture content differing not more than 4% from the optimum moisture content. The Contractor shall demonstrate adequately by **field and laboratory tests that the specified density has been obtained.** In other areas the soil should be backfilled and compacted suitably as specified by the Engineer.

**Timber Shoring:**

Close timbering shall be done by completely covering the sides of the trenches and pits generally with short, upright members called 'polling boards'. These shall be of minimum 25 cm x 4 cm sections or as approved by the Employer's Representative. The boards shall generally be placed in position vertically side by side without any gap on each side of the excavation and shall be secured by horizontal walling of strong wood at maximum 1.2 meter spacing, strutted with bullies or as approved by the Employer's Representative. The length of the bully struts shall depend on the width of the trench or pit. If the soil is very soft and loose, the boards shall be placed horizontally against each side of the excavation and supported by vertical walling, which in turn shall be suitably strutted. The lowest boards supporting the sides shall be taken into the ground and no portion of the vertical side of the trench or pit shall remain exposed, so as to render the earth liable to slip out.

Timber shoring shall be 'close' or 'open' type, depending on the nature of soil and the depth of pit or trench. The type of timbering shall be as approved by the Employer's Representative. It shall be the responsibility of the Contractor to take all necessary steps to prevent the sides of excavations, trenches, pits, etc. from collapsing.

Timber shoring may also be required to keep the sides of excavations vertical to ensure safety of adjoining structures or to limit the slope of excavations, or due to space restrictions or for other reasons. Such shoring shall be carried out, except in an emergency, only under instructions from the Employer's Representative.

The withdrawal of the timber shall be done carefully to prevent the collapse of the pit or trench. It shall be started at one end and proceeded with, systematically to the other end. Concrete or masonry shall not be damaged during the removal of the timber.

In the case of open timbering, the entire surface of the side of trench or pit is not required to be covered. The vertical boards of minimum 25 cm x 4 cm sections shall



be spaced sufficiently apart to leave unsupported strips of maximum 50 cm average width. The detailed arrangement, sizes of the timber and the spacing shall be subject to the approval of the Employer's Representative. In all other respects, the Employer's Requirements for close timbering shall apply to open timbering.

In case of large pits and open excavations, where shoring is required for securing safety of adjoining structures or for any other reasons and where the planking across sides of excavations/pits cannot be strutted against, suitable inclined struts supported on the excavated bed shall be provided. The load from such struts shall be suitably distributed on the bed to ensure no yielding of the strut.

**Dewatering:**

The Contractor shall ensure that the excavation and the structures are free from water during construction and shall take all necessary precautions and measures to exclude ground/rain water so as to enable the works to be carried out in reasonably dry conditions in accordance with the construction planning. Sumps made for dewatering must be kept clear of the excavations/trenches required for further work. The method of pumping shall be approved by Employer's Representative, but in any case, the pumping arrangement shall be such that there shall be no movement of subsoil or blowing in due to differential head of water during pumping. Pumping arrangements shall be adequate to ensure no delays in construction. The dewatering shall be continued for at least (7) seven days after the last pour of the concrete. The Contractor shall, however, ensure that no damage to the structure results on stopping of dewatering.

The Contractor shall study the sub-soil conditions carefully and shall conduct any tests necessary at the site with the approval of the Employer's Representative to test the permeability and drainage conditions of the sub-soil for excavation, concreting etc., below ground level.

The scheme for dewatering and disposal of water shall be approved by the Employer's Representative. The Contractor shall suitably divert the water obtained from dewatering from such areas of site where a buildup of water in the opinion of the Employer's Representative obstructs the progress of the work, leads to unsanitary conditions by stagnation, retards the speed of construction and is detrimental to the safety of men, materials, structures and equipment.

When there is a continuous inflow of water and the quantum of water to be handled is considered in the opinion of Employer's Representative, to be large, a well point system- single stage or multistage, shall be adopted. The Contractor shall submit to

the Employer's Representative, details of his well point system including the stages, the spacing, number and diameter of well points, headers etc., and the number, capacity and location of pumps for approval.

**Rain Water Drainage:**

Grading in the vicinity of excavation shall be such as to exclude rain/surface water draining into excavated areas. Excavation shall be kept clean of rain and such water as the Contractor may be using for his work by suitably pumping out the same. The scheme for pumping and discharge of such water shall be approved by the Employer's Representative.

**MUNICIPAL CORPORATION  
BHAVNAGAR**

**VENDOR LIST**

**(A) LIST OF APPROVED VENDORS FOR CIVIL WORKS**

<b>Sr. No.</b>	<b>ITEMS</b>	<b>Approved Brands / Quality</b>
1	CEMENT PPC 53 Grade & SULPHATE RESISTANT CEMENT,S.R.C.	Ambuja, Hathi, Ultra Tech, Sanghi, Siddhi, Hi-bond
2	BRICKS	MBM, Arjun, PBM, 555, Kisan, ABM, TRD, Paresh, Dhara, B.R.C., Kiran, BMB, Kirit, Sonal
3	Steel TMT, CRS	TISCO, SAIL, VIZAG, Kamdhenu, NATIONAL, Electrotherm, JSW, Welspun steel, Pollad Steel, DIAMOUND TMT, M. G. Steel, Friends Steel, Crown next TMT, Briskon TMT
4	VITRIFIED TILES	Asian, Kajaria, Jonson, Varmora, Simpolo, OASIS
5	CERAMIC TILES	Asian, Kajaria, Johnson, Varmora, Simpolo, OASIS
6	GLAZED TILES	Asian, Kajaria, Johnson, Varmora, Simpolo
7	ACRYLIC PAINT	ICI, Asian, Nerolac, Burger
8	OIL BOUND DISTEMPER	ICI, Asian, Nerolac, Burger
9	EXTERIOR WEATHER PROOF EMULSION PAINT	ICI, Asian, Nerolac, Burger
10	Oil Paint	ICI, Asian, Nerolac, Burger
11	SANITARY WARE	Cera, Hindware, Parryware
12	CAST IRON PIPES AND FITTINGS.	NECO, Swayarhoo, Bengal, Oriental Castings, Electro steel Castings
13	P.V.C. PIPES AND FITTING (UPVC/CPVC)	Finolex, Supreme, Jain, Kisan, Astral, Dutron, Prince
14	CHROMIUM PLATED WATER SUPPLY FITTINGS	Jaquar, Ess Ess, Plumber ,ESSCO, Crown, Metro, Prince
15	GALVANIZED PIPE	Tata, Essco, Jaquar, Ess Ess, Plumber
16	GALVANIZED FITTINGS	'R' Brand, 'RV' Brand, Kranti
17	C.I. MANHOLE COVER	Manish, Sil, NECO
18	PLUMBING FIXTURES	Jaguar, Plumber, Essco
19	PVC WATER TANK (100% VIRGIN PVC)	Sintex, Aqua
20	ALUMINIUM SHEETS AND ACCESSORIES	Nalco, Jindal, Hindalco, Banko

Sr. No.	ITEMS	Approved Brands / Quality
21	ALUMINIUM EXTRUDED DOOR/ WINDOW SECTION	Jindal, Hindalco, Banko, Ajin India, Aldowin, Alumilite
22	ALUMINIUM HARDWARE	Rajdoot, Belu, Diamond, Glider, Ajin India, Aldowin, Alumilite
23	WATER PROOFING MATERIALS	Zycosil, Dr. Fixit, Kerakoll, Pidilite, Roff
24	DOOR CLOSER	Efficient Gadget, Everite, Hardwin, Aldowin, Ozone
25	DOOR FITTINGS	Godrej, Efficient Gadgets (E.G.) Dunex, Doorset, Suzu, Coral
26	HINGES	Suzu, Yama, E.P.P.W.
27	SCREW AND BOLTS	Nettle Folds, GKW, Stud
28	BOLTS & FASTENERS	Hilti, Fisher
29	LIFT	Top, Express, Omega, OTIS, Schander, TRIO, Aegis Elevator, Mitsubishi, Aditya, Siemens slider
30	ROOFING MATERIAL – Galvalume sheets	TATA, Essar, Jindal
31	Slag Cement	SANGHI CEMENT Sanghipuram
32	CPVC PIPES FOR AUTOMATIC SPRINKLER FIRE EXTINGUISHING SYSTEM	ASTRAL POLY TECHNIK LIMITED પાર્કિંગ એરિયા, બેઈઝમેન્ટ એરિયા જેવા વિસ્તારો સિવાય માત્ર કન્સીલ્ડ પાઈપીંગ માટે આ કંપનીના CPVC pipe નો ઉપયોગ fire sprinkler piping માટે કરવાની મંજૂરી આપવામાં આવે છે.
33	AAC Blocks	NXTBLOC
34	Jointing Mortar	NXTFIX Block
35	Ready Mix Plaster	NXTPLAST
36	Block joining Masonry Mortar	Unifix
37	Tile adhesive	Unifix
38	RCC bench	Sardar Pre cast
39	Rubber mould garden curbin	Sardar Pre cast

<b>Sr. No.</b>	<b>ITEMS</b>	<b>Approved Brands / Quality</b>
40	Rubber mould Paver block	Sardar Pre cast
41	Fencing Pole	Sardar Pre cast
42	RCC Masonry block	Sardar Pre cast
43	Pre cast wall	Sardar Pre cast

**(B) LIST OF APPROVED VENDORS FOR MECHANICAL & ELECTRICAL WORKS**

Sr. No.	Description	Name of Manufacturer
1	HSCF Pump	Crompton Greaves Ltd
		Kirloskar Brothers Limited (KBL)
		JASCO
		Mather & Platt Pumps Ltd.
		Jyoti Ltd.
2	Electric Motor	Lubi Industries LLP
		Bharat Bijlee Ltd.
		Jyoti Ltd.
		JSL Industries Ltd.
		Jeumont Electrical India Pvt. Ltd.
3	Electrical Panel	LHP
		Crompton Greaves Ltd
		Bhagyashree Power Control
		Dynamic Control System
		Elembica Services
		JSL Industries Ltd.
4	Kinetic Air Valve	Nutral Power Tech
		Kirloskar Brothers Limited (KBL)
		FOURESS Engineering (India) Limited.
		Durga Valves Pvt.Ltd
		Orbinox
5	Expansion Bellows	ಶ್ರೀ ಕ್ರಿಷ್ಣಾ ಇಂಜಿನಿಯರಿಂಗ್ಸ್
6	Dewatering (Drain) Pump(Submersible/Horizontal)	Precise Engineers
		KSB Pumps
		Kirloskar Brothers Limited (KBL)
		JASCO
		Crompton Greaves Ltd
		La Gajjar Machinery Pvt Ltd.
		Pullen Pumps Industries Pvt. Ltd.
MBH		
7	Sluice Valves and Sluice Gate	Kirloskar Brothers Limited (KBL)
		DURGA Valves Pvt.Ltd
		L & T Valves
		Jupiter
		SACHDEVA
8	UPVC Pipe	Supreme Industries Ltd.,Mumbai
		Dutron Polymers Ltd
		Parixit Industries Ltd., A'bad
		Jain Irrigation Systems Ltd., Jalgaon
9	HDPE Pipe	Jain Irrigation Systems Ltd., Jalgaon
		Dutron Polymers Ltd
		Jindal
		Essar Steel
10	C.I. Pipe	Electro Steel, Kejriwal, Oriental Castings, BIC, Jindal, Lanco Industries Ltd.,Chennai, Kesins
13	EOT Crane	Grip Engineering Pvt. Ltd., JAPS Project, Brady & Morris Engineering Co. Ltd., Techno Industries

Sr. No.	Description	Name of Manufacturer
14	Cable & Wires	KEI Industries Ltd.
		Polycab Wires Pvt. Ltd.
		Aerolex Cables Pvt. Ltd.
		Allwin Industries
		Finolex Cables
		L&T Cables
		ULTRA CAB (India) Limited
15	Transformer	Atlanta Electricals Pvt. Ltd.
		Powerlite Electricals
		Voltamp Transformers Ltd.
		SKP Transformers
		Arya Electronics
16	Components for MCC :	
	Switch	L&T, Siemens
	HRC Fuse	L&T, Siemens
	Timer	L&T, Siemens
	Relay	L&T, Siemens
	Push Button Stations	L&T, Siemens
	Indicating Lamp	L&T, Siemens
	Cable Jointing Kit	CCI, M. Seal
	MCB/DB's	MDS, Siemens, Indokupp
17	Capacitors	L&T, Crompton, Khatau Note: Capacitors shall be oil fill type
18	KWH Meter	Simco, Jaipur, GEC
19	Light Fittings: (Indoor & Outdoor Luminaries)	Philips, Crompton, Bajaj, NESSA Illumination
20	Exhaust Fans	Crompton, Bajaj,
21	Ceiling Fans	Crompton, Bajaj, Havells
22	Air Blowers	Everest Ltd.
		Swan Pneumatics (P) Ltd
23	Alum Dosing Pumps	Asia LMI
		VK Pumps
		Swelore
24	Pressure Gauges	General Instruments
		Bells Control
		H. Guru Marketing
25	Level Gauge / Indicator	R K Dutt
		Levecon
		S. B. Electromec
26	Clarifier Equipment	Enviro Control Associates
		Voltas Ltd
		Hindustan Dorr-Oliver
		Geomiller/Triveni
27	Chlorination System	Industrial Device (I) Pvt. Ltd
		Metito
		Chloroequip
		Pennwalt
28	Gear Box	Greaves
		Radicon
		Elecon
		Shanti



Sr. No.	Description	Name of Manufacturer
29	Level Switches	Level-Tech
		Revathi Electronics
		Levec
30	Refrigerator	LG, Samsung, Kelvinator
31	PVC Pipes for Fluid	Finolex, Jain Irrigation
32	PVC Conduits for Electricals	Precision, Shakti
33	Butterfly Valve	KIRLOSKAR Brothers Limited(KBL), DURGA valves Pvt Ltd, L & T valves, R&D MULTIPLE, Jupiter, श्री कृष्णा इंजिनियर्स IVC, IVI, Audco, R & D multiple, Jupiter, Cair, Orbit Engineers
34	Check Valve (Dual Plate check Valve)	KIRLOSKAR Brothers Limited(KBL), DURGA valves Pvt Ltd, Orbinox, R&D MULTIPLE, Orbit Engineers
35	Metallic Expansion Bellow	Beloflex(B.D. Engineers), Stanfab Engineering Pvt. Ltd., D. Wren Engineering Pvt. Ltd., Sur Industries,
36	Centrifugal / Centrifugal Non Clog Pumps	Beacon Weir, KSB, Mather & Platt (Wilo), Worthington, WPIL, Xylem pumps , Grundfos Pumps Pvt. Ltd., MBH, JASCO
37	Submersible non Clog Pumps / Submersible Centrifugal Pumps	Kirlosker, KSB, ABS, ITT- Flyght, Xylem pumps, Grundfos Pumps Pvt. Ltd. , MBH, JASCO, AQUA, Jyoti, PULLEN PUMPS, Alpha, Het Pump
38	Screw Pump	Roto, Netzsch, Tushaco, Seepex
39	Metering / Dosing Pumps	Swellore, V.K. Pumps, Shapotools
40	Non Return Valves ( Single / multi door) / Dual Plate Check Valves	Kirlosker, IVC, IVI, R & D multiple, Durga, Jupiter, Cair, Orbit Engineers
41	Knife Gate valves	Jash, Fouess, Vass (Dezurick), Vag, Orbinox, Orbit Engineers
42	Sluice gates / open Chanel Gates	Jash Engineering, IVC, R & D Multiple, Jupiter
43	Mechanical Fine Screens – Step (Mat) Type / Drum Type	Jash, Huber, Johnson, Savi, Italy, Apollo Screens
44	Mechanical Course bar Screen	Jash, Huber, Johnson, HDO, Triveni, Savi, Italy
45	Manual Bar Screen	Jash, Japs, HDO, Triveni, Auric
46	Grit mechanism	EIMCO – KCP, Hindustan Dorr – Oliver, Jash-Shivpad, Triveni, Voltas
47	Diffused Aeration System	EDI, OTT, Rehau
48	Air Blower	Kay, Swam, Everest, Usha Compressors, Gardner Denver
49	Agitator / mixer	Remi, Schurtek, Fibre & Fibre, Milton Roy
50	Gear Boxes	Greaves, Elecon, CPEC, PEPL, Bonfiglioli
51	Centrifuge	Humboldt, Alpha Laval, Hiller

<b>Sr. No.</b>	<b>Description</b>	<b>Name of Manufacturer</b>
52	HDPE Pipes	Astral, Dutron, Duraline, Narmada, RIL (PIL), Penwalt, Anjney, jain irrigation, Sangir
53	Air Compressor	Ingersoll – Rand, khosla, Kirlosker, CPE, Alpha
54	Bearing For All Equipments	SKF, FAG, Tata
55	Fasteners	Precision, Durakhanawala, Echjay, Tata, Sundaram
56	Mechanical Seals	Eagle Seals (Sealol), Durametalllic, Burgman
57	Electric Actuator	Auma ,Rotork, Emerson, Pentair
58	(1) CATEGORY III Indoor LED fittings, LED Panel light, LED down light, outdoor LED ligh (street light, LED flood light, LED Post top lantern, LED bollard ) (2) Solar LED Light	NESSA ILLUMINATION TECHNOLOGIES PVT.LTD., Litsun, Nextray
59	STREET LIGHT POLES	AMBICA POLES (for octogonal poles,swage poles,street loght poles, high mast poles,decorative poles, conical poles, JETCOTECH Engineering LLP
60	Resilient Seated Slice Valve	Cair
61	Air Vale	Cair, Orbit Engineers
62	Flow Control valve	Cair
63	Altitude Control valve	Cair, Orbit Engineers
64	Pressure reducing valve	Orbit Engineers
65	Pressure relief valve	Orbit Engineers
66	Ball valve	Orbit Engineers
67	Mast pole	JETCOTECH Engineering LLP
68	Earthing material	JETCOTECH Engineering LLP
69	Hot dip galvanizing	JETCOTECH Engineering LLP
70	LED Highbay	Litsun

**(C) LIST OF APPROVED VENDOR FOR INSTRUMENTATION SYSTEM**

<b>SR NO</b>	<b>DESCRIPTION</b>	<b>Name Of Manufacturer</b>
1	Electromagnetic Flow Meter	E+H, Siemens, Abb, Fuji, Yokogawa, Krohne-Marshall, AAROHI Embedded System Pvt Ltd., Emerson, SBEM
2	Pressure Gauges	Wika, H.Guru, General Instruments Consortium Manometer (India) P. Ltd. , Baumer, Waaree
3	Pressure Switch	Danfoss , Indfoss , Switzer
4	Process Analyzers (pH, DO, Free / Residual Chlorine , BOD / COD)	E+H , Emerson , Hach , Chemitech , Polymetron, Wtw (Forbes Marshall),Yokogawa
5	Ultrasonic transmitter level / diff. level / flow	E+H, Siemens – Milltronics, Krohne, Vega
6	Hydraulic level transmitter	E+H,Siemens, ABB, Forbes- Marshall, Emerson, SBEM
7	Displacer/Float Switches	Levcon, Nivo, Toshbro, Pune Techtrol , SBEM
8	PP Float / Buoyancy switch	Pepprl + Fuchs, Baumer, Waaree, E+H , Pune Techtrol , SBEM
9	Float & Board Type Level Gauge	Levcon, Nivo, Toshbro, Pune Techtrol, SBEM
10	Electromagnetic Flow Meter	E+H, Siemens, ABB, Fuji, Yokogawa, Krohne-Marshall
11	Field Transmitter (P, DP,F, L , T)	ABB, Fuji, Yokogawa, Honeywell, Emerson
12	Pressure Gauges	Wika, H.Guru, General Instruments Consortium Manometer (India) P. Ltd., Baumer, Waaree
13	Panel Mounted Process Indicator & Flow Integrator	Masibus, Nishko, Nivam, Selectron, Radix, Yokogawa, ABB
14	Pressure Switch	Danfoss, Indfoss, Switzer
15	Programmable Logic Controllers	Rockwell (Allen Bradeley), Siemens, Schneider, Fuji, ABB, GE Fanuc
16	Control Panel Enclosure	Rittal, Enklotek, Bartakke, BCH, Eldon
17	Alarm Annunciator	Aplab Ltd., Minilec , IIC
18	Solenoid valves	Asco, Rotex, Schrader
19	Tube Fitting	Excel Hydropneumatic, Multimetal, Placka

20	Instrument Valves , Manifolds	Aptek, Anmol (Superlok), Excel Hydropneumatic, General
21	Fitting	Instrument Consortium , Multimetal, Technomatic, Placka
22	Pneum , Brass Fitting	Swagelok, Multimetal Industries, SMC, Festo
23	Control Panel Accessories / Components	
a.	Miniature Relay	Wago, Omron,Phoenix, Rockwell
b.	Indication Pilot Lamps (LED Type)	Teknic, Schneider, Siemens
c.	Push Button / Selector Switch (with NO/NC Elements)	Teknic, Schneider, Siemens
d.	DC Power Supplies (DIN Rail mounted)	Phoenix, Omron, Schneider, Rockwell
e.	Terminals	Elmex, Phoenix, Wago, Connectwell
f.	Panel Wires	Finolex , Havell's , R R Kabel
g.	Panel Illumination	Philips , Crompton , GE
24	Instrument Cables (Power , Signal , Control)	Associated Cables, Associated Flexible and Wires P.Ltd., Brooks Cables, Thermo Cables, Udey Pyro
25	Cable Glands	Ex-protecta, Braco, Sudhir, Comet, Connectwell
26	Junction Box	Ex-protecta, CEAG, Sudhir, Baliga, FCG
27	Cable Tray	M.M.Engineering, Globe, Jacinth, Equi. Reputed, JETCOTECH Engineering LLP
28	Computer System	HP-Compaq, Dell, IBM, Sony, Samsung
29	UPS	Hirel-Hitachi, Emerson, APC
30	<ol style="list-style-type: none"> <li>1. PLC (Programmable Logic Controller )</li> <li>2. SCADA (Supervisory Control and Data acquisition )</li> <li>3. VFD (Variable Frequency Drive Up to 500 KW )</li> <li>4. ACB ( Air Circuit Breaker up to</li> </ol>	MITSUBISHI ELECTRIC INDIA PRIVATE LIMITED, Emerald House, EL-3, J Block, M.I.D.C., Bhosari, Pune 411026

	<p>6000A)</p> <ol style="list-style-type: none"><li>5. MCCB ( Moulded Case Circuit Breaker up to – 1600 A)</li><li>6. MCB (Miniature Circuit Breaker up to – 63 A)</li><li>7. ELCB (Earth Leakage Moulded Case Circuit Breaker up to 1600 A)</li><li>8. Contractor up to – 800 A &amp; OLR (Over load Relay) up to 630 A</li><li>9. Multi Functional Meters</li><li>10. MPCB (Motor Protection Circuit Breaker up to 32 A )</li></ol>	
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**(D) LIST OF APPROVED VENDORS FOR MATERIALS RELATED TO WATER****SUPPLY AND SEWERAGE NETWORK**

<b>SR. NO.</b>	<b>ITEMS</b>	<b>NAME OF AGENCIES</b>
1	A C Pressure pipe MAZZA process	Lotus, Kirti
2	A C Pressure pipe MEGHNANI process	Lotus, Kirti, Hindustan
3	Sluice Valve	Durga, kartar, Kirloskar, Jupiter, SACHDEVA ( C.I. & D.I.), શ્રી કિર્તી ઇન્જિનીયર્સ, Cair, Orbit Engineers
4	DI Pipe	Electrotherm (I) Ltd.,Ahmedabad, Lanco Industries Ltd.,Chennai, Electrsteel, Jindal Saw Ltd.,Ahmedabad, Kesins, Welspun
5	R.C.C. PIPE ( COLLAR JOINT & SOCKET SPIGOT JOINT) CLASS NP3 & NP4, & R.C.C. COLLARS	VIPUL SPUN PIPES (SIHOR & LATHIDAD,BOTAD), KATARIYA & CO. (DHASSA), OMKARESHVAR PIPES ( NAVAGAAM), OMKAR PIPES ( LATHIDAD, BOTAD), MARUTI PIPES ( BAGODARA ,AHMEDABAD), KALATHIYA PIPES(BAGODARA ,AHMEDABAD), R. S. PIPES (BODELI), UMA HUME PIPES (KALOL, GANDHINAGAR), SIDHDHIVINAYAK ( KARDEJ ,BHAVNAGAR)
6	R.C.C. MACHINEOLE FRAME & COVER, INLET FRAME COVER 10T.(600*450 MM.) , 20T.,35T., & 50T.	SONI CEMENT PRODUCT , VIPUL SPUN PIPES, KATARIYA & CO., OMKARESHVAR PIPES, OMKAR PIPES, MARUTI PIPES, KALATHIYA PIPES , R. S. PIPES, UMA HUME PIPES, SIDHDHIVINAYAK , S.K. Corporation, Laxmi Price Industries, S.J.Corporation, Sardar pre cast
7	Stone ware PipeManufacturer having BIS Certificate for ISI marking	Krishna Pipe, j.K. Pipe, Taya ceramic, Burn & co., perfect Potteries, Navroji Vakil, Kashmira
8	D.I. & C.I. FITTINGS	RG BRAND, ESSEM Engineering Industries, Bikaners Engineers works
9	CID Joints	ESSEM Engineering Industries
10	Valves & Graded Castings	ESSEM Engineering Industries
11	Pipe Fittings	ESSEM Engineering Industries, Bikaners Engineers works
12	CI/DI/MS graded castings	Bikaners Engineers works
13	Scaper machine hole	Sardar Pre cast

**CONTRACT NO.**

**Bhavnagar Municipal Corporation  
BHAVNAGAR**



**(A WHOLLY OWNED BHAVNAGAR MUNICIPAL CORPORATION UNDERTAKING)**

**ESTIMATED COST**

**BID DOCUMENT FOR UPGRADATION OF DRAINAGE LINE NETWORK IN OLD SOCIETIES OF ADHEWADA AREA UNDER BHAVNAGAR MUNICIPAL CORPORATION (BMC), BHAVNAGAR. DISTRICT: BHAVNAGAR**

**ESTIMATED COST: RS.10,43,72,277.30/-**

**VOLUME – IIIC: DATA SHEET**

**Employer**

**EXECUTIVE ENGINEER**

**(Drainage Dept.)**

**BHAVNAGAR Municipal Corporation**

Sir Mangal Sinhji Road, Near Kalanala,

Bhavnagar,

Bhavnagar,-364001.

Contact Number: 0278 2424801-10

## INDEX

Sr. No.	Particulars
	Preamble to Data Sheet
1	Section- 1: Brief Description of Work
2	Section- 2: Data Sheet: - Civil Works



### **PREAMBLE TO DATA SHEET**

1. The Levels given in the Appendix to Bid and drawings are as per the Data available with authority. As the Working survey is included in scope of the work of contractor, agency shall carry out working survey along the route.
2. The Agency shall have to confirm both the levels and line out of the pipeline network as per the requirement of the inter-related actual pipeline route/any structure and design accordingly. No Extra payment shall be made by the Department to the Agency for the extra excavation or for the raised structure above Ground Level.
3. The levels given in the documents are tentative as per the selected site presently surveyed. In case of change in pipeline route/any structure is to be necessary due to any reason, the Agency shall be bound to carry out all the works as per the new pipeline route/any structure and the design is to be carried out accordingly without any extra claims.
4. The sizes of the panel room given in the Price Bid are as per the Departmental Type Design of authority. The above-mentioned work should be constructed accordingly and any changes in size shall be measured and the payment will be made as per schedule of Payment. Agency shall be bound to carry out the work as per the re-designed structures.
5. All the civil structure like panel room given should be designed in relevant manner with given flow diagram, and the layout shall get approved before the detailed designing from the EIC.
6. For Construction of Civil Structures all the data are to be obtained by the agency and accordingly the structural design shall be prepared & to be got approved by authority.

**Signature of Bidder With Stamp**

**Executive Engineer  
(Drainage Dept)  
BMC**

**SECTION- 1:**

## BRIEF DESCRIPTION OF WORK

The main scope of works/ services to be done/ provided by the contractor under this bid shall be as under.

### A LAYING/ INSTALLATION OF MATERIAL ISSUED BY DEPARTMENT:

Nil

#### PROCUREMENT, SUPPLY & LAYING OF SEWER COLLECTING PIPELINE

Providing, Supplying, Lowering, Laying, Jointing, testing and commissioning of RCC pipes (of Sulphate resisting Cement), NP3 Class pipes for following nominal bore diameter with One collar should be provided with each full length plain ended RCC pipe. One rubber ring should be supplied with each full-length socketed pipe.

Sr. No.	Description	Quantity
1	200 mm dia NP3 class	As per price bid
2	300 mm dia NP3 class	
3	400 mm dia NP3 class	
4	600 mm dia NP3 class	

#### CONSTRUCTION OF HOUSE CONNECTION

Construction of House Connection as per Design criteria given in tender & as per BMC and required to be approved by authority prior to construction.

Sr. No.	Description	Quantity
1	House Connection	As per price bid

### C Operation & Maintenance

Sr. No.	Particular	Months
1	Operation & Maintenance after Completion of the Project.	24
2	Defect Liability period	36

Signature of Bidder

Executive Engineer  
(Drainage Dept)  
BMC

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CONTRACT NO.

**Bhavnagar Municipal Corporation  
BHAVNAGAR**



**(A WHOLLY OWNED BHAVNAGAR MUNICIPAL CORPORATION UNDERTAKING)**

**ESTIMATED COST**

**BID DOCUMENT FOR UPGRADATION OF DRAINAGE LINE NETWORK IN OLD SOCIETIES OF  
ADHEWADA AREA UNDER BHAVNAGAR MUNICIPAL CORPORATION (BMC), BHAVNAGAR.  
DISTRICT: BHAVNAGAR**

**ESTIMATED COST: RS. 10,43,72,277.30/-**

**VOLUME - IV**

**PRICE BID**

**Bhavnagar Municipal Corporation**

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**INDEX**

<b>SR NO.</b>	<b>PARTICULARS</b>
A	Preamble to Price Schedules
B	Bid form
C	Preamble
D	Schedule of Payment
E	Schedule for Testing of materials List of registers to be maintained Vendor list for tender works
F	Schedule-B

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## **A. PREAMBLE TO PRICE SCHEDULES**

Name of work:

**BID DOCUMENT FOR UPGRADATION OF DRAINAGE LINE NETWORK IN OLD SOCIETIES OF ADHEWADA AREA UNDER BHAVNAGAR MUNICIPAL CORPORATION (BMC), BHAVNAGAR. DISTRICT: BHAVNAGAR**

1. The bidder shall quote his firm and fixed price for the entire work under this Contract, defined in more details in various sections of this bid document.
  2. The rates and prices shall be submitted in the electronic formats given by n-procure which is called Schedule-B, rates and prices received in any other formats will be rejected and the bids will be disqualified.
  3. It will be entirely at the discretion of the employer to accept or reject the bidder's proposal, without giving any reasons whatsoever and the bidder shall not be permitted to withdraw his bid on this account.
  4. The bidder should quote online the percentage above/below/at par with respect to amount put to tender at the end of schedule B.
  5. The % above/ below/at par with respect to amount put to tender shall be submitted in the electronic formats given by n-procure. The percentage (%) above/ below/ at par received in any other formats will be rejected and the Bids will be disqualified.
  6. In Price Schedule-B, bidder shall quote his price for entire work. Prices quoted in Schedule-B only will be considered for comparison and evaluation.
  7. Wherever for a particular item the quantities have been specified payment shall be on unit rate basis and unit variation in quantity will be paid with pro rata basis.
  8. The wording in the item description is for subject matter guidance only; clause references are indicative only and all other relevant clauses shall also be referred to.
  9. The prices shall allow for all the works covered under the bid digitized asset mapping and all liabilities and contractual obligations whether separately specified or not. Items against which no prices are quoted shall not be separately paid for and the bidder shall be deemed to have covered the cost of execution of such items (according to the requirements of the bid document) in the prices quoted for other items.
  10. Items not specifically listed in his Price Schedules, but required to be executed for satisfactory working/safety of the system as specified, will not be separately paid for by the Employer when executed and shall be deemed to be already covered by other items and rates listed in the price sheets No extra payment shall be given for any item which is required to complete and perform the project.
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11. Schedule-D gives the basis of interim payment for construction of civil works, mechanical, instrumentation & electrical works.
  12. The bidder shall be deemed to have allowed in his price for provision, maintenance and final removal of all temporary works of whatsoever nature required for construction including temporary bunds, diverting water, pumping, de-watering etc. for the proper execution of works. The rates shall also be deemed to include any works and setting out that may be required to be carried out for laying out of all the works involved.
  13. Prices shall be filled online only.
  14. The Price Schedules are to be read in conjunction with the conditions of Contract, the Specifications and other sections of these bid documents and these documents are to be taken as mutually explanatory of one another. Prices quoted by bidder shall be firm for the entire period of contract including o & m period without any escalation in accordance with the condition of contract.
  15. The bidder shall interpret the data furnished and carry out any additional survey work, or investigation work required at his own cost.
  16. The prices quoted shall also include the cost of materials utilized for testing.
  17. The bidder should acquaint himself with the site conditions including the access to Work site. The successful bidder shall have to make suitable access to work sites at his own cost. These accesses will be used by the other contractors working for Nagarpalika.
  18. The item descriptions in price schedule are for subject matter guidance only and the prices shall include all the equipments / materials / accessories and services required as per the specifications. The bidder shall fill in the price schedule furnished.
  19. Deleted
  20. 1% of the value of work will be deducted from the Running bill against labour cess, which shall be non-refundable.
  21. Third Party Inspection / CSC agency will be deployed by BMC and charges of the same will be borne by BMC. If contractor gives misleading information about their readiness for inspection, cost of such futile inspection/ visit of third party agency due to misinformation shall be recovered from contractor.
  22. Any expenditure incurred by inspection/ CSC agency for the work misinformed by the contractor and charges of inspection/ CSC agency without any work due to misinformation shall be recovered from the contractor.
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23. The rates quoted shall be **Exclusive of GST**, but inclusive of all other taxes and cess or levies or duties which shall not be paid extra. While GST will be paid for admissible part of actual work done at the approved tender rates and tender conditions of price variation. GST shall be paid as per prevailing rates at the time of payment. The TDS shall be deducted at source as per provision of IT rules and GWSSB policy.
  24. The rates should be quoted **Exclusive of GST** but inclusive of all other taxes as per Volume-II, General Conditions of Contract, Clause No. 47.
  25. The process requires that the bidder shall quote his price for the work components contained the price schedules for the entire work. Such prices shall remain firm and fix during the entire period of performance of the contract
  26. Payment shall be made for the components for which lump sum prices are quoted, as per the schedule of payment. Total cost will be worked out on the basis of work done of individual items and rates quoted against those particular items only.
  27. Royalties: The contractor shall be liable to pay the royalty of the quarried materials/minerals used in the construction of works at the rates specified in the Narmada Water Resources, Water Supply & Kalpsar Dept. Resolution No. GEN-2010-595- (6)-M.I. Cell ( K- 1) Dt. 29-4- 2011 ( Gujarati Version Copy enclosed) and shall be recovered from the running bills of the work from time to time and remaining amount if any shall be recovered from the final bill before releasing the security deposit of the work. The contractor shall furnish the statement showing the quantity of quarried materials / minerals from whom purchased (with full address of the seller) and copies of the bills for purchase to the Executive Engineer of the in charge of the work. The contractor shall also furnish such additional information as regards royalty payment to the competent authority.
  28. Agency shall have to take Insurance policy and intimate to BMC along with the evidence within time limit. In case of noncompliance entire responsibility shall be rest with the agency and required amount shall be recovered from any due amount of the agency.
  29. BMC can recover penalty amount from the agency for not taking the insurance. Though the penalty amount is recovered, responsibility of the agency for taking insurance shall be continued and will not be escaped from the responsibility
  30. The PMC/PIU certified report of successful flow test including leakages/hydro test for the components covered under the respective running bill / final bill must be attached for payment.
  31. All water, electricity, fuel (For running of DG, Diesel pumps etc. for construction purpose) charges during construction and Test & Trial Run shall be borne by the Contractor.
  32. Liquidated damages under Clause No.02 of Volume- II shall be read together in conjunction to Mode of Payment
  33. The bidder should acquaint himself with all the site conditions including but not limited to the access to work site, HFL, High/Low Tide level as etc. The
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successful bidder shall have to make suitable access to work sites at his own cost. These accesses may be permitted for the use of the other contractors working for BMC as per instruction of Engg. in charge

34. The prices quoted shall also include the cost of Temporary/Permanent plugging and blocking of sewer line, branch connections and diversion of flows and removal of all plugs, etc.
35. For any Underground and Over Head Utility, the contractor has to confirm it during site visit (as scheduled), the shifting or getting it shifted from the concern dept. (i.e. Liaisoning, follow -up and approval) required will be in contractor's scope. No extra cost will be given to contractor for any type of utilities shifting. All statutory fees/charges shall be paid by BMC on submission of proper fees receipt/challans and other relevant documents.
36. The price bid submitted by the bidder rates shall be inclusive for,
  - a) Removing of Existing Pipeline incl. Removal of specials, valves jointing material including carting and stacking of removed material from site of work to the department store as directed excl. Excavation and refilling Pipes/ Pre Stressed Concrete Pipe.
  - b) Tracing of existing manholes using all required tools, labours complete



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**BID FORM (WITH PRICE)**

**Bidders are required to fill up all the blank spaces in this Bid Form.**

To,  
Executive Engineer  
(Drainage Dept.),  
BMC,  
Bhavnagar

**BID DOCUMENT FOR UPGRADATION OF DRAINAGE LINE NETWORK IN OLD SOCIETIES OF ADHEWADA AREA UNDER BHAVNAGAR MUNICIPAL CORPORATION (BMC), BHAVNAGAR. DISTRICT: BHAVNAGAR**

1. Having visited the site and examined the Bid Documents, Drawings, Conditions of Contract, Specifications, Schedules, Annexure, Preamble to Price Schedules, Price Schedules etc. including Addenda / Amendments to the above, for the execution of the above Contract, we the undersigned offer to Design, Engineer, Procure, Construct, Complete, Commission, and Run the whole of the said works from the date of commissioning including defects liability period as given in Conditions of Contract and in conformity with the drawings, conditions of Contract, specifications, Preamble to Price Schedules, Price Schedules, Annexure, Bidding Documents, including Addenda Nos. \_\_\_\_\_ (insert numbers) for Lump sum fixed price of Rs. \_\_\_\_\_.(Rupees \_\_\_\_\_) for Construction or such other sum as may be ascertained in accordance with the conditions.
  2. I / We agree that;
    - (a) If we fail to provide required facilities to the Employer's representative or any other person / Agency by the Employer to perform on his behalf for carrying out the inspection and testing of materials and workmanship.

Or
    - (b) If we incorporate into the Works, materials before they are tested and approved by the Engineer's representative

Or
    - (c) If we fail to deliver pure water of required quantity according to the conditions / stipulations of the Contract, the Engineer will be at liberty to take any action including termination of Contract and impose at his absolute discretion any penalties, and / or reject the work.
  3. We undertake, if our Bid is accepted, to complete and deliver the works in accordance with the Contract within **Duration of Project (Which is Mention in Tender Notice.)** inclusive of monsoons, from the date or receipt of Letter of Acceptance issued to us by you.
-

4. We agree to abide by this Bid for a period of **180 days** from the last date of submission of bid and it shall remain binding upon us and may be accepted at any time before the expiry of that period.
5. In the event of our Bid being accepted, we agree to enter into a formal Contract Agreement with you incorporating the conditions of Contract thereto annexed but until such agreement is prepared this Bid together with your written acceptance thereof shall constitute a binding Contract between us.
6. We agree, if our Bid is accepted, to furnish performance Security in the forms and of value specified in the General Conditions of Contract.
7. We have independently considered the amounts of liquidated damages shown in Appendix to Bid and agree that they represent a fair estimate of the damages likely to be suffered by you in the event of the work not being completed by us in time.
8. We understand that you are not bound to accept the lowest or any bid you may receive.

Dated this \_\_\_\_\_ day of \_\_\_\_\_ 20\_\_

\_\_\_\_\_  
(Signature)

\_\_\_\_\_  
(Name of the person)

\_\_\_\_\_  
(In the capacity of)

Company Seal

\_\_\_\_\_  
(Name of firm)

Duly authorized to sign Bid for and on behalf of

\_\_\_\_\_

Witness :

Signature \_\_\_\_\_

Name \_\_\_\_\_

\_\_\_\_\_

### 3.0 Summary of Price

#### Schedule - B: Summary of Price-Total Price for Evaluation of Bid

Bid Document For Upgradation of Drainage line Network in Old Societies of Adhewada Area under Bhavnagar Municipal Corporation (BMC), Bhavnagar. DISTRICT: BHAVNAGAR		
SCHEDULE -B ABSTRACT (GRAND SUMMARY)		
Schedule No.	Description	Amount Put to Tender
SCHEDULE - B1	Zone 1: Providing, Lowering,Laying and Jointing R.C.C. NP3 Sewer line.	4,18,55,234.00
SCHEDULE - B2	Zone 2: Providing, Lowering,Laying and Jointing R.C.C. NP3 Sewer line.	3,53,91,175.00
SCHEDULE - B3	House Connection Work	2,53,73,868.31
SCHEDULE - B4	Operation & Maintenance Work For 2 Years	17,52,000.00
TOTAL TENDER COST IN (Rs.)		10,43,72,277.31
Say (Rs)		10,43,72,277.30

I/We am/are willing to carry out the work @ \_\_\_\_\_% \_\_\_\_\_ percent (should be writer in figures and words) below/above /at par , the estimated rates mentioned above, amount of my/our tender works out as under:

*Estimated Amount		*Estimated Amount	
Put	to	Put	to
Rs.....	tender	Rs.....	tender
Deduct.....		Add.....	
Rs.....	Belo	Rs.....	Abov
w		Net	
Net		Rs.....	
Rs.....		In	Words
In	Words	Rupees.....	
Rupees.....		.....	
.....		.....	

(\* Please strike out whichever is not applicable)

Above all items of "Schedule-B" with Item Description, Unit, Qty, Rate and Amount have verified by me and found in order.

Bidder's Stamp and Initials

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### C. PREAMBLE TO PRICE BID

1. As mentioned in the Conditions of contract, the Contract being a lump sum type turnkey Contract on EPC basis, the provision of measurement will be applicable only for the assessment of value of work done for inclusion in any interim certificate for part payment to the Contractor.
  2. The Schedule specifies the procedure for all such assessment of the items specified in Schedule B.
  3. Each item of Schedule-B has been divided into broad components. The Employer's Representative shall assess the value of each component as indicated in paragraph 6 herein below.
  4. Percentages are indicated against each component of each item specified in Schedule B, based on the Employer's best appreciation of the value of the component as related to the total costs of the concerned item as whole. A head titled (any other item(s)) is included in each breakdown of schedule and the tenderer shall at the time of tendering indicate any additional items which he considers necessary but cannot be covered by any of the heads indicated in the breakup.
  5. The percentage breakup as indicated in the Schedule may differ from that corresponding to the tenderer's scheme and design and he should take this into account while quoting his lump sum prices for the items specified in Schedule-B.
  6. The contractor shall, after approval of his detailed designs and drawings furnish to the Employer's Representative an initial bill of quantities to all major items, to be reviewed and updated periodically with the Employer's Representative. This bill of quantities will be used for assessment of percentage progress of the component at any stage. By measurement jointly taken by the Employer's Representative and the Contractor, mutually agreed and entered in the measurement books in the form and by the method approved by the Employer's Representative, and signed jointly by both the parties.
  7. Priority of work shall be decided in consultation with officials of ULB, BMC and PMC before starting /planning of work and the same shall be followed.
  8. The contractor after approval of his detailed designs and drawings shall furnish to the Employer's Representative an initial bill of quantities of all items as mentioned in Schedule B (to be reviewed and updated periodically). This bill of quantities will be used for assessment of percentage progress of any component at any stage.
  9. Measurements jointly taken (for Turnkey works) by the Employer's Representative and the Contractor will be entered in the measurement books and signed jointly by both the parties which shall form the basis for such interim payments.
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10. As mentioned in the preamble to price schedule, the provision of measurement will be applicable only for the assessment of value of work done and certified by Engineer-in-Charge for Schedule B and Schedule Part C
  11. Payment for items as mentioned in Schedule B and Schedule C will be released as per provision for interim payment as given in schedule mentioned below.
  12. Percentages are indicated against each component of some of the items of Schedule B specified in Schedule D, based on the Employer's best appreciation of the value of the component as related to the total costs of the concerned item as a whole. However payment for those items which are not covered under Schedule D will be made as per quantity verified by Engineer-in-Charge for such items as mentioned in Schedule B. The extent of amount to be released against each such item will be as per decision of Engineer-in-charge.
  13. Payment shall be released within 30 days after the fulfillment of condition mentioned in Para 2 above. The decision of the Engineer In-charge in this regard shall be final and binding upon bidder.
  14. The percentage breakup as indicated in the Schedule D, may differ from that corresponding to the Bidder's scheme and bidder's design and he should take this into account while quoting his prices for the items specified
  15. During O & M, the Contractor shall be paid as per the Price Bid. The amount withheld against the O & M from the running bill of the contract shall be released as per direction of engineer in charge.
  16. Release of Security deposit shall be as per Volume II (A) Clause 1 of General Conditions of Contract and Volume II (B) .
  17. The total inflow mentioned in the tender documents is indicative and only for calculation purpose. Any change in the flow as per actual design shall not lead to extra financial implication to BMC.
  18. It is clarified by way of abundant caution that contractor shall not claim any additional remuneration in the head of O & M.
  19. The price Bid submitted by the bidder is to include for,
    - a) Tracing of existing manholes using all required tools, labours complete.
    - b) Removing of Existing Pipeline incl. Removal of specials, valves jointing material including carting and stacking of removed material from site of work to the department store as directed excl. Excavation and refilling RCC Pipes/ Pre-Stressed Concrete Pipe.
-

Note: Payment will be released after certification of quantities recorded in the measurement book by EIC.

### E. SCHEDULE FOR TESTING OF MATERIALS

For ensuring quality control and workmanship, various tests prescribed below for materials shall Be taken at periodical intervals as stipulated below.

Sr N	Brief Description of Materials to be tested	Qty. Materials	Prescription of test which shall be carried	Frequency @ which test shall be carried out	Total No. of Test 'to betaken.
1	25 to 90 H. B.Metal 40 to 63 H. B.Metal 40 to 50 M. C.Metal 20 to 50 M. C.Metal Kapachi		- Gradation Test - Impact Value - Flakiness Index - Water absorption test - Sp. gravity	1 to 100 Cmt. - 1 Test 100 to 500 Cmt. - 3 Test 500 to 1500 Cmt. - 5 Test 1500 to 5000 Cmt. - 7 Test	
2	Grit		- Stripping Value, gradation, Water absorption, Sp. gravity	One test per work	
3	Murrum		- P. I. Value - C.B.R.	One test per work	
4	Quarry spall		- C.B.R. - Gradation	One test per work	
5	Asphalt		- Penetration Test as per Specification	Tanke Test 1 1 2to15 2 16to5 3	
6	Tack Coat		- Binder temperature for application - Rate of spread of binder	Irregular close in intervals Two test per day.	
7	Carpet & Seal coat mix		- Grading - temperature of binder in boiler, aggregates in the dryer and mix at the time of laying and rolling (Binder content vide 45 IMD 2172) Rate of Spreaded mix materials.	One test on individual constituents and mixed aggregates from the dryer for each 100 tons of mix subject to minimum of Two tests per plant per day. One Test for each 100tons of mix subjects to mini. of Two per dayplant. Regular control through checks on layer thickness.	
8	Bricks		- Water absorption - Effloresce - Size - Compressive Strength	1 Test @ 50,000 Bricks	
9	Cement		Consistency - Compressive Strength - Initial & Final setting - Fineness - Soundness - Specific Gravity - Chemical analysis	1 Test / 50 M.T. 2 Tests / 100 M.T. 3 Tests / 200 M.T. 4 Tests / 400 M.T. 5 Tests / 500 M.T. 6 Tests / 600 M.T	
10	Steel (TMT / M.S.)		- Tensile strength - Yield Stress - Elongation	1 Test / 40 M.T. 1 Test/ 40 M.T. 1 Test / 40 M.T. 1 Test / 40 M.T. 1 Test / 20 M.T.	

Sr N	Brief Description of Materials to be tested	Qty. Materials	Prescription of test which shall be carried	Frequency @ which test shall be carried out	Total No. of Test 'to betaken.
				1 Test / 20 M.T.	
11	C.C. Cube in M-150 M-200, M-250,		- Compressive Strength	1 to 5 C.mt. -1 Set 6 to 15 C.mt. 2 Sets 16 to 20 C.mt. - 3 Sets 20 to 50 C.mt. - 4 Sets	

	M-300, M-350 Grade			51 above - 4 One additional sample for each 100 C.mt. / or.	
12	Coarse Sand		C.B.R., silt content, sieve analysis	One Test per work	
13	Sand (For concrete work)		- Specific Gravity - Alkali Reactivity - Petrography Exa. - Gradation - Silt Content - Water absorption test	2 Tests per season or change of river	
14	Crushed stone Aggregate (For concrete work)		- Gradation - Water absorption - Impact Value - Abrasion Value - Soundness Test	1 Sample / 150 Cum. or 2 Sample / Season each source.	
15	Water for all item pertaining to water		- Portability - Salinity - Chemical analysis	One sample for each source of supply	
16	Earthwork for Embankment		- Sand content - Atterberg's limit - Density test - Moisture content - C.B.R.	2 Test / 8000 Cum 2 Test / 8000 Cum 2 Test / 8000 Cum 1 Test / 250 Cum. 1 Test / work	
17	Cement concrete		- Mix design	One time test for each concrete grade beyond M-200	
18	Geotechnical Investigation		- Soil Bearing Capacity	One test for Structure Design Up to 10mtr. Depth	



## LIST OF REGISTERS TO BE MAINTAINED AT SITE

FOLLOWING DOCUMENTS/REGISTERS TO BE MAINTAINED AT SITE FOR ENSURING PROPER QUALITY CONTROL OF WORK IN PROGRESS.

1. A complete set of Contract Documents
2. A Complete set of drawings (tender drawings and Good for Execution Drawings)
3. A complete set of change in specification or scope if any and approval thereof.
4. Master Test Register for Material for field Test.
  - i) Lab Report
  - ii) Lab/Field Test.
5. Register for bricks testing. Lab/Field
6. Concrete Pouring Card
7. Bitumen Test Register
8. Paint Register
9. Empty Bags of Cement Shall Be Deposited on Monthly Basis at Store of BMC And Same Shall Be Recorded in Store Register for Cement.
10. Register for approval of samples for various materials.
11. Site Order Book.
12. Register showing defects noticed during execution of work and compliance reports.
13. Hindrance Register

## Vendor List for Tender work

### SCHEDULE OF APPROVED MAKES/MANUFACTURER'S OF MATERIALS:

The following guidelines are to be noted regarding use of materials in the work:

1. As far as possible, materials bearing "Standard Mark (ISI)" from Bureau of Indian Standard (BIS) shall be used in the work.
2. Wherever, materials bearing Standard Mark (ISI) are used in the work, the following shall be ensured:
  - i) The supplier has a valid license form BIS during the period the material is being used in the work.
  - ii) The Contractor should maintain furnish necessary documents and proof of payments made for the procurement of materials bearing Standard Mark (ISI).
3. Mandatory Tests shall be conducted at the specified frequency specified in the Contract. In case, frequency of testing is not stipulated in the contract then standard specification (CPWD, ISI etc.) may be considered for frequency at which materials are to be tested.
4. Before bulk purchase of quantities of materials, it is the responsibility of the Contractor to get the samples of materials approved from consultant and EIC. EIC reserves the right to engage Third Party Consultant for verify the material and QAP standards.
5. All cost towards the testing shall be borne by the contractor.
6. The latest approved Vendor list for the Civil/Mechanical/Electrical/Instrumentation and other equipment mentioned in GWSSB is applicable for this contract. Approval of any other make of the same material or additional items shall be put up for approval by tendering authority.

Reference: official website at

<https://watersupply.gujarat.gov.in/vendors/approved-vendors-42>

**Bid Document For Upgradation of Drainage line Network in Old Societies of Adhewada Area under Bhavnagar Municipal Corporation (BMC), Bhavnagar. DISTRICT: BHAVNAGAR**

**SCHEDULE -B ABSTRACT (GRAND SUMMARY)**

Schedule No.	Description	Amount Put to Tender	
SCHEDULE - B1	Zone 1: Providing, Lowering,Laying and Jointing R.C.C. NP3 Sewer line.	4,18,55,234.00	
SCHEDULE - B2	Zone 2: Providing, Lowering,Laying and Jointing R.C.C. NP3 Sewer line.	3,53,91,175.00	
SCHEDULE - B3	House Connection Work	2,53,73,868.31	
SCHEDULE - B4	Operation & Maintenance Work For 2 Years	17,52,000.00	
<b>TOTAL TENDER COST IN (Rs.)</b>		<b>10,43,72,277.31</b>	
<b>Say (Rs)</b>		<b>10,43,72,277.30</b>	
			<b>Estimated Amount</b>
	Sub total amount put to the tender	Rs.....	Sub total amount put to the tender
	Deduct..... % below	Rs.....	Add..... % above
	Net	Rs.....	Net
Total-A	In words .....		Rs..... .....
Note-1	All work shall be carried out as per public works department hand book and other specifications as per tender or as directed by Engineer in charge.		
Note-3	Rates quoted include clearance of site (Prior commencement of work and at its close) in all respects and hold good for work under all conditions, site, moisture, weather etc.		

Signature of Contractor with Stamp

Executive Engineer  
Drainage Department  
BMC, BHAVNAGAR

**Bid Document For Upgradation of Drainage line Network in Old Societies of Adhewada Area under Bhavnagar Municipal Corporation (BMC), Bhavnagar. DISTRICT: BHAVNAGAR**

**Schedule - B1**

**Zone 1: Providing, Lowering, Laying and Jointing R.C.C. NP3 Sewer line.**

Sr No.	DESCRIPTION	QTY	UNIT	Rate Rs.		AMOUNT Rs.
				Rate In Figure	In Words	
1	<p><b>Horizontally cast</b>                      Providing and supplying ISI Standard R.C.C. pipes(of Sulphate Resisting Cement) in standard lengths of following class and diameter suitable for either collar joints or rubber ring joints including all taxes, insurance, transportation, freight charges, octroi, inspection charges, loading, unloading, conveyance to departmental stores, stacking etc. complete. (IS - 458/ 1989)                      Note : One collar should be supplied with each full length plain ended RCC pipe, cost included in rates below. One rubber ring should be supplied with each full length socketed pipe, cost included in rates below.  <b>200 mm Dia Pipe</b></p>	9566.00	RMT	417.00	Rupees Four Hundred Seventeen Only	39,89,022.00
1.1	<p><b>300 mm dia pipe</b></p>	2370.00	RMT	755.00	Rupees Seven Hundred Fifty Five Only	17,89,350.00
2	<p><b>Vertical cast</b>                      Providing and supplying ISI Standard and marked R.C.C. pipes(of Sulphate Resisting Cement) in standard lengths of following class and diameter spigot socket or Tongue and groove joint or Rebated Rubber Ring jointed flushing from inside suitable for rubber ring joints including all taxes, insurance, transportation, freight charges, octroi, inspection charges, loading, unloading, conveyance to departmental stores, stacking etc. complete. (IS - 458/ 1989)                      Note : One rubber ring should be supplied with each full length socketed pipe, cost included in rates below.  <b>400 mm dia pipe</b></p>	1328.00	RMT	1131.00	Rupees One Thousand One Hundred Thirty One Only	15,01,968.00

Sr No.	DESCRIPTION	QTY	UNIT	Rate Rs.		AMOUNT Rs.
				Rate In Figure	In Words	
3	RCC precast M.H. Frame & Cover Manufacture, supply & Delivery at store or at site of work precast RCC M.200 Frame & cover suitable to drainage M.H. and as per type design & Drawing including cost of reinforcement M.S. Angles or Flate, curring mold work etc. <b>Heavy Duty</b> > Frame	495.00	No.	813.00	Rupees Eight Hundred Thirteen Only	4,02,435.00
3.1	> Cover	495.00	No.	920.00	Rupees Nine Hundred Twenty Only	4,55,400.00
4	<b>Sewer Manholes</b> 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 ,inside and outside 15mm thick plastering in C. M. 1:3 necessary 100 mm coping in R.C.C.M. 200 fixing C. I. steps and fixing manhole frame and covers (But excluding supply of manhole frame and covers) over manholes and house connection chambers and fixing Manhole covers (but excluding supplying of manhole covers) over scraper manhole etc. complete, providing and fixing safety chain wherever necessary as per the stipulations in the type desing complete (excl. excavation). <b>Manhole type "A" Circular type having inside diameter of 1200 mm for depth upto 1.5 m depth (for 150 mm to 500 mm dia sewer)</b> <b>(A)Manhole type "A" as above but up to 1.0 M depth.</b>	180.00	No.	14005.85	Rupees Fourteen Thousand Five and Eighty Five Paisas Only	25,21,053.00
4.1	Extra depth beyond 1 .0 M but up to 1 .5 M depth for "A" type manhole above.	69.00	Rmt.	7622.20	Rupees Seven Thousand Six Hundred Twenty Two and Twenty Paisas Only	5,25,932.00
4.2	(B)Manhole type "B" circular type having inside diameter of minimum 1500 mm and for depth from 1.5 M to 4.0 M (for 150 mm to 600 mm dia sewers) <b>Manhole type "B" as above but up to 1.5 M depth.</b>	313.00	No.	24283.40	Rupees Twenty Four Thousand Two Hundred Eighty Three and Forty Paisas Only	76,00,705.00
4.3	Extra depth beyond 1 .5 M but up to 4.0 M depth for type B manhole above.	64.00	Rmt.	14159.95	Rupees Fourteen Thousand One Hundred Fifty Nine and Ninety Five Paisas Only	9,06,237.00

Sr No.	DESCRIPTION	QTY	UNIT	Rate Rs.		AMOUNT Rs.
				Rate In Figure	In Words	
4.4	Manhole type "C" circular type having inside diameter of minimum 1500 mm and for depth beyond 4.0 m to 6.0 m (for 150 mm to 1800 mm dia sewers)	2.00	No.	60844.20	Rupees Sixty Thousand Eight Hundred Forty Four and Twenty Pisas Only	1,21,689.00
5	<b>Vertical Drop Manhole.</b> Providing and constructing vertical drop arrangement of 0.6 m and more height as required including providing and jointing special such as double T. Bend required stoneware pipe fixed in m-100 C. C. at required level as type design cutting, jointing and filleting as per specification etc. complete. <b>Vertical drop arrangement as above up to 0.6 m height.</b>	52.00	No.	2477.10	Rupees Two Thousand Four Hundred Seventy Seven and Ten Pisas Only	1,28,810.00
5.1	Extra over item No.4 above for additional drop beyond 0.6 m	96.00	R.Mt.	2214.90	Rupees Two Thousand Two Hundred Fourteen and Ninety Pisas Only	2,12,631.00
6	Excavation for pipeline trenches for water supply, sewerage line, manhole etc. all with shoring and struting if required as per required gradient and line including safety provisions using site rails and stacking excavated stuff including up to all required lead cleaning the site etc. complete for all lifts and strata as specified. <b>0.00 m to 1.5 m depth.</b> <b>In all sorts of soil &amp; soft murrum</b>	11817.00	Cum	102.35	Rupees One Hundred Two and Thirty Five Pisas Only	12,09,470.00
6.1	In hard murrum,boulders	11817.00	Cum	155.25	Rupees One Hundred Fifty Five and Twenty Five Pisas Only	18,34,590.00
6.2	In soft rock and/or masonry in CM or L M or Lime Concrete.	2955.00	Cum	187.45	Rupees One Hundred Eighty Seven and Forty Five Pisas Only	5,53,915.00
6.3	In hard rock with blasting and chiseling or by chieilling only for finishing.	2955.00	Cum	427.80	Rupees Four Hundred Twenty Seven and Eighty Pisas Only	12,64,149.00
7	Excavation for pipeline trenches for water supply, sewerage line, manhole etc. all with shoring and struting if required as per required gradient and line including safety provisions using site rails and stacking excavated stuff including up to all required lead cleaning the site etc. complete for all lifts and strata as specified. <b>(1.50 m to 3.0 m depth)</b> <b>In all sorts of soil &amp; soft murrum</b>	171.00	Cum	112.70	Rupees One Hundred Twelve and Seventy Pisas Only	19,272.00

Sr No.	DESCRIPTION	QTY	UNIT	Rate Rs.		AMOUNT Rs.
				Rate In Figure	In Words	
7.1	In hard murrum,boulders	1022.00	Cum	170.20	Rupees One Hundred Seventy and Twenty Paisas Only	1,73,945.00
7.2	In soft rock and/or masonry in CM or L M or Lime Concrete.	1193.00	Cum	205.85	Rupees Two Hundred Five and Eighty Five Paisas Only	2,45,580.00
7.3	In hard rock with blasting and chiseling or by chieilling only for finishing.	1022.00	Cum	446.20	Rupees Four Hundred Forty Six and Twenty Paisas Only	4,56,017.00
8	Excavation for pipeline trenches for water supply, sewerage line, manhole etc. all with shoring and struting if required as per required gradient and line including safety provisions using site rails and stacking excavated stuff including up to all required lead cleaning the site etc. complete for all lifts and strata as specified. (3.00 m to 4.50 m depth) <b>In all sorts of soil &amp; soft murrum</b>	1.00	Cum	118.45	Rupees One Hundred Eighteen and Forty Five Paisas Only	119.00
8.1	In hard murrum,boulders	2.00	Cum	177.10	Rupees One Hundred Seventy Seven and Ten Paisas Only	355.00
8.2	In soft rock and/or masonry in CM or L M or Lime Concrete.	3.00	Cum	215.05	Rupees Two Hundred Fifteen and Five Paisas Only	646.00
8.3	In hard rock and / or in C. C. 1:2:4 only.	2.00	Cum	456.55	Rupees Four Hundred Fifty Six and Fifty Five Paisas Only	914.00
9	In all sorts of soil and soft murrum, hard Murrum and boulders, Soft Rock, Hard Rock, upto 1.5 mt. depth from G. L. Extra for dewatering in all sorts of strata's, for each 1.5 mt. or part thereof beyond 1.5 mt. depth. <b>(Total for Dewatering)</b> <b>1.50 m to 3.0 m depth</b> <b>In all sorts of soil &amp; soft murrum</b>	170.30	Cum	31.05	Rupees Thirty One and Five Paisas Only	5,288.00
9.1	In hard murrum,boulders	1021.80	Cum	31.05	Rupees Thirty One and Five Paisas Only	31,727.00
9.2	In soft rock and/or masonry in CM or L M or Lime Concrete.	1192.10	Cum	31.05	Rupees Thirty One and Five Paisas Only	37,015.00
9.3	In hard rock with blasting and chiseling or by chieilling only for finishing.	1021.80	Cum	31.05	Rupees Thirty One and Five Paisas Only	31,727.00

Sr No.	DESCRIPTION	QTY	UNIT	Rate Rs.		AMOUNT Rs.
				Rate In Figure	In Words	
10	In all sorts of soil and soft murrum, hard Murrum and boulders, Soft Rock, Hard Rock, upto 1.5 mt. depth from G. L. Extra for dewatering in all sorts of strata's, for each 1.5 mt. or part thereof beyond 1.5 mt. depth. <b>(Total for Dewatering)</b> <b>3.00 m to 4.50 m depth</b> In all sorts of soil & soft murrum	0.30	Cum	42.55	Rupees Forty Two and Fifty Five Paisas Only	13.00
10.1	In hard murrum,boulders	1.20	Cum	42.55	Rupees Forty Two and Fifty Five Paisas Only	52.00
10.2	In soft rock and/or masonry in CM or L M or Lime Concrete.	2.70	Cum	42.55	Rupees Forty Two and Fifty Five Paisas Only	115.00
10.3	In hard rock and / or in C. C. 1:2:4 only..	1.80	Cum	42.55	Rupees Forty Two and Fifty Five Paisas Only	77.00
11	Add for restoration of infrastructures like Soak well, Electrical line, Water Supply line, Telephone cables all type, Gas line, Septic Tank etc. <b>0.00 m to 1.5 m depth</b>	4431.60	Cum	2121.64	Rupees Two Thousand One Hundred Twenty One and Sixty Four Paisas Only	94,02,260.00
11.1	Add for restoration of infrastructures like Soak well. <b>1.50 m to 3.0 m depth</b>	511.20	Cum	2239.96	Rupees Two Thousand Two Hundred Thirty Nine and Ninety Six Paisas Only	11,45,068.00
12	Shoring or timbering for trench with 50 mm thick planks and suitable size truts etc. complete.	2378.00	Sq.M.	81.65	Rupees Eighty One and Sixty Five Paisas Only	1,94,164.00
13	Lowering, Laying & Jointing R.C.C. pipes(Horizontal-Vertical) in C. M. 1:1 1/2 of following diameters in proper position, grade and alignment as directed by Engineer-in-charge including conveyance from stores to site of work, labour, giving hydraulic testing as per ISI code. Class NP3 Test Pressure, 0.7 Kg / Sq.m. <b>200 mm Dia pipe</b>	9566.00	RMT	101.20	Rupees One Hundred One and Twenty Paisas Only	9,68,080.00
13.1	300 mm dia pipe	2370.00	RMT	136.85	Rupees One Hundred Thirty Six and Eighty Five Paisas Only	3,24,335.00
13.2	400 mm dia pipe	1328.00	RMT	174.80	Rupees One Hundred Seventy Four and Eighty Paisas Only	2,32,135.00



Sr No.	DESCRIPTION	QTY	UNIT	Rate Rs.		AMOUNT Rs.
				Rate In Figure	In Words	
14	Refilling the pipeline trenches incl. ramming, watering, consolidating desposal of surplus stuff as directed within a radius of 3 km	30243.91	Cu.M.	25.30	Rupees Twenty Five and Thirty Paises Only	7,65,171.00
15	Extra lead for transportation of Surplus stuff spreing or stacking as directed (removal of excavated stuff fromsite of U/G sump sewagepumping station,filter Plant etc.)	2709.00	Cu.M.	74.75	Rupees Seventy Four and Seventy Five Paises Only	2,02,498.00
16	Providing bedding incl. ramming, watering, levelling, consolidating etc. Complete As above with required quality Sand brought from outside including all lead as per standard and instruction of engineer incharge	381.00	Cum	378.35	Rupees Three Hundred Seventy Eight and Thirty Five Paises Only	1,44,152.00
17	Providing C.C.M.:100 for encasing pipes using trap metal size 12 mm to 50 mm incl. form work curing consolidation etc. complete for various location on pipe line. using trap metal 20 mm nominal size. Using trap metal 20 mm nominal size	58.00	Cum	4730.87	Rupees Four Thousand Seven Hundred Thirty and Eighty Seven Paises Only	2,74,391.00
18	Supplying cutting, bending, binding and placing in position steel as per plan and design and as per ISS 2502 including cost of steel and binding wire for reservoirs/structures only including lift up to 6 meter height or depth below G.L. for all diameters Do - deformed (TMT) bars confirming to relevant IS Fe - 500 grade for all diameters	2.32	MT	89129.60	Rupees Eighty Nine Thousand One Hundred Twenty Nine and Sixty Paises Only	2,06,781.00
19	Supplying of graded stone aggregate of following sizes (for W.B.M. Road)(2) Hand broken stone aggregate 40 mm to 63 mm size.	3200.00	Cu.M.	292.14	Rupees Two Hundred Ninety Two and Fourteen Paises Only	9,34,856.00
20	Spreading the stone aggregate for rolling and W.B.M. including filling the interstices to required camber and gradient (excluding spreading of Blindage)(ii) 40mm to 63mm size aggreagates (H.B.)	3200.00	Cu.m	249.75	Rupees Two Hundred Forty Nine and Seventy Five Paises Only	7,99,209.00

Sr No.	DESCRIPTION	QTY	UNIT	Rate Rs.		AMOUNT Rs.
				Rate In Figure	In Words	
21	Rolling and consolidating water bound macadam (except laterite and Kankar) including watering not exceeding 150mm thickness (Main layer including binding materials ) including filling in depressions which occur during the process.(A) With power roller exceeding 8 tonne and not exceeding 12 tonne.	16000.00	Sq.m	15.12	Rupees Fifteen and Twelve Paisas Only	2,41,916.00
<b>Total for Schedule-B3(Rs.)</b>						<b>4,18,55,234.00</b>
Signature of Contractor with Stamp				Executive Engineer Drainage Department BMC, BHAVNAGAR		

Bid Document For Upgradation of Drainage line Network in Old Societies of Adhewada Area under Bhavnagar Municipal Corporation (BMC), Bhavnagar. DISTRICT: BHAVNAGAR

SCHEDULE - B2

Zone 2: Providing, Lowering,Laying and Jointing R.C.C. NP3 Sewer line.

Sr No.	DESCRIPTION	QTY	UNIT	Rate Rs.		AMOUNT Rs.
				Rate In Figure	In Words	
1	<p><b>Horizontally cast</b>                      Providing and supplying ISI Standard R.C.C. pipes(of Sulphate Resisting Cement) in standard lengths of following class and diameter suitable for either collar joints or rubber ring joints including all taxes, insurance, transportation, freight charges, octroi, inspection charges, loading, unloading, conveyance to departmental stores, stacking etc. complete. (IS - 458/ 1989)                      Note : One collar should be supplied with each full length plain ended RCC pipe, cost included in rates below. One rubber ring should be supplied with each full length socketed pipe, cost included in rates below.  <b>200 mm Dia Pipe</b></p>	7014.00	RMT	417.00	Rupees Four Hundred Seventeen Only	29,24,838.00
1.1	300 mm dia pipe	1683.00	RMT	755.00	Rupees Seven Hundred Fifty Five Only	12,70,665.00
2	<p><b>Vertical cast</b>                      Providing and supplying ISI Standard and marked R.C.C. pipes(of Sulphate Resisting Cement) in standard lengths of following class and diameter spigot socket or Tongue and grove joint or Rebated Rubber Ring jointed flushing from inside suitable for rubber ring joints including all taxes, insurance, transportation, freight charges, octroi, inspection charges, loading, unloading, conveyance to departmental stores, stacking etc. complete. (IS - 458/ 1989)                      Note : One rubber ring should be supplied with each full length socketed pipe, cost included in rates below.  <b>400 mm dia pipe</b></p>	663.00	RMT	1131.00	Rupees One Thousand One Hundred Thirty One Only	7,49,853.00
2.1	600 mm dia pipe	1184.00	RMT	2049.00	Rupees Two Thousand Forty Nine Only	24,26,016.00
3	<p>RCC precast M.H. Frame &amp; Cover Manufacture, supply &amp; Delivery at store or at site of work precast RCC M.200 Frame &amp; cover suitable to drainage M.H. and as per type design &amp; Drawing including cost of reinforcement M.S. Angles or Flate, curring mold work etc.  <b>Heavy Duty</b>                      &gt; Frame</p>	372.00	No.	813.00	Rupees Eight Hundred Thirteen Only	3,02,436.00
3.1	> Cover	372.00	No.	920.00	Rupees Nine Hundred Twenty Only	3,42,240.00

Sr No.	DESCRIPTION	QTY	UNIT	Rate Rs.		AMOUNT Rs.
				Rate In Figure	In Words	
4	<p><b>Sewer Manholes</b>  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 ,inside and outside 15mm thick plastering in C. M. 1:3 necessary 100 mm coping in R.C.C.M. 200 fixing C. I. steps and fixing manhole frame and covers (But excluding supply of manhole frame and covers) over manholes and house connection chambers and fixing Manhole covers (but excluding supplying of manhole covers) over scraper manhole etc. complete, providing and fixing safety chain wherever necessary as per the stipulations in the type desing complete (excl. excavation).  <b>Manhole type "A" Circular type having inside diameter of 1200 mm for depth upto 1.5 m depth (for 150 mm to 500 mm dia sewer)</b>  <b>(A)Manhole type "A" as above but up to 1.0 M depth.</b></p>	149.00	No.	14005.85	Rupees Fourteen Thousand Five and Eighty Five Paisas Only	20,86,872.00
4.1	Extra depth beyond 1 .0 M but up to 1 .5 M depth for "A" type manhole above.	56.00	Rmt.	7622.20	Rupees Seven Thousand Six Hundred Twenty Two and Twenty Paisas Only	4,26,844.00
4.2	<p>(B)Manhole type "B" circular type having inside diameter of minimum 1500 mm and for depth from 1.5 M to 4.0 M (for 150 mm to 600 mm dia sewers)  <b>Manhole type "B" as above but up to 1.5 M depth.</b></p>	221.00	No.	24283.40	Rupees Twenty Four Thousand Two Hundred Eighty Three and Forty Paisas Only	53,66,632.00
4.3	Extra depth beyond 1 .5 M but up to 4.0 M depth for type B manhole above.	40.00	Rmt.	14159.95	Rupees Fourteen Thousand One Hundred Fifty Nine and Ninety Five Paisas Only	5,66,398.00
4.4	<p>Manhole type "C" circular type having inside diameter of minimum 1500 mm and for depth beyond 4.0 m to 6.0 m (for 150 mm to 1800 mm dia sewers)  <b>Manhole type "C" as above but up to 4.0 M depth.</b></p>	2.00	No.	60844.20	Rupees Sixty Thousand Eight Hundred Forty Four and Twenty Paisas Only	1,21,689.00
5	<p><b>Vertical Drop Manhole.</b>  Providing and constructing vertical drop arrangement of 0.6 m and more height as required including providing and jointing special such as double T. Bend required stoneware pipe fixed in m-100 C. C. atrequired level as type design cutting, jointing and filleting as per specification etc. complete.  <b>Vertical drop arrangement as above up to 0.6 m height.</b></p>	22.00	No.	2477.10	Rupees Two Thousand Four Hundred Seventy Seven and Ten Paisas Only	54,497.00
5.1	Extra over item No.4 above for additional drop beyond 0.6 m	56.00	R.Mt.	2214.90	Rupees Two Thousand Two Hundred Fourteen and Ninety Paisas Only	1,24,035.00
6	<p>Excavation for pipeline trenches for water supply, sewerage line, manhole etc. all with shoring and struting if required as per required gradient and line including safety provisions using site rails and stacking excavated stuff including up to all required lead cleaning the site etc. complete for all lifts and strata as specified.  <b>0.00 m to 1.5 m depth.</b>  <b>In all sorts of soil &amp; soft murrum</b></p>	9232.00	Cum	102.35	Rupees One Hundred Two and Thirty Five Paisas Only	9,44,896.00

Sr No.	DESCRIPTION	QTY	UNIT	Rate Rs.		AMOUNT Rs.
				Rate In Figure	In Words	
6.1	In hard murrum,boulders	9232.00	Cum	155.25	Rupees One Hundred Fifty Five and Twenty Five Paisas Only	14,33,268.00
6.2	In soft rock and/or masonry in CM or L M or Lime Concrete.	2308.00	Cum	187.45	Rupees One Hundred Eighty Seven and Forty Five Paisas Only	4,32,635.00
6.3	In hard rock with blasting and chiseling or by chieilling only for finishing.	2308.00	Cum	427.80	Rupees Four Hundred Twenty Seven and Eighty Paisas Only	9,87,363.00
7	Excavation for pipeline trenches for water supply, sewerage line, manhole etc. all with shoring and struting if required as per required gradient and line including safety provisions using site rails and stacking excavated stuff including up to all required lead cleaning the site etc. complete for all lifts and strata as specified. (1.50 m to 3.0 m depth) In all sorts of soil & soft murrum	721.00	Cum	112.70	Rupees One Hundred Twelve and Seventy Paisas Only	81,257.00
7.1	In hard murrum,boulders	924.00	Cum	170.20	Rupees One Hundred Seventy and Twenty Paisas Only	1,57,265.00
7.2	In soft rock and/or masonry in CM or L M or Lime Concrete.	1078.00	Cum	205.85	Rupees Two Hundred Five and Eighty Five Paisas Only	2,21,907.00
7.3	In hard rock with blasting and chiseling or by chieilling only for finishing.	924.00	Cum	446.20	Rupees Four Hundred Forty Six and Twenty Paisas Only	4,12,289.00
8	In all sorts of soil and soft murrum, hard Murrum and boulders, Soft Rock, Hard Rock, upto 1.5 mt. depth from G. L. Extra for dewatering in all sorts of strata's, for each 1.5 mt. or part thereof beyond 1.5 mt. depth. (Total for Dewatering) 1.50 m to 3.0 m depth In all sorts of soil & soft murrum	721.00	Cum	31.05	Rupees Thirty One and Five Paisas Only	22,388.00
8.1	In hard murrum,boulders	924.00	Cum	31.05	Rupees Thirty One and Five Paisas Only	28,691.00
8.2	In soft rock and/or masonry in CM or L M or Lime Concrete.	1078.00	Cum	31.05	Rupees Thirty One and Five Paisas Only	33,472.00
8.3	In hard rock with blasting and chiseling or by chieilling only for finishing.	924.00	Cum	31.05	Rupees Thirty One and Five Paisas Only	28,691.00
9	Add for restoration of infrastructures like Soak well, Electrical line, Water Supply line, Telephone cables all type, Gas line, Septic Tank etc. 0.00 m to 1.5 m depth	4154.40	Cum	2121.64	Rupees Two Thousand One Hundred Twenty One and Sixty Four Paisas Only	88,14,142.00
9.1	Add for restoration of infrastructures like Soak well. 1.50 m to 3.0 m depth	656.46	Cum	2239.96	Rupees Two Thousand Two Hundred Thirty Nine and Ninety Six Paisas Only	14,70,445.00
10	Shoring or timbering for trench with 50 mm thick planks and suitable size truts etc. complete.	4145.00	Sq.M.	81.65	Rupees Eighty One and Sixty Five Paisas Only	3,38,440.00

Sr No.	DESCRIPTION	QTY	UNIT	Rate Rs.		AMOUNT Rs.
				Rate In Figure	In Words	
11	Lowering, Laying & Jointing R.C.C. pipes(Horizontal-Vertical) in C. M. 1:1 1/2 of following diameters in proper position, grade and alignment as directed by Engineer-in-charge including conveyance from stores to site of work, labour, giving hydraulic testing as per ISI code. Class NP3 Test Pressure, 0.7 Kg / Sq.m. <b>200 mm Dia pipe</b>	7014.00	RMT	101.20	Rupees One Hundred One and Twenty Pisas Only	7,09,817.00
11.1	300 mm dia pipe	1683.00	RMT	136.85	Rupees One Hundred Thirty Six and Eighty Five Pisas Only	2,30,319.00
11.2	400 mm dia pipe	663.00	RMT	174.80	Rupees One Hundred Seventy Four and Eighty Pisas Only	1,15,893.00
11.3	600 mm dia pipe	1184.00	RMT	262.20	Rupees Two Hundred Sixty Two and Twenty Pisas Only	3,10,445.00
12	Refilling the pipeline trenches incl. ramming, watering, consolidating desposal of surplus stuff as directed within a radius of 3 km	23838.00	Cu.M.	25.30	Rupees Twenty Five and Thirty Pisas Only	6,03,102.00
13	Extra lead for transportation of Surplus stuff spreading or stacking as directed (removal of excavated stuff from site of U/G sump sewage pumping station, filter Plant etc.)	2322.00	Cu.M.	74.75	Rupees Seventy Four and Seventy Five Pisas Only	1,73,570.00
14	Providing bedding incl. ramming, watering, levelling, consolidating etc. Complete As above with required quality Sand brought from outside including all lead as per standard and instruction of engineer incharge	542.00	Cum	378.35	Rupees Three Hundred Seventy Eight and Thirty Five Pisas Only	2,05,066.00
15	Providing C.C.M.:100 for encasing pipes using trap metal size 12 mm to 50 mm incl. form work curing consolidation etc. complete for various location on pipe line. using trap metal 20 mm nominal size. <b>Using trap metal 20 mm nominal size</b>	95.00	Cum	4730.87	Rupees Four Thousand Seven Hundred Thirty and Eighty Seven Pisas Only	4,49,433.00
16	Supplying cutting, bending, binding and placing in position steel as per plan and design and as per ISS 2502 including cost of steel and binding wire for reservoirs/structures only including lift up to 6 meter height or depth below G.L. for all diameters <b>Do - deformed (TMT) bars confirming to relevant IS Fe - 500 grade for all diameters</b>	4.75	MT	89129.60	Rupees Eighty Nine Thousand One Hundred Twenty Nine and Sixty Pisas Only	4,23,366.00
<b>Total for Schedule-B3(Rs.)</b>						<b>3,53,91,175.00</b>
Signature of Contractor with Stamp				Executive Engineer Drainage Department BMC, BHAVNAGAR		

**Bid Document For Upgradation of Drainage line Network in Old Societies of Adhewada Area under Bhavnagar Municipal Corporation (BMC), Bhavnagar. DISTRICT: BHAVNAGAR**

SCHEDULE - B3						
House Connection Work						
Sr No.	DESCRIPTION	QTY	UNIT	Total Rate In Figure	Total Rate In Words	AMOUNT Rs.
1	Providing and constructing rectangular brick masonry chamber for house connection as per type design in brick masonry in C. M. 1:3 including M-100 in foundation M-150 in benching inside plastering in C. M. 1:3 and outside plastering in C. M. 1:3 coping in M200 and fixing RCC precast manhole frame and covers, but Excl. supply of manhole and cover etc. complete excl. excavation.	1307.00	Nos	9110.30	Rupees Nine Thousand One Hundred Ten and Thirty Paises Only	1,19,07,162.10
2	Providing Fixing of Steel Fiber Rainforced Concrete (SFRC) Frame & cover Manufacture Supply & Delivery of store or at Site of work Steel Fiber Rainforced Concrete (SFRC) Frame & cover which is suitable to Drainage MH. and as per type design & Drawing including flat.curing mold work etc. Capacity: 20 Ton, Size: 36"x36 Frame	1307.00	Nos	2300.00	Rupees Two Thousand Three Hundred Only	30,06,100.00
3	Providing and supplying in standard length ISI mark rigid unplosticised PVC pipes suitable for potable water with ring til joint including cost of rings, as per IS specification no. 4985/1988 including all local a nd central taxes, transportation, freight charges, octroi, inspection charges, loading, unloading, conveyance to the departmental stores and including cost of jointing meteriol etc. complete. <b>110 mm dia</b>	8032.50	Rmt	320.00	Rupees Three Hundred Twenty Only	25,70,400.00
3.1	90 mm dia	9817.50	Rmt	213.00	Rupees Two Hundred Thirteen Only	20,91,127.50
4	Horizontally cast Providing and supplying ISI Standard R.C.C. pipes(of Sulphate Resisting Cement) in standard lengths of following class and diameter suitable for either collar joints or rubber ring joints including all taxes, insurance, transportation, freight charges, octroi, inspection charges, loading, unloading, conveyance to departmental stores, stacking etc. complete. (IS - 458/ 1989) Note : One collar should be supplied with each full length plain ended RCC pipe, cost included in rates below. One rubber ring should be supplied with each full length socketed pipe, cost included in rates below. <b>150 mm Dia RCC NP 3 Pipe</b>	6535.00	Rmt	331.00	Rupees Three Hundred Thirty One Only	21,63,085.00
5	Manufacture, supply & delivery of PVC specials plain & Socket or flanged suitable to PVC pipe.	1.00	L.S	233076.38	Rupees Two Lacs Thirty Three Thousand Seventy Six and Thirty Eight Paises Only	2,33,076.38
6	Lowering, laying, fixing and jointing PVC/uPVC/cPVC pipes and specials of following class and diameter including cost of conveyance from stores to site of works including cost of labour, material, cement solvent, giving satisfactory hydraulic testing as per ISI code. <b>110 mm dia</b>	8032.50	Rmt	21.85	Rupees Twenty One and Eighty Five Paises Only	1,75,510.13

Sr No.	DESCRIPTION	QTY	UNIT	Total Rate In Figure	Total Rate In Words	AMOUNT Rs.
6.1	90 mm dia	9817.50	Rmt	19.55	Rupees Nineteen and Fifty Five Paisas Only	1,91,932.13
7	Lowering, Laying & Jointing R.C.C. pipes(Horizontal-Vertical) in C. M. 1:1 1/2 of following diameters in proper position, grade and alignment as directed by Engineer-in-charge including conveyance from stores to site of work, labour, giving hydraulic testing as per ISI code. Class NP3 Test Pressure, 0.7 Kg / Sq.m. <b>150 mm Dia</b>	6535.00	Rmt	72.45	Rupees Seventy Two and Forty Five Paisas Only	4,73,460.75
8	Excavation for pipe line trenches incl. all safety provisions using site rails and stacking excavated stuff up to a lead of 90 mts. cleaning the site etc. complete for lifts and strata as specified. Upto 1.50 mt depth. <b>In all sorts of soil and soft murrum</b>	6364.80	Cu.m	102.35	Rupees One Hundred Two and Thirty Five Paisas Only	6,51,437.28
8.1	In hard murrum,boulders,incl. Macadam road	707.20	Cu.m	155.25	Rupees One Hundred Fifty Five and Twenty Five Paisas Only	1,09,792.80
8.2	Refilling the pipeline trenches incl. ramming, watering, consolidating disposal of surplus stuff as directed within a radius of 3 km	6933.00	Cu.m	25.30	Rupees Twenty Five and Thirty Paisas Only	1,75,404.87
9	Demolition including stacking of serviceable materilas and disposal of unserviceable materials with all lead and lift. (i) R.C.C. work	367.00	Cu.m	1030.81	Rupees One Thousand Thirty and Eighty one Paisas Only	3,78,305.81
10	Providing and laying cement concrete 1:4:8 (1- Cement : 4- coarse sand : 8- hand broken stone aggregates 40 mm nominal size) and curing complete excluding cost of formwork in (A) Foundation and Plinth	367.00	Cu.m	2660.45	Rupees Two Thousand Six Hundred Sixty and Forty Five Paisas Only	9,76,385.56
11	Providing and erecting C. I. and MS ventilating columns 15 cms. dia. with C.I. ornamental cap and Min 6.00 Mtr. Height (Height may be varying as per site) base fixed firmly with necessary foundation with one coat of red lead oxide paint and one coat of any approved colour with 15 cms, dia.10 Mt.in length with 0.35mt*0.35mt* M100 Encasing, stoneware or R.C.C. pipe connection with M.H. including excavation and jointing as required etc. complete. <b>6m High</b>	8.00	Nos	33836.00	Rupees Thirty Three Thousand Eight Hundred Thirty Six Only	2,70,688.00
<b>Total Amount (Rs)</b>						<b>2,53,73,868.31</b>

Signature of Contractor with Stamp

Executive Engineer  
Drainage Department  
BMC, BHAVNAGAR



**Bid Document For Upgradation of Drainage line Network in Old Societies of Adhewada Area under Bhavnagar Municipal Corporation (BMC), Bhavnagar. DISTRICT: BHAVNAGAR****Schedule - B7 : OPERATION & MAINTANANCE FOR 2 Years**

Sr. No.	Description	Qty	Unit	Rate	In word	Amount
1	Operation & Maintenance for R.C.C. NP3 PIPE FOR SEWER COLLECTING SYSTEM, CONSTRUCTION OF HOUSE CONNECTION CHAMBER. <b>For 1st Year</b>	1	Year	8,76,000.00	Rupees Eight Lacs Seventy Six Thousand Only	8,76,000.00
1.1	For 2nd Year	1	Year	8,76,000.00	Rupees Eight Lacs Seventy Six Thousand Only	8,76,000.00
<b>Total Rs.</b>						<b>17,52,000.00</b>

**Signature of Contractor with Stamp**

**Executive Engineer  
Drainage Department  
BMC, BHAVNAGAR**

**Bhavnagar Municipal Corporation  
BHAVNAGAR**



**(A WHOLLY OWNED BHAVNAGAR MUNICIPAL CORPORATION UNDERTAKING)**

**ESTIMATED COST**

**BID DOCUMENT FOR UPGRADATION OF DRAINAGE LINE NETWORK IN OLD SOCIETIES OF  
ADHEWADA AREA UNDER BHAVNAGAR MUNICIPAL CORPORATION (BMC), BHAVNAGAR.  
DISTRICT: BHAVNAGAR**

**ESTIMATED COST: RS. 10,43,72,277.30/-**

**VOLUME- V**

**Conditions of Contract for O & M**

**Employer**

**EXECUTIVE ENGINEER**

**(Drainage Dept.)**

**BHAVNAGAR Municipal Corporation**

Sir Mangal Sinhji Road, Near Kalanala,

Bhavnagar,

Bhavnagar,-364001.

Contact Number: 0278 2424801-10

**GENERAL CONDITIONS OF CONTRACT  
FOR OPERATION AND MAINTENANCE**

## I - ADMINISTRATIVE PROVISIONS

The following additional clauses shall apply only during the Operation and Maintenance period.

### 1. DEFINITIONS AND INTERPRETATION:

#### 1.1. Definitions:

In these Conditions of Contract ("Conditions") the following words and expressions shall have the meanings hereby assigned to them, except where the context otherwise requires.

1. "Applicable Law" means all national (or State) legislation, statutes, ordinances and other Laws and regulations and by laws of any legally constituted public authority.
2. "Contract" means the contract agreement, these conditions, the employer's requirements, the Tender and the further documents (if any) which are listed in the contract agreement.
3. "Contractor's Equipment" shall mean all equipment, instruments, tools, machinery and other appliances and things of the Contractor at the Site required for the fulfilment of the obligations of the Contractor under these Conditions.
4. "Contractor's Personnel" means the contractor's representative and all personal that the contractor utilizes on site, which may include the staff, labour, & other employees of the contractor and of each sub-contractor & any other personnel assisting the contractor in the execution of the work.
5. "Dispute" shall have the meaning given to it in Clause 15 of these Conditions.
6. "Employer's Risk" shall include the risks mentioned as employer's risks in the General Conditions and shall include any negligence or misconduct on the part of the Employer and also any event of Force Majeure as provided in Clause 12 of these Conditions.
7. "Employer's Personnel" means the Employer's Representative, the assistants and all other staff, labour and other employees of the employer and of the Employer's representative, and any other personnel notified to the contractor, by the employer or the employer's representative, as employer's personnel.
8. "Employer's Requirements" means the document entitled employer's requirements, as included in the contract, and any additions and modifications to such document in accordance with the contract. Such document specifies the purpose, scope, and / or design and / or other technical criteria, for the works.
10. "Force Majeure" shall mean those events mentioned in Clause 12 of these Conditions.

"General Conditions" shall mean the conditions of tender issued by BHAVNAGAR MUNICIPAL CORPORATION (BMC) for O&M works of projects.

- b) "Good Operating Practices" means the standards, practices, methods and procedures as practiced internationally and in India conforming to all Applicable Law and that degree of skill,

diligence, prudence and foresight which would reasonably be expected from a skilled and experienced contractor engaged in India in the same type of undertaking under the same or similar circumstances as the Contractor pursuant to these Conditions.

11. "O & M Contract" shall mean the contract or part of any other contract having scope of operation and maintenance of facilities, entered in between the Employer and the Contractor pursuant to these Conditions.
12. "O & M Completion Certificate" shall mean the certificate to be issued by the Employer on the completion of all the obligations of the Contractor under these Conditions.
  - a) "O & M Services" shall mean those services specified in Schedule [1] which the Contractor is obligated to perform under these Conditions.
13. "O & M Standard" shall mean the standards:
  - a) As set forth in the O & M Manual as accepted by the Employer,
  - b) As required pursuant to Applicable Law;
  - c) Set out in the Performance Guarantee; and
  - d) For the functioning of the Facility as required in accordance with the Contract including such requirements as may be mentioned in the Employer's Requirements.
  - e) For the functioning of the Facilities set forth in these Conditions.
14. "O & M Manual" shall have the meaning for manual of Operation and Maintenance.
15. "O & M Period" shall have the meaning set out in Clause.
16. "O & M Price" shall mean the amount stated in Price Schedule.
17. "Party" shall mean each of the Contractor and the Employer and Parties shall mean both of them together.
18. "Performance Guarantees shall mean the guarantee that the Facility shall be operated satisfying the minimum performance parameters set out in Schedule.
22. "Successor Contractor" shall have the meaning given to it in Clause.
23. "Site" shall mean that specific area specified in the bid documents & shall include any other places as may be specifically designed by the employer from the time to time as forming part of the site.
24. "Taking over Date" shall mean the date of issue of the taking over certificate at the end of Operation and Maintenance period.
25. "Taking over Certificate" means the certificate to be issued by employer to the contractor at the successful completion of the Operation and Maintenance period.
26. "Termination" shall have the meaning given to it in Clause [13] of these Conditions.

## **1.2. Interpretation:**

In these Conditions, except where the context requires otherwise.

- a) words indicating one gender include all genders,
- b) words indicating the singular also include the plural and words indicating the plural also include the singular,
- c) Provisions including the word "agree", "agreed" or "agreement" require the agreement to be recorded in writing;
- d) "written" or "in writing" means hand-written, type-written, printed or electronically made, and resulting in a permanent record;
- e) The marginal words and other headings shall not be taken into consideration in the interpretation of these Conditions;
- f) The words "include", "includes" and "including" is not limiting;
- g) As used in these Conditions, all defined terms include the plural as well as the singular;
- h) Any agreement, document or drawing defined or referred to in these Conditions shall include amendment, modification and supplement thereto and waiver thereof as maybe come effective from time to time, except where otherwise indicated;
- i) Any reference to any Clause or Sub – Clause shall unless specified otherwise mean Clause or Sub-Clause of these Conditions; and
- j) Any rights of the Employer to make any inspections or to review any document shall not create any obligation on the Employer to conduct such inspections or reviews to detect any errors, inaccuracies, ambiguities or other potential problems. No inspection or approval by or on behalf of the Employer shall operate as a waiver of any provision of these Conditions, any obligation of Contractor under these Conditions, or any of the rights of the Employer hereunder, except as expressly agreed in writing by the Employer.

## **1.3 Commencement and Duration of O & M Contract:**

1.3.1. "The O & M Period" shall commence from the date of issue of certificate of successful commissioning (after 3 months of Trial run) of the facilities and shall continue for a period of 2 years there from.

**1.3.2. The O & M period may then be extended subject to mutual consent and on terms and conditions agreed to by both the Parties.**

## **1.4. Applicable Law:**

1.4.1. The Contractor shall comply with all Applicable Law relevant to the Contractor's Personnel, including Applicable Law relating to their employment, health, safety, welfare, immigration and emigration, and shall allow them all their legal rights.

1.4.2. The Contractor shall require his employees to obey all Applicable Laws, including those concerning safety at work.

1.4.3. In the event Employer becomes liable to any Employers Personnel, any governmental authority (including but not limited to any fines or penalties levied by or payable to such

authority) or any other third party under the provisions of any Applicable Law resulting from Contractor's failure to comply with such Applicable Law, Contractor shall reimburse Employer for all payments required to be made by Employer to such Employers Personnel, governmental authority or any other third party, plus the actual expenses that Employer may incur in investigating, settling or defending any litigation or threatened litigation.

**1.5. Assignment:**

The Contractor will not be entitled to sub-contract any part of his obligation under these Conditions to any third party without prior approval of the Employer. Neither party may assign their rights and obligations under these Conditions without the consent of the other Party. However the Employer may assign any rights under these Conditions to any financial institution from whom any financial assistance/credit facilities have been availed by the Employer.

**1.6. Safety:**

**1.6.1. Emergencies:**

In the event of an emergency endangering life or property, the Contractor shall immediately take action as may be necessary to prevent, avoid or mitigate injury, damage or loss and shall, as soon as possible, report any such incidents, including his response thereto to the Employer.

**1.6.2. Contractor Action:**

The Contractor shall utilize his personnel to take such action as may be necessary in accordance with Good Operating Practices in the event of an emergency. Notwithstanding anything to the contrary herein, the Contractor may incur any expenditure or take any other operating actions as the Contractor deems to be necessary (in accordance with Good operating practices) in the case of emergencies affecting the Facilities or the operation of the Facilities to counteract the effects where the Contractor considers immediate action is required to safeguard lives or property. In case such emergency was caused due to an Employer's Risk then the Employer shall reimburse such reasonable expenses that might have been incurred by the Contractor in relation thereto acting in accordance with Good Industry Practices.

**1.7. Notification:**

1.7.1. In the event of an emergency the Contractor shall forthwith notify the Employer of the emergency, the expenditures made and the operating actions taken.

1.7.2. If the Employer considers that an emergency has arisen in relation to the Facilities, the Employer may give written notice to the Contractor specifying the nature of the emergency which it has identified and the manner in which it requests such emergency to be rectified. The Contractor shall rectify such defect with all due diligence. If such emergency is on account of an Employer's Risk then the Contractor shall be reimbursed all costs and expenses reasonably incurred by the Contractor for any actions taken by it pursuant to such direction or notice. If the Contractor fails to comply with such direction or notice promptly, the Employer shall be entitled to procure that it or any third party takes such actions as may be necessary to remedy such breach by the Contractor. Any costs that may be incurred by the Employer in this regard shall be reimbursed to him in full by the Contractor and shall be a debt due to him from the Contractor.

## **1.8 Inspections:**

Notwithstanding any provisions of these Conditions and without prejudice to any of the other rights vested by the Contractor under these Conditions, The Employer shall have the right at all times to inspect the Facilities and the Contractor shall co-operate in every manner with the representatives of the Employer inspecting the Facilities and allow them access to every part of the Facilities and produce any records requested.

## **2. OPERATION OF THE FACILITIES:**

### **2.1. Operation of the Facilities:**

- 2.1.1. The Employer appoints the Contractor to perform and undertake the O & M Services and all other obligations set out and in accordance with these Conditions during the O&M Period. The Contractor accepts the appointment and acknowledges a duty to perform such obligations.
- 2.1.2. The Contractor shall be in complete charge of and have custody and control over and responsibility for the Facilities, and the Contractor shall perform or cause to be performed on behalf of the Employer all O & M Services for the Facilities and shall supply or cause to be supplied all materials required therefore in accordance with the O & M Standard.
- 2.1.3. The Contractor shall also acknowledge that the Employer and the Employer's Personnel and other contractors may be carrying out work at the Facilities and shall Endeavour to fully co-operate and work in a manner so as not to cause any obstruction or hindrance to them.
- 2.1.4. The Contractor shall remain an independent Contractor and not an agent, employee and nothing in these conditions or the O & M part of contract shall be deemed to create a joint venture between the Employer and the Contractor.

### **2.2. Responsibility of the Contractor:**

The Contractor shall be solely and exclusively responsible for:

- 2.2.1. Obtaining all necessary permits and consents required by Applicable Law or any governmental authority for the Contractor to carry out the O & M Services;
- 2.2.2. The procurement of all goods and services necessary to ensure compliance with its obligations under these Conditions,
- 2.2.3. Making available suitably qualified and trained personnel to perform the O & M Services;
- 2.2.4. Perform the O & M Services in accordance with the O & M Manuals and maintain the Facilities in good repair and condition and ensure that the Facilities are well and suitably maintained at all times in accordance with Good Operating Practices and in accordance with these Conditions;
- 2.2.5. Procuring and administering all chemicals and other consumables, tools, equipment, spare parts and other materials (which shall be of good quality and unused) necessary for the operation and maintenance of the Facilities;
- 2.2.6. Maintaining a system of records to identify all inventories related to the Facilities and preparing and providing to the Employer a complete accounting of such inventory for every fiscal quarter;



2.2.7. Arranging for the testing and recalibration of all scales, meters, gauges and other measuring devices at the Facilities on an annual basis and maintain the calibration certificate as records unless otherwise stated in the O & M Contract; and

2.2.8. for providing any and all relevant information required by the Employer.

### **3. DUTY OF CARE BY THE OPERATOR AND PERFORMANCE STANDARDS:**

#### **3.1. Duty of Care:**

3.1.1. The Contractor shall manage, operate and maintain the Facilities in accordance with Good Operating Practices and in accordance with the O & M Standard so that the Facilities are capable of meeting the outputs and specifications set out in the Contract.

3.1.2. The Contractor shall take full responsibility for the care of the Facility from the date of start of O & M period, till the end of the O & M Period.

3.1.3. If any loss or damage happens to the facility, during the O & M Period due to any breach by the Contractor of any of his obligations under these Conditions including any wilful misconduct, negligence and non-conformity with Good Operating Practices then the Contractor shall, at his own cost, rectify such loss or damage so that the facility conforms in every respect with the provisions of these Conditions.

3.1.4. The Employer shall be liable only in case of any damage caused due to any Employer's Risk.

### **4. OBLIGATIONS AND RESPONSIBILITIES OF THE EMPLOYER:**

The Employer shall employ the Contractor to provide the O & M Services and shall:

4.1. Follow the issue of certificate of successful commissioning, hand-over the custody of the facilities to the Contractor for its use during the O & M Period; and

4.2. Pay the Contractor all sums required to be paid in accordance with the terms of these Conditions. Notwithstanding anything else herein contained the Employer may set off any sums owed by the Contractor under the Contract for monies owed to the Contractor by the Employer under these Conditions or as a debt due from the Contractor.

### **5. REPRESENTATIONS AND WARRANTIES OF THE CONTRACTOR:**

The Contractor hereby represents for the benefit of the Employer as follows:

#### **5.1. Performance of O & M Services:**

5.1.1. That the Contractor has the required skills and capability to perform, and shall diligently perform, the O & M Services in a high-quality, timely and professional manner utilizing sound engineering principles and project management procedures in accordance with Good Industry Practices;

5.1.2. That the Contractor shall perform his obligations hereunder in accordance with the requirements of these Conditions and shall meet the Performance Guarantee; and

5.1.3. That it shall not use any spare parts or material that are not new and which shall be of a quality that is in accordance with Good Industry Practices.

**5.2. Knowledge of Adverse Information:**

5.2.1. As of the Commencement Date, Contractor is not aware of any facts, conditions or events which would affect the ability of Contractor to provide the O & M Services in accordance with these Conditions.

5.2.2. Contractor has familiarized itself with the nature and extent of the O & M Services required to be provided under these Conditions and with all other requirements under Applicable Law

**5.3. Organization, Standing and Qualification:**

Contractor is validly existing and in good standing under Applicable Law and has all necessary power and authority to carry on its business as presently conducted and to perform its obligations under these Conditions. Contractor is, or will be prior to the date on which the O & M Services are to be commenced duly qualified or licensed to provide these services.

**5.4. Due Authorization:**

5.4.1. Each of the execution, delivery and performance by the Contractor of all contracts entered into pursuant to these Conditions shall be duly authorized by all necessary action on the part of Contractor.

5.4.2. Neither the execution and delivery by Contractor of the O&M Contract, nor the consummation by Contractor of any of the transactions contemplated hereby, requires the consent or approval of, the giving of notice to, the registration with, the recording or filing of any document with, or the taking of any other action in respect of, any governmental authority or agency, except:

- a) Such as have been duly obtained, given, registered, recorded, filed or taken and are in full force and effect or are not yet required; and
- b) Filings and recordings expressly required pursuant to the O & M part of Contract. Contractor holds, or will obtain, any and all licenses, permits and approvals on a timely basis. Contractor has no reason to believe that any of those not yet required will not be readily obtainable or done in the ordinary course of business upon due application there for

**5.5. Litigation:**

In the aggregate, there are no pending or, to the knowledge of Contractor, threatened actions, investigations or proceedings before any court, governmental authority or arbitrator, which would have material adverse effect on the ability of Contractor to perform its obligations under these Conditions

**6. INSURANCE:**

**6.1. General Conditions:**

6.1.1. Without limiting the Contractor's obligations, responsibilities and liabilities under these Conditions, the Contractor shall be required to provide and maintain in full force and effect, at his expense the insurance coverage's specified in Schedule [5] throughout the O&M Period. Any deductibles on the insurance shall be to the account of the Contractor.

6.1.2. Maintenance of insurance shall not relieve the obligation of the Contractor to remedy or repair any damage to the Facility in case such damage is caused due to the fraud, negligence, will full misconduct or breach of any obligations of the Contractor under these Conditions (including failure to perform the O & M Services in accordance with Good Operating Practices) at the Contractor's cost promptly and regardless of the extent of settlement of claims by the underwriters or the time taken for settlement of claims. Any amounts not insured or not recovered from the insurers shall be borne by the Contractor to the extent any such liability or damage is caused due any breach of any obligations of these Conditions (including failure of the Contractor to perform the O & M Services in accordance with the Good Operating Practices) by the Contractor or any will full misconduct, negligence on the part of the Contractor.

6.1.3. The terms of the Insurance shall be approved by the Employer.

6.1.4. The Contractor within the 14 days from work order shall submit to the Employer evidence that the insurances required under Schedule [5] of these Conditions has been obtained as approved by the Employer.

6.1.5. The Contractor shall not make any alteration to the terms of any insurance without the prior approval of the Employer. If the Contractor fails to effect and keep in force any of the insurance it is required to effect and maintain under these Conditions, or fails to provide satisfactory evidence and copies of policies in accordance with this Sub-Clause, the Employer may affect insurance for the relevant coverage and pay the premiums due and may claim the same from the Contractor.

**The insurances;**

- a) shall be in the name of the Employer and the Employer shall be the sole loss payee,
- b) shall be extended to cover liability for all loss and damage to the Employer's property arising out of the Contractor's performance of his obligations or failure to do so under these Conditions and any fraud, gross negligence or wilful misconduct on his part, and

6.1.6. If the Contractor fails to effect and keep in force insurance which is required to be maintained under these Conditions, and the Employer neither approves the omission nor effects insurance for the coverage relevant to this default, any moneys which would have been recoverable pursuant to such insurance shall be paid by the Contractor.

6.1.7. The insurance shall cover all the electrical items, mechanical items, Instrumentation & automation items, all civil works, Storage structures etc. The insurance for the work of transmission main is optional. Since the responsibility of safety of all work lies with contractor, contractor may prefer to take the insurance of optional item also if deemed fit.

6.1.8 The natural calamity & fire etc. (standard perils) insurance shall be limited to Electrical & Mechanical Equipments / assets of the pumping station installed indoor and / or outdoor. The beneficiary shall be (BMC) on A/c of bidder and "Standard Workman Compensation Policy" of manpower engaged for the work by the bidder should be on Account of the bidder c/o BHAVNAGAR MUNICIPAL CORPORATION (BMC) TOWN. In short the bidder has to take adequate insurance cover for electro mechanical Equipment (value shall not be less than estimated and / or accepted value) and man power engaged for O & M work as per rates / monthly amount as per prevailing minimum wages act without fail. It would be contractor's sole responsibility to see that insurance policies are bought & renewed in time. Failure to comply

with this condition the contractor shall be entirely responsible for any litigation & financial liabilities.

## **7. INDEMNIFICATION:**

### **7.1. Loss or Damage to Facilities:**

The Contractor shall at its own expense make good any physical loss or damage to the Facilities occasioned by it in the course of the performance of its obligations under these Conditions if and to the extent such loss or damage is caused by the negligence, will full default or breach of statutory duty or failure to follow Good Industry Practices by the Contractor

### **7.2. Other Loss or Damage:**

7.2.1. Except as otherwise stated in this Clause 7.2 or covered by Clause 7.3, the Contractor shall indemnify, defend and hold harmless the Employer against any and all liabilities, losses, damages and claims of whatever kind and nature, including all related costs and expenses incurred in connection therewith, in respect of personal injury to or death of third parties or any employee of the Employer or the in respect of loss of or damage to any third party property or property belonging to employee of the Employer by:

- i) any breach by the Contractor of its obligations hereunder and
- ii) any negligence, wilful default or breach of statutory duty on the part of Contractor.

7.2.2. Except as otherwise stated in this Clause 7.2 or covered by Clause 7.3, the Employer shall indemnify, defend and hold harmless the Contractor for all claims and losses of whatever kind and nature, including all related costs and expenses incurred in connection therewith, in respect of personal injury to or death of third parties or of any person employed by the Contractor in respect of loss of or damage to any third party property or property belonging to any person employed by the Contractor to the extent that the same arises out of any Employer's Risk

### **7.3. Accidents or Injury to Workmen:**

7.3.1. The Contractor shall indemnify, defend and hold harmless the Employer or any Employer's Personnel against any and all claims for loss, damage and expense of whatever kind and nature (including all related costs and expenses) in respect of the death of or injury to any person employed by the Contractor in connection with the performance of the O&M Services and obligations hereunder except to the extent that such death or injury is caused by an Employer's Risk.

7.3.2. Neither Party shall be liable to the other Party for loss of use of the Facilities, loss of profit, loss of any contract or for any indirect or consequential loss or damage which may be suffered by the other Party in connection with the Contract, other than under Sub-Clause [13] and this Clause [7].

7.3.3. The total liability of the Contractor to the Employer, under or in connection with these Conditions other than as provided in Clause 7.3.2 & 14 shall not exceed the sum of the O & Price and the Delay Damages payable under these Conditions.

7.3.4. This Sub-Clause shall not limit liability of the Contractor in case of fraud will full default, gross negligence and liabilities arising due to breach of Applicable Law and the liability under another Clause of these Conditions that might impose a greater liability on the Contractor.

## **8. INSPECTION:**

### **8.1. General Provisions:**

8.1.1. The Employer may check the operation of the Facilities or designate an organization of his choice to carry out inspections regularly. The Employer or the organization appointed by him shall check that the Contractor is performing the tasks for which he is responsible with due diligence. The Contractor shall at his cost provide all the assistance the Employer requires to complete these inspections

8.1.2. Before any inspection, the Employer shall give prior notice to the Contractor, indicating the name(s) of the person(s) empowered to carry out such inspection in the name of the Employer

### **8.2. Measurement and Analysis:**

8.2.1. The Employer has the right to perform any analysis or inspection he deems necessary.  
Before any inspection, the Employer shall give a prior written notice to the Contractor.

8.2.2. The water quantity, for any such test, analysis or inspection shall be measured by flow-meters installed at the Facility, which are acceptable to the Employer, provided they are maintained and calibrated as per requirements of this contract.

8.2.3. Other parameters like Pressure temperature and speed shall be measured by certified calibrated meters provided by the contractor and, which are acceptable to the Employer

8.2.4. The flow meters shall be inspected and certified upon their availability by the Employer and the Contractor. Thereafter, the said meters shall be tested and their accuracy verified once in every six (6) months by the Contractor. After each inspection, the flow-meters shall both be sealed in the presence of representatives of the Employer and the Contractor in a manner that is adequate to prevent the tampering of said meters by any person.

8.2.5. The Contractor shall be responsible for the security and protection of flow-meters at the designated point. If there is any malfunctioning of the meters, it should be repaired at the Contractor's cost, as per manufacturer's technical recommendations.

### **8.3. Plant Complex Visits:**

8.3.1. At the end of each month, or at the initiative of the Employer, a visit shall be organized so that both Parties can check the condition of the installations at the Facilities.

8.3.2. A report shall be drawn up to record the opinions of both Parties. The Employer reserves the right to call in equipment manufacturers or specialized technicians for these visits.

8.3.3. These visits shall provide an opportunity for examining maintenance programs and operating procedures and improvements requiring additional investments.

8.3.4. Any test, visit, analysis or inspection and any approval thereof shall not in any way alter/modify or dilute the responsibility of the Contractor to fulfil his obligations under these Conditions.

## **9. RECORDS AND REPORTS:**

### **9.1. Operating Records and Data:**

The Contractor shall:

- 9.1.1. Prepare and maintain, on a current basis and in accordance with generally accepted Indian accounting principles, proper, accurate and complete books and records and accounts of all transactions related to the Facilities including a log book at the site which shall contain inter alia the following details
  - a) Reading from the different meters, indicators and recorders (including but not limited to consumption of energy, volume of water conveyed, operating times of the different items of equipment etc which may be updated on a daily basis); and
  - c) Report of visits by persons other than those of the Employer and the Contractor to the Facility.
- 9.1.2. Establish and maintain a weekly and monthly reporting system to provide storage and ready retrieval of operating data relating to the Facilities, including such information necessary to verify calculations made pursuant to these Conditions or the O & M part of contract and provide the same to the Employer on a monthly basis
- 9.1.3. Provide to the Employer or such persons notified by it access to the Facilities and to data in relation to the Facilities, at all times.
- 9.1.4. At the Employer's request, at the end of every month, make a copy of the system performance data for that month as recorded by the instrument and control system on CDs / DVDs and printed document there from and deliver the same to the Employer with one week.
- 9.1.5. Provide support to the Employer to meet the data requirements of all competent authorities and under Applicable Law.

### **9.2. Reports:**

- 9.2.1. The Contractor shall submit the reports mentioned in Schedule [4] at times indicated in the said Schedule.
- 9.2.2. The Contractor shall also provide the Employer with such reports as are required by the Employer and shall comply with all reporting requirements prescribed under these Conditions and the O & M part of Contract. In addition, the Contractor shall submit the following information to the Employer.
- 9.2.3. Upon obtaining knowledge thereof, shall submit prompt written notice of:
  - i) Any litigation or material claims, disputes or actions, threatened or filed, concerning the Facilities or the services to be performed hereunder;
  - ii) Any refusal or threatened refusal to grant, renew or extend or any action pending or threatened that might affect the granting, renewal or extension of any clearance, permit or license;
  - iii) Notwithstanding the aforementioned materiality, all penalties or notices of violation issued by any authority under Applicable Law;

9.3. The Contractor shall promptly submit to the Employer any material information concerning new or significant aspects of the operations of the Facilities, any material complaint about the Facilities from any person or entity with a benefice complaint who complains directly to the Contractor and, upon Employer's request, shall promptly submit any other information concerning the Facilities or the services performed by the Contractor.

9.3.1. The Employer may from time to time specify any changes to be made to any of the format of any report or plan required hereunder.

9.3.2. If the Contractor is required by any Applicable Law to produce any projection, report or another document relating to the provision of the O & M Services of the Facilities or the Employer requests a report regarding other information relating to the Facilities, the Contractor shall prepare a draft of such document at the request of the Employer, as soon as practicable and in any event within any time limit prescribed by Applicable Law.

9.3.3. If the Contractor is required by any Applicable Law to produce any projection, report or another document, it shall prepare such report diligently and submit the same to the Employer as soon as possible thereafter. Wherever practicable, such reports shall be submitted to the Employer for review seven days before the same is issued. The Contractor shall take into account any comments or revisions proposed by the Employer thereon.

#### **9.4. Procurement:**

9.4.1. The Contractor is responsible for the procurement of all goods and services necessary to ensure compliance with its obligations under these Conditions.

9.4.2. The Contractor shall procure and keep in readiness spare parts required for urgent repairs, materials, supplies and other consumable items, and maintains an adequate inventory thereof Facilities.

9.4.3. The Contractor shall submit a report for every fiscal quarter to the Employer reflecting the status of the inventory for spare parts, materials and other consumable items.

9.4.4. The Contractor shall procure the Alum, Lime and Chlorine Gas. Necessary arrangement for procurement of Chlorine Gas in tonners/cylinders shall be made by the contractor. No extra charges shall be paid for hiring/Purchasing the tonners/Cylinders.

#### **10. PAYMENT:**

10.1. The Contractors request(s) for payment shall be made to the BHAVNAGAR MUNICIPAL CORPORATION (BMC) in writing, accompanied by invoice(s) along with presence sheet of personnel of particular month duly certified by our Engineer on site, claims etc. as appropriate.

10.2. Payment shall be made by BHAVNAGAR MUNICIPAL CORPORATION (BMC) as per procedure subsequent to the submission of such invoice(s)/ claim(s) by the Contractor.

10.3. The BHAVNAGAR MUNICIPAL CORPORATION (BMC) will deduct from the amount payable to the Contractor, any amount paid by BHAVNAGAR MUNICIPAL CORPORATION (BMC) on behalf of the Contractor (e.g. telephone bills, GVCL penalty for Power factor or any other dues and liquidated damages as per clause and, as per tender terms and condition. Any telephone

bills submitted by telephone department, the payment of telephone bills will be borne by Contractor.) BHAVNAGAR MUNICIPAL CORPORATION (BMC) will provide telephone facilities on site.

10.4. Contractor will provide Security Guards services for all assets in BHAVNAGAR MUNICIPAL CORPORATION (BMC) head works premises for 24 hours of a day and 365 days of the year for the whole contractor period'

10.5. The contractor will get O & M work payment only for the deployed staff and insurances during the period of defect liability for pumping machinery & electromechanical works. The base for payment will be approved estimated rates

## **11. LIQUIDATED DAMAGES:**

### **11.2. Leakages in pipeline.**

The contractor shall ensure that leakages from transmission mains due to faulty air release valves, scour valves, joints, damage to pipeline are urgently attended.

### **11.3. For Higher Power consumption, due to lower pump efficiency: (If Applicable)**

At Testing / Commissioning stage, the following minimum guaranteed parameters must be achieved for the pumps and motors installed for this work shall be as under:

- a. For each pump, the minimum efficiency shall be as mentioned in contract / HIS.
- b. For each motor, the minimum efficiency shall be as per contract.

**Note:** No negative tolerance shall be allowed in above.

During Testing/ Commissioning, each pump and motor set shall be tested and efficiency shall be worked out up to TWO Decimal. The combined efficiency of each pump and motor set shall also be worked out. If the guaranteed combined efficiency of each pump motor set found lesser than the specified above, then the pump and/or motor set shall be liable for rejection. Therefore, the contractor shall rectify/ repair / replace the system/ part and retesting/ re- commissioning to be carried-out for the pump and/or motor set within a week period. Thereafter, In case, the guaranteed combined efficiency of each pump and motor set not meeting the above guaranteed combined efficiency, then the pump and/ or motor set shall be rejected. No any claims from the Contractor against this shall be entertained.

### **11.4. For delay in Restoration:**

The Restoration Period shall be subject to the following liquidated damages & penalties for its failure to carry out.

### **11.5. For the non-compliance of employment of key personnel:**

If the successful bidder does not recruit/depute the key personnel identified as per schedule, then liquidated damages will be deducted at double the rate of applicable scale of BHAVNAGAR MUNICIPAL CORPORATION (BMC)/Local body or the rate quoted, whichever is higher.



## **12. FORCE MAJEURE:**

In this Clause, "Force Majeure" means an event or circumstance, which materially and adversely affects the ability of the affected Party to perform its obligations.

- i) Which is beyond a Party's control,
- ii) which such Party could not reasonably have provided against before entering into the O & M part of Contract;
- iii) which, having arisen, such Party could not reasonably have avoided or overcome, and
- iv) which is not attributable to the other Party, Force Majeure may include, but is not limited to, exceptional events or circumstances of the kind listed below, so long as conditions (a) to (d) above are satisfied:
  - v) war, hostilities (whether war be declared or not), invasion, act of foreign enemies)
  - vi) rebellion, terrorism, revolution, insurrection, military or usurped power, or civil war,
  - vii) riot, commotion, disorder, strike or lockout by persons other than the Contractor's Personnel and other employees of the Contractor;
  - viii) As result of war, explosive materials, harmful radiation or contamination by radioactivity, except as may be attributable to the Contractor's use of such munitions, explosives, radiation or radio-activity, and
  - ix) Natural catastrophes such as earthquake, hurricane, typhoon or volcanic activity. Heavy rainfall, cyclone, strike and lockout.

### **12.1. Notice of Force Majeure:**

- 12.1.1. If a Party is or will be prevented from performing any of its obligations under these Conditions by Force Majeure, then it shall give notice to the other Party of the event or circumstances constituting Force Majeure and shall specify the obligations, the performance of which is or will be prevented. The notice shall be given within 7 days after the Party became aware, or should have become aware, of the relevant event or circumstance constituting Force Majeure.
- 12.1.2. The Party shall, having given notice, be excused performance of such obligations for so long as such Force Majeure prevents it from performing them.
- 12.1.3. Notwithstanding any other provision of this Clause, Force Majeure shall not apply to obligations of either Party to make payments to the other Party under the Contract.

### **12.2. Duty to Minimize Delay:**

- 12.2.1. Each Party shall at all times use all reasonable endeavours to minimize any delay in the performance of the Contract as a result of Force Majeure.
- 12.2.2. A Party shall give notice to the other Party when it ceases to be affected by the Force Majeure.
- 12.2.3. Notwithstanding anything else herein contained the Employer may terminate the O & Part of Contract if the Force Majeure event continues for more than a period of 90 days.

### **13. TERMINATION:**

Termination shall mean the termination of the O&M part of Contract by the Employer or the Contractor in accordance with Clause 13.1 or 13.2 respectively.

#### **13.1. Termination by Employer:**

The Employer may terminate the O & M part of Contract by notice on:

- i) the dissolution or insolvency of the Contractor, pursuant to an order of a court or the bankruptcy of the Contractor; or;
- ii) if 45 days having passed since the Contractor is in material breach of his obligations under these Conditions, or
- iii) if the Contractor ceases to carry on its business; or
- iv) abandonment;
- v) The subsisting Force Majeure event as provided in Clause 12.2.3 above.

#### **13.2. Payments upon Termination:**

13.2.1. Upon termination or as soon as practicable thereafter an account shall be taken of the net amount owing from the Employer to the Contractor or from the Contractor to the Employer (as the case may be). The Employer shall forthwith pay to the Contractor (if the balance is due to the Contractor) all moneys due to the Contractor. If the account shows a balance due to the Employer from the Contractor, the Contractor shall forthwith pay any such balance to the Employer.

13.2.2. As part of the calculation made pursuant to clause 13.1 of the amounts due to the Contractor on Termination, the following amount shall be taken into account.

13.2.2.1. The portion of the O & M Price outstanding and payable by the Employer for the period prior to the Termination;

13.2.2.2. Any Delay Damages or indemnities for which the Contractor would be liable under these conditions up to the date of Termination;

13.2.2.3. Any other amounts due to the Employer under these Conditions by the Employer including return of any amount of the O & M Price paid in advance by the Employer to the Contractor under Clause [10].

13.3. In case of a Termination by the Employer in accordance with Clause 13.1 the Employer may recover other than the amounts due to him under Clause 13.2.2.2, any costs incurred by him in finding any replacement contractor.

#### **13.4. Successor to the Contractor upon Termination:**

- 13.4.1. The Contractor shall use all endeavours to facilitate the appointment and commencement of duties of any person to be appointed by the Employer to operate and maintain the facilities (the "Successor Contractor") so as not to disrupt the normal Operation & Maintenance of the facilities and shall provide full access to the Facilities and to all relevant information, data and records relating thereto by the Successor Contractor and its representatives and accede to all reasonable requests made by such persons in connection with preparing for taking over the Operation & Maintenance of the Facilities;
- 13.4.2. Promptly after Termination, the Contractor, shall deliver to (and shall, with effect from Termination, hold on trust for and to the order of) the Employer or (if so required by the Employer by written notice) to the Successor Contractor all property in its possession or under its control owned by the Employer or leased or licensed to the Employer;
- 13.4.3. The Contractor shall transfer to the Successor Contractor, as from the date of Termination, its rights as the Contractor under all contracts entered into by it in the performance of its obligations under these Conditions or relating to the Operation & Maintenance of its obligations under these Conditions or relating to the Operation & Maintenance of the Facilities. Pending such transfer, the Contractor shall hold its rights and interests there under for the account and to the order of the Successor Contractor.
- 13.4.4. The Employer shall be reimbursed any cost and expenses incurred by the Employer due to default of the Contractor in discharging its obligations under this Clause [13].
- 13.4.5. The Contractor shall, upon Termination of the O & M part of Contract, co-operate with the Employer and the Successor Contractor and comply with all reasonable requests thereof, including the execution of documents etc.
- 13.4.6. Upon Termination of the O & M part of Contract on expiry of the terms of the O & M part of Contract, the Parties agree that: -
- 13.4.7. The Contractor will use reasonable efforts to ensure a transition to the next Contractor that will avoid operating difficulties for the Facilities.
- 13.4.8. For a six (6) month period after Termination or six (6) months prior to the expiration of the O & M part of Contract, the Contractor shall, at his expense, provide sufficient assistance to the Employer in the hiring and training of replacement personnel for those Facilities.
- 13.4.9. Notwithstanding anything else herein contained the Employer shall be entitled to terminate the O & M part of Contract, at any time at the Employer's convenience, by giving notice of such termination to the Contractor. The termination shall take effect 28 days after issuance of the notice of termination.
- 13.4.10. On the expiry of the O & M Contract or Termination of the O & M Contract, all the installations, works and equipment placed under the Contractor's responsibility shall be handed over to the Employer, at no cost, in good working order, except for normal wear and tear. The Employer may perform any inspections; tests or expert appraisals he shall consider

necessary with a view to checking that the property is in good working order. The Contractor shall also hand over any unutilized spares, consumables etc. Purchased for the Facilities.

13.4.11. At the end of O & M Period, the Contractor shall be entitled to receive an O & Completion Certificate within thirty (30) days

13.4.12. The delivery of such O & M Completion Certificate will relieve the Contractor from his responsibility as regard to the operation & maintenance of the Facilities and confirm that the Contractor has fulfilled all of his obligations under these Conditions.

## **14. CONFIDENTIALITY AND INTELLECTUAL PROPERTY RIGHTS:**

### **14.1. Confidential Information:**

Subject to Clause [14.2], the Contractor shall at all times during the O & M Period and for a period of Two years after that:

14.1.1. use all efforts to keep all information regarding the terms and conditions and any data or information acquired under or pursuant to these Conditions confidential and accordingly shall not disclose the same to any other person; and

14.1.2. not use any document or other information (whether technical or commercial) obtained by them it by virtue of these Conditions or the Contract concerning the Employer's undertaking for any purpose other than performance of the obligations under these Conditions; Provided that the provisions of this Clause 14.1 shall not apply to information, which at the time of disclosure was in the public domain other than by breach at the foregoing obligations of confidentiality.

### **14.2. Disclosure of Confidential Information:**

The Contractor shall not be entitled to disclose the terms and conditions of these Conditions and any data or information acquired by it under or pursuant to these Conditions without the prior written consent of the Employer unless such disclosure is made in good faith:

14.2.1. To any outside consultants engaged by or on behalf of the Contractor and acting in that capacity, having made them aware of the requirements of this Clause [14].

14.2.2. To the lenders, any security trustee, any bank or other financial institution and its advisers from which the Contractor is seeking or obtaining finance, having made them aware of the requirements of this Clause [14].

14.2.3. to the extent required by Applicable Law;

14.2.4. To any insurer under a policy of insurance; or

14.2.5. to the Contractor's Personnel having made them aware of the requirements of this Clause [14];

### **14.3. Information:**

The Contractor shall:

14.3.1. make available to the Employer without charge such materials, documents and data of any nature (except any materials documents and data protected by legal privilege or which is subject to any duty of confidentiality to any third party) acquired or brought into existence in any manner whatsoever by it as the Employer may request for the purposes of exercising its rights or carrying out its duties in respect of the Facilities or exercising its rights under or performing its obligations under these Conditions.

14.3.2. make available to the Employer other such materials and documents and data acquired or brought into existence by third parties as the Employer may request for the purposes referred to in sub-paragraph (l) above

#### **14.4. Third Party Intellectual Property:**

The Contractor shall:

14.4.1. Procure that any intellectual property owned or developed by third parties and utilized by the Contractor in connection with the performance of its obligations under these Conditions is licensed to the Contractor for the purposes of the Operation & Maintenance or repair of the Facilities and otherwise for the purposes of the Facility; and

14.4.2. Ensure that the Contractor shall have the right to sub-license that intellectual property to the Employer and any Successor Contractor for use in connection with the operation, maintenance and repair of the Facilities. These licenses should survive termination under these Conditions. The Contractor shall grant all such sub-licenses. If any fee is payable to the licensor in consideration of any such sub-license, the Contractor shall pay such amount during the O & M Period and each such license shall be irrevocable

14.4.3. Indemnify and hold harmless the Employer against any action, claims, and damages, losses caused to the Employer by the owner of the Intellectual Property due to the allegedly unauthorized or improper use of this intellectual property by the Contractor for the fulfilment of his obligations under these Conditions.

#### **14.5. Successor Contractor:**

If the licenses and sub-licenses of intellectual property granted under this Clause respectively shall survive termination of the O & M part of Contract in accordance with the terms of this Clause, the Employer shall be permitted to grant sub-licenses of intellectual property licensed to it there under to any Successor Contractor of the Facilities for use only in connection with the operation, maintenance and repair of the Facilities provided that such Successor Contractor concludes an agreement with the Contractor or, as the case may be, the licensor of any such intellectual property on terms which it may reasonably require any payment in connection with those sub-licenses. Where intellectual property has been sub-licensed to the Employer under this Clause and such sub-license is not subject to revocation by the Contractor there under, the Contractor shall take such actions as the Employer may request in connection with the grant of licenses to any Successor Contractor for the purposes set out above.

## **15. ARBITRATION AND DISPUTE RESOLUTION:**

### **A) SETTLEMENTS OF DISPUTES:**

- i) If any dispute of any kind whatsoever may arise between the Employer and the Contractor in connection with or arising out of the Contract, including without prejudice to the generality of the foregoing any question regarding its existence validity or termination, or the execution of the works whether during the progress of the work or before or after the termination, abandonment or breach of the contract, the either parties shall have to raise/ refer their disputes/ differences / claims in writing to the other party, within a period of 30 days on occurrence of such events, to resolve any such dispute or difference.
- ii) The contractor shall have to refer their disputes to the concerned In Charge Engineer. After receipt of the dispute from the contractor under this clause, the Engineer In-charge of works shall have to submit their report to the Executive Engineer within a period of 90 (Ninety) days. The Executive Engineer shall offer an opportunity to the contractor to be heard and to furnish evidence in support of their disputes within 30 (Thirty) days after the receipt of the disputes duly compiled by In Charge Engineer. After hearing the contractor regarding their disputes along with their documentary support and the concern In Charge Engineer of the work, the Executive Engineer shall give decision within a period of 120 (One Hundred Twenty) days or the contractor is dissatisfied with the decision within 120 (One Hundred Twenty) days after the contractor has been heard. If The Executive Engineer does not give decision within 120 (One Hundred Twenty) days or the contractor is dissatisfied with the decision of the Executive Engineer, the contractor shall within 30 (thirty) days after receiving the instruction or decision, appeal to the BHAVNAGAR MUNICIPAL CORPORATION (BMC). After hearing both the parties the BHAVNAGAR MUNICIPAL CORPORATION (BMC) will give reasonable decision within 180 (One Hundred Eighty) days from the date of receipt of appeal by the contractor. The decision of the BHAVNAGAR MUNICIPAL CORPORATION (BMC) shall be final and binding on both the parties. If the BHAVNAGAR MUNICIPAL CORPORATION (BMC) does not give decision within 180 (One Hundred Eighty) days after the date of appeal by the contractor, the contractor will have right to refer the dispute to arbitration tribunal as per provision of clause "Arbitration".

### **B) ARBITRATION:**

- i) Subject to Clause (A) mentioned above and in the event of any dispute or difference arising out of or in any way relating to all concerning these contracts or the construction or effect of these contracts shall on the initiative of either party to the contract be referred to "The Arbitration Tribunal Constituted Under The Provision Of Gujarat Public Work Contract Dispute Arbitration Tribunal Act, 1992".
- ii) The arbitration shall be conducted in accordance with the provisions of the "Gujarat Public Work Contract Dispute Arbitration Tribunal Act, 1992" or statutory modifications there on. The Arbitration shall be held at such place and time as the Tribunal may determine.
- iii) The decision of the tribunal shall be final and binding upon both the parties. The expenses of the arbitration shall be paid as may be determined by the Tribunal.

- iv) Performance of the contractor under the contract shall if reasonably be possible, continue during the arbitration proceedings and payments due to the contractors by the owner shall not be withheld, unless they are the subject matter of the arbitration proceedings.
- v) The dispute is deemed to have arisen on the date, on which BHAVNAGAR MUNICIPAL CORPORATION (BMC) shall not give his decision as mentioned above in Clause (A) or in the case of intimation of any decision, the contractor intimates in writing that he has finally refused to accept the offer made by the BHAVNAGAR MUNICIPAL CORPORATION (BMC).
- vi) Where any dispute arises between the parties to the work contract either party shall irrespective of whether such works contract provides for any arbitration or not, refer, within one year from the date that BHAVNAGAR MUNICIPAL CORPORATION (BMC) has not given the decision as per Clause (A) such dispute in writing to the Tribunal for arbitration in such form and accompanied by such documents or other evidence any by such fees, as may be prescribed.
- vii) Legal jurisdiction: All question relating to this Tender shall be governed by the law of India and shall be subject to jurisdiction of court at Gandhinagar, Gujarat.

**16. GOVERNING LAW AND JURISDICTION:**

These Conditions and the O & M part of Contract shall be governed in accordance with Indian Law. The Contractor agrees that any legal action or proceedings arising out of these Conditions may be brought in the courts or tribunals at Gandhinagar in India and irrevocably submits themselves to the jurisdiction of such courts or tribunals. The Employer may, however, in its absolute discretion commence any legal action or proceedings arising out of these Conditions in any other court, tribunal or other appropriate forum, and the Contractor hereby consents to such jurisdiction.

**17. MATERIAL, TOOLS AND TEST EQUIPMENTS:**

All materials required for the O&M of the project shall be new and of best quality and suitable for the purpose intended. These shall be got approved from the Engineer in charge before use.

**17.1. Electricity Supply:**

Contractor shall keep good liaison with concerned Electric Authority for power supply in case of electric power failure (break down/shut down) it shall be the responsibility of the agency to inform all the concerns as well as to contact concern authorities to restore the power supply. The contractor shall keep good liaison with concern substation for voltage Up and Down and restore the power. The vehicle kept at site by the contractor shall be provided for this purpose along with operation and maintenance staff in case of requirement as per direction of Engineer in charge or his representative without any extra claims.

**17.2. Work Order Book:**

A bound half sheet size work order book shall be provided by the contractor and handed over to the owner for maintaining at the work site. This shall be a permanent record. The contractor or his Resident engineer shall sign against instructions & orders recorded by the Engineer in-charge or his representative for the maintenance work. He may take out a copy thereof if necessary. He shall take prompt action as per the instruction/orders of the owner and necessary compliance shall be recorded against each instruction/order.

**17.3. Electrical Installations:**

All electrical work shall be carried out as per the provisions of Indian Electricity Act, Indian Electricity Rules, Instructions and requirement of authority/authorities i.e. Electrical Inspector and Gujarat Urja Vitran Nigam Limited or as mentioned in the Volume of General Condition for contract.

**17.4. Accident on the works:**

The contractor shall be fully responsible for any accident that may occur to the labour on his work on duty and report the same to the Engineer in charge and concerned Govt. labour department authority and shall pay all necessary compensation as per rules. Contractor shall also be fully responsible for any loss to any individual or public property occurred due to him or his worker's negligence under the scope of this contract.

**17.5. Use of site:**

The contractor shall not unreasonably encroach the site with materials and equipment. The contractor shall not use land for any private purpose.

**17.6. Compliance:**

The contractor shall be bound by all ordinance acts, codes, rules, regulations and orders of which in any way affects conduct of works, or workmen engaged for the work. The contractor shall be responsible for any violation of any govt. rules & regulations. It shall be the responsibility of the contractor against any claim or liability arising from violation of above.

**17.7. Accommodation for Staff:**

Contractor shall provide necessary accommodation to their labours & engineers at his own cost. However, owner shall give vacant staff quarters available at each head works, subhead works or available in the jurisdiction at the rate prescribed by the owner.

**17.8. Transportation:**

Contractor shall have to make his own arrangements for conveyance of his staff at his cost. No facility will be provided by the owner.

**17.9. Medical:**

Contractor shall provide medical facility to his staff at his cost.

**18. CONTRACTOR'S STAFF & THEIR CONDUCT ETC.:**

**18.1. Nationality & Address:**

All employees shall be Indian Nationality and it shall be contractor's responsibility to give temporary and permanent address: Convicted or penalized person shall not be employed.

**18.2. Salary to Employees:**

Contractor shall strictly follow labour laws and shall also ensure regular monthly salary payment to his staff. The owner will not take any liability of any of his employees appointed for operation and maintenance under this contract. Contractor shall submit monthly certificate for full payment to his staff on or before 10th of every month. Owner reserves the right to conform the contents of the certificate from contractor's employee for their last pay. The owner will not be responsible for any delayed payment/ compensation/ overtime or any other claims by employees of contractor during the tender period and even after the tender period.



**18.3. Identification Dress Code with Badge/ Identity Card:**

Contractor shall have to provide special dress code with identification badge with name plate strip to be displayed on front pocket to each staff as approved by Engineer in charge along with Identity Card etc.

**18.4. Holidays and Leave:**

Holidays and leaves shall be given to staff as per relevant labour rules. During holidays/ causal leave/earned leaves etc. and contractor shall arrange for the substitute. The owner shall not make any separate payment of overtime for these substitutes provided by the contractor during above periods.

**18.5. Conduct:**

All employees of the contractor shall follow the instruction of Engineer in charge. If any employee misbehaves with Engineer in charge he/she shall be immediately removed from duty and substitute for that shall be employed by the contractor. If contractor fails to do so, non-refundable penalty of Rs.200/- (Rupees Two hundred only) per day per such case will be levied, this amount shall be recovered from the bill or any due amount of Agency.

**18.6. Visitors:**

The plant is one of its own kinds. Visitors are expected to visit this plant. It is expected that all staff and Engineers be present and follow the directives of Engineer in charge.

**SCHEDULE 1**  
**Operation and Maintenance Services**

**The Contractor shall be required to perform the following services under these Conditions:**

The Contractor shall be responsible for corrective maintenance of civil, hydraulic, mechanical, electrical and computing equipment as well as miscellaneous equipment.

The Contractor shall be responsible for carrying out regular servicing and lubrication of rotary machines, complying with maintenance instructions as defined in the Operation and Maintenance Manual and ensuring that electromechanical equipment and motors operate correctly at all times.

The Contractor shall ensure that measurement systems are calibrated, within the valid period of certification and operate correctly at all times.

The Contractor is responsible for the maintenance of the landscaped areas inside the Employer plant fences.

The Contractor shall be responsible for maintenance of civil structures including intakes, pump houses, reservoirs, administration buildings, workshops, garages, etc.

The Contractor will operate and maintain in a state of continuous operational readiness all plant and systems to meet the flow requirements. It shall remain the Contractor's responsibility to ensure that plant systems are at all times able to operate to the maximum capacity of the installed duty plant.

Provided here are certain standard services that BHAVNAGAR MUNICIPAL CORPORATION (BMC) could require. However, BHAVNAGAR MUNICIPAL CORPORATION (BMC) may wish to review this and make changes depending on the exact nature of services they require from the Contractor.

The Contractor shall be entitled to appoint a representative who shall together with Employers Representative on the last day of each month or if such day is not a working day on the following day, jointly carry out a reading of water meters and jointly certify the record of such readings.

For the duration of the O & M period, the Contractor will be responsible for the supply and control of lubricants, spare parts and consumable materials excluding electrical power, necessary for the continuous operation of the works.

The Contractor will manage the consumables and utilities services to ensure their most economic consumption and to minimize wastage.

The quantities of all the unutilized spare parts and consumable materials will be fully handed-over to the Employer at the end of the O&M period.

The store's inventory, the issuing and recording of spare parts will be the responsibility of the Contractor.

The Contractor is also responsible for providing spare parts and material required for the operation and maintenance during the operation period, and shall bear the cost for the same, including the cost of storing and safeguarding.

The Contractor will make all necessary arrangements to ensure the continuous supply of spare parts and material for the works; and the rate of advance supply of these materials shall be in such quantities and amounts as would ensure uninterrupted operation.

All the furniture and administrative office equipment etc. required shall be furnished by the Contractor. Costs of operating administrative office and supplies shall be borne by the Contractor.

The Contractor shall take out subscriptions for standard telephone lines/ wireless sets. Running cost for the telephone / wireless sets will be borne by the Contractor.

Cost of operation and maintenance and housekeeping of housing complexes including domestic water supply and drainage, roads, gardens, electrical installations, etc. will be borne by the contractor.

The Contractor will provide staff personnel for the full term of O & M as per schedule of establishment given in Annexure- I.

Contractor has to do painting to Every Civil Structures with the same quality of paint used while construction of structures or as directed by Engineer in charge at an interval of every two and half years. If Contractor fails to do same, this work will be carried out by BHAVNAGAR MUNICIPAL CORPORATION (BMC) and expenditure occurred will be deducted from contractor's Bill.

## SCHEDULE - 2

### Performance Guarantees

~~The Contractor shall guarantee that:~~

- ~~a) The total transmission losses in the raw water and / or treated water system shall not exceed 5%.~~
- ~~b) The total reduction in duty point efficiency of the pumps after one year of operation shall not exceed 0.25% than the guaranteed efficiency of each type of pump.~~

~~(The Bidder to fill the format and specify guaranteed efficiency of each type of pump)~~

### **SCHEDULE- 3**

#### **O & M Price**

The Contractor shall be paid at the quoted rates per month. The amount withheld against them from the bill of the main contract shall be released by end of each year.

## **SCHEDULE- 4**

### **REPORTS**

#### **MONTHLY REPORT**

The monthly report shall include but not be limited to:

Volume of water conveyed, to each consumers off-take point end. All the problem areas in the facility,

O & M works carried out during the month.

Electricity consumed totally. **(If Applicable)**

Monthly materials consumption statement

#### **SEMI- ANNUAL REPORT**

A semi-annual report shall include the measurement of noise level at the site boundary at plant, to be indicated by the Employer.

#### **ANNUAL REPORT**

The Contractor shall provide the Employer by March 31 of the current year (n) with an annual report for the preceding year (n- 1). This report shall include:

\*All technical statistics related to plant operation as supplied by the operation;

\*A statement of works carried out during the preceding year n-1 in connection with the contractor's obligations under these conditions.

**NOTE:** The Employer may consider if it requires these reports or requires reports and provide for the same. This will need to be looked at in the light of reporting requirements in these Conditions. The Employer will also need to determine what information is required in these reports

## **SCHEDULE- 5**

### **Insurances**

#### **Insurance against Injury to Persons and Damage to Property;**

The Contractor shall insure against each liability for any loss, damage, death or bodily injury which may occur to any physical property (mechanical, electrical, automation work, all civil works, Storage etc. excluding pipe line) or to any person which may arise out of the Contractor's performance of his obligations under these Conditions during the O & Period.

This insurance shall be for a limit of per occurrence of not less than the amount of Rs. 5 Lacs, with no limit on the number of occurrences.

#### **Insurance for Contractor's Personnel;**

The Contractor shall effect and maintain insurance against liability for arising from injury, sickness, disease or death of any person employed by the Contractor or any other of the Contractor's Personnel.

The Employer shall also be indemnified under the policy of insurance, except that this insurance may exclude losses and claims to the extent that they arise from any act or neglect of the Employer or of the Employer's Personnel.

Contractor shall have to take insurance for Electrical, Mechanical and instrumentation equipment under this packages and whereas the insurance of other component like pipeline will be optional. This General Insurance for the work will be in the name of BHAVNAGAR MUNICIPAL CORPORATION (BMC). The depreciated value is to be considered for the purpose of insurance for respective year. The insurance for skilled, semi- skilled and unskilled labour is compulsory. The same should be taken by agency as per labour act laws in force.

**SECTION B**

**SPECIAL TERMS AND CONDITIONS**



## **SECTION B:**

### **SPECIAL TERMS AND CONDITIONS OF CONTRACT** **FOR OPERATION & MAINTENANCE**

#### **PART- 1: Technical Conditions**

- 1) The operation and maintenance of all the works included in this tender as per details given should be carried out by contractor at his own cost.
- 2) All the storage structures situated at H.W. sites should be kept in fill-up condition as per requirement during the full day period. (24 Hours) (If Applicable)
- 3) A weekly report for supply of water with Quantity should be submitted to the office of the Engineer in charge concerned. A certificate of the concern in-charge Engineer for daily receipt of required Quantity of water at each head works / off take points at the end of week should be received and submitted with weekly report.
- 4) Electric bill for running the plant at head works site will be paid by department. Bill should be submitted to office for payment as soon as received from concern GVCL. If charges for delay in payment, levied on account of late payment, due to late submission of bill by contractor, then the same will have to be paid by contractor.
- 5) All the required electrical goods / fixtures like bulb, tube light, chock, starter, fuse, wire etc. required for operation and maintenance shall be procured by contractor at his own cost and lighting arrangement should be kept in good condition.
- 6) At the time of breakage in pipeline or valves for repairing purpose contractor shall have to make arrangement at his risk and cost for labours, fitter, required all materials like rubber packing, nut, bolts, gland, all required parts of valves in Plant & transmission main including transportation arrangement like pickup van, Jeep, welding machine, welding rods, Tractor etc. should be provided by contractor at his own cost. All consumable material should be of standard quality as approved by Engineer-in-charge of work.
- 7) All type of rising main and gravity main including chambers should be maintained and repaired by contractor at his own cost.
- 8) At the time of repairing or replacement of Pipes and valves required for repairing or replacement after verification by concerned engineer or his representative, fitting work of pipe or valves shall be carried out by contractor at his own cost including, labour, excavation cutting, fitting, welding, testing, refilling etc. complete. During the repairing work scrap materials received should be returned to concern departmental store at the cost of contractor after duly entering in register. Repairing work shall be started within

One hour after breakage or leakage come into notice, care should be taken to prevent wastage of water otherwise recovery at the Rs.16/ per m<sup>3</sup> of cost of water will be made from contractor. Due to leakage and repairing work, contractor will be responsible for loss of any property or crop of private land owner and compensation will have to be paid by contractor,

if contractor fails to do so and complain is received by department than department will make the payment to private owners and recovery will be made from contractors bill.

- 9) Any type of valve or part of the valve not working properly after repairing and requires replacement, as per opinion of Engineer in charge or his representative, then required valve will supplied to the contractor free of cost from departmental store if available. Replacement shall be done by the contractor and old valve should be shifted to department store and entered in concerned register including cost of loading, unloading, carting stacking etc. complete.
- 10) Contractor shall have to do leak detection survey along the pipeline regularly such as Pipes joint leakage, pipe bursting etc. and leakage observations and repairing work record should be maintained section wise by contractor. all the valves fixed on it such as sluice valves scour valves, air valves, air cushion valves, butterfly valves, zero velocity valves, flow meters, water meters and valve chambers should be maintained by contractor. Quantity of water as pumped from head works same quantity should reach to distribution point. For any unauthorized connection taken or given by anybody the Contractor will be responsible for it. Prevention and removal of unauthorized

Connection will be carried out by contractor and intimated to department. For unauthorized consumption of water or misuse of water recovery at the Rs.100 per m<sup>3</sup>of cost of water will be made from contractor. All type of valves including air valve and scour valve should be inspected regularly by contractor, a programme for inspection for air valves & scour valve should be prepared by contractor and strictly observed it. Special care should be taken by contractor for air valves.

- 11) During the period of contract a person other than responsible representative of contractor or persons employed by him should not enter into the premises of the head works site. Every care should be taken by contractor to prevent such type of unauthorized entry or interruption in the premises or surrounding the property of BHAVNAGAR MUNICIPAL CORPORATION (BMC)TOWN.
- 12) Persons required for security of materials in the stores at sub head works sites will be deployed by contractor.
- 13) At any time during the visit of Engineer in charge or his representative if it is observed that the operation and maintenance is not carried out properly, water supply is stopped and contractor is responsible for it recovery will be made at double rate of contract for that particular day or contract will be terminated.
- 14) Operation and maintenance of meters installed at head works sites should be carried out by contractor and entry shall be made in the register at every one hours. If any meter is not working properly it should be properly repaired by contractor from any technician of such type of repairing work.
- 15) After issue of work order contractor or his responsible representative should joint visit the site of every work accompany with officer concern. A list and position of works and all valves with dia and nos. a report will be prepared and should be jointly signed by contractor and department. A copy of same report shall be issued to contractor. At the time of completion of

contract period same type of report should be prepared and possession of all the works and components should be handed over to department. If repairing & maintenance work is not done properly by contractor, the cost of repairing work will be recovered by department from contractor.

- 17) All the works executed under this project & covers in the scope of this tender will be deemed to be handed over to contractor from the date of successful commissioning of facility. Proper operation and maintenance of the same works/components shall be carried out by contractor and at the time of completion of contract period or termination of contract, contractor should have to give possession of all the work and components to the department in good condition. Before handing over the possession to the department account of contract will not be finalized and deposit will not be refunded to contractor. For all type of legal activities and expenditure for the same, contractor will be fully responsible.
- 18) During the period of contract for any type of dispute, decision of EIC, will be final and binding to both the parties.
- 19) Prescribed registers as maintained by agency during the period of operation and maintenance period shall be submitted to the department. All the materials received during repairing and replacement shall be deposited in departmental store at the cost of contractor. All repairing work should be carried by contractor at his own cost during the period of contract contractor should be fully responsible for injury to any public person omen engaged by contractor for work and contractor shall be fully responsible for compensation for it.
- 20) If water storage or supply could not be continued due to any reasons it should be informed to department. As per condition of contract required steps should be taken immediately by contractor to solve the problem and start the water supply. After starting the water supply department shall be informed accordingly.
- 21) Proper care is to be taken by contractor to keep neat and clean. Every component of headwork sites and maintenance of all the components shall be done by contractor.
- 22) Servicing of all the valves cleaning of all civil works and maintenance shall be carried out regularly by contractor and entered into the concerned registers.
- 23) History sheet shall be maintained by contractor for replacement of material in pipeline, or valves, spare parts of Electro-mechanical equipment.
- 24) Leakage repairing shall be carried out in proper way and technically workmen like manner. Repairing by rubber tubes or by fixing wooden Peg shall not be allowed. Register of leakage repairing shall be maintained with reasons properly.
- 25) All the works included in the scope of work shall be oil painted once during contract period at the cost of contractor.
- 26) All the gardens and plants situated at head works sites shall be supplied water and maintained properly by contractor. No any extra payment will be made on account of this work.

- 27) Telephone/wireless message shall be received and entered in the register and message should be conveyed to concern party head works for action. If any interruption in the system of any important message should convey immediately to concerned Engineer in charge.
- 28) All the information regarding labours, staff, vehicles etc. is incorporated in this tender for preparation of estimate. As per list staff having proper qualification/labours and vehicle shall be deployed by contractor. If due to negligence of contractor for providing sufficient staff and vehicles water is not supplied properly remaining labours/staff and vehicles will be deployed by department at the risk and cost of contractor and recovery for such expenditure will be made from the bill of contractor.
- 29) The contractor has to make all the arrangements required for the proper operation, maintenance and safety of all the works included in this contract at his own cost during the whole contract period.
- 30) Continuous patrolling with Jeep and Driver throughout the alignment should be carried out by the contractor.
- 31) All the storage structure located at H/W site should be kept in fill up condition as per the requirement during the full day period.
- 32) Separate log book for arrival & releasing of water from each storage structure will be maintained day to day by the contractor and shall be submitted to department at the end of month.
- 33) Repairing of all electro-mechanical and civil work shall be carried out at site including valve chamber located at site without any extra cost.
- 34) Except in unavoidable circumstances all the storage structures should be filled with water as per requirement & availability of electricity & pressure during the period of day or night. If electric supply is not available for 15 minute, contractor shall contact to concern GVCL to start the electric supply & intimate to Department with reasons for non- availability of electric supply.
- 35) List of all the assets, pipeline apparatus plants & machineries, all types of valves, chambers, pump houses, security cabin, office building, hydraulic civil structure, spare parts, store malts, wireless sets, telephone, air-conditioner, electric panels etc. will be handed over to contractor for Maintenance & Repair purpose & same has to return to Department with good conditions as soon as the project is taken over by department for further M&R period to any other party.
- 36) During the period of contract if water is not supplied satisfactorily at head works/ off take point at any day & reasons given by contractor is not suitable in the opinion of officer of department recovery at the double rate of contract rate will be made for such a day from the bill of contract.
- 37) Any damage / breakage found from mischievous element found in the system, the contractor should lodge police case immediately under intimation to concern Engineer in charge.
- 38) The total wastage of water due to leakage & all other reason should not be more than 1%,if it is more than prescribed quantity, recovery at the rate of Rs. 15/- per 1000 letter (Or as revised from time to time) shall be made from the running bill of contractor. Quantity wasted will be decided by Engineer in charge will be final.

- 40) Material consumption register in prescribed format should be maintained by the contractor. During the visit of Engineer- in- charge if required it should be produced.
- 41) Vehicles will have to be maintained and to be kept ready for whole contract period at Headwork's site by contractor and to be used for day to day routine checking. Any fault time for providing such facilities for betterment of operation period will be sublet to reduced payment by department and all logbooks to be maintained by contractor for such movement of vehicle.
- 42) "The Contractor" shall operate the complete services, on a continuous 24hours basis to supply all the flow conveyed through pipeline up to desired point of supply with assured quantity.
- 43) "The Contractor" shall operate and utilize all the control and monitoring systems, provided and if found to be necessary and if approved by the engineer, shall make adjustments within the operating range of the control system and equipment so that the plant operation matches the requirement.
- 44) "BHAVNAGAR MUNICIPAL CORPORATION ((BMC))" shall directly pay all the power bill to PGVCL but the Contractor will be required to furnish Electricity Consumption in the Schedules provided.
- a) Telephone bills will have to be paid by the successful bidder. No reimbursement shall be made.
- b) Electric /Battery operated flow meter has to be maintained by Contractor in case failure of batteries, same has to be replaced by contractor at his own cost.
- 45) All miscellaneous items, for example, vehicles, tools, testing equipment, cleaning or green keeping equipment, security and safety equipment, electrical fixtures, etc shall be provided by the Contractor at his expense.
- b) The qualification and capability of the Contractor's personnel shall be appropriate for the task they are assigned to perform. The staff provided shall be fully trained in the operation of the Raw Water Pumping Station before being given responsibility for operating any part of the plant. If in the opinion of the Engineer, any member of the Contractors staff is considered to be insufficiently skilled or otherwise inappropriate for the task he is required to perform, he shall be replaced by the Contract with a person with the appropriate skills and experience for the task, to the approval of the Engineer. The Contractor will be required to submit to the Employer the Schedule of 'Manpower 'and 'Organization Chart'
- c) The Curriculum Vitae (CV) /Resumes of the Contractors personnel shall be submitted to the Engineer for acceptance at least 7 days before the anticipated commencement of the O & M, period. Any change of personnel shall be promptly informed to the Engineer within a day's time. Normal time duty hours for the contractors' operation & maintenance personnel may be modified as necessary and agreed by the Engineer. Rotating shift schedule shall be established by the Contractor and agreed by the Engineer which will ensure that an adequate number of the Contractor's staff, fluent in Hindi as well as Gujarati is on duty at Plants 24 hours per day, 7 days per Week, Including all holidays

d) Contractor will submit one photograph of each personnel, with his resume, permanent address, etc and department will issue identity cards to each personnel. Any replacement in Employment by Contractor shall have to be reported in 24 hours to Engineer in charge concerned. Contractor has to put the name person on duty shift wise on display board. Display board shall be kept in each pumping station

47) a) The Contractor shall be responsible for safety on Site during the O & M of the Works by the Contractor.

b) The Contractor's duties with respect to Safety shall include the following;

i) Utilize safety awareness procedures in every element of operation and maintenance.

ii) Give emphasis to site including:

47) a) The maintenance service provided by the Contractor for the period specified in the Contract shall ensure the continuous operation of the that the breakdown or deterioration in performance, under normal operating conditions, of any items, of Plant and equipment and component parts thereof is kept to a minimum.

b) The Contractor shall adhere to the manufacturer's recommendations with respect to equipment maintenance, the type and grades of lubricants to be used. Frequency of lubrication, adjustments to be made regularly and recommended spares to be held in store.

49) The Contractor shall be responsible for:

a) The maintenance of electrical, ventilation and air conditioning, plumbing and drainage installations.

b) General Building Maintenance and housekeeping.

c) Full maintenance of the site services, cabling and earthing systems, together with the site road lighting system. Painting of all Civil, Mechanical, Electrical structures which are open to sky every three years.

d) Site maintenance including the upkeep of landscaped areas.

The building services and house-keeping maintenance shall be undertaken on all building and services installation.

The Contractor shall ensure that all unwanted or redundant items are removed from the building and sites. Depending on their condition such items shall either be placed into storage or disposed of site.

50) a) The store's inventory, the issuing and recording of spare parts will be the responsibility of the Contractor.

- b) The Contractor is also responsible for providing spare parts and material required for the operation and maintenance during the operation period, including the cost of storing and safeguarding.
  - c) The Contractor will make all necessary arrangements to ensure the continuous supply of spare parts and material for the works and the rate of supply of these materials shall be in such quantities and amounts as would ensure uninterrupted operation.
  - d) Spare parts shall be supplied by the Contractor and the same will be used during Operation and Maintenance Contract period.
  - e) The contractor shall have to procure the required spares from original manufacture or authorized dealer at his cost.
  - f) The required spare parts which will be available with BHAVNAGAR MUNICIPAL CORPORATION (BMC) will be issued to the contractor from its stock and subsequently contractor shall have to replace the same without any extra cost.
- 51) a) The Employer reserves the right to arrange the visits of VIP's dignitaries, public representatives and other persons of Social or Political repute, any organizations and when necessary, to the Raw Water Pumping Station. The Contractor shall offer full cooperation to the BHAVNAGAR MUNICIPAL CORPORATION (BMC) on the occasions of such visits.
- b) Inspection register will have to be maintained, wherein inspection officers will note their instructions duly dated signature. Successful bidder has to follow the instructions strictly.
- 52) On the date of Contract Completion or if the Contract is terminated, all the installations, works and equipment placed under the Contractor's responsibility shall be handed over to the Employer, at no cost, in good working order. The Employer may perform any inspections, tests or expert appraisals he shall consider necessary with a view to checking that the property is in good working order and will certify to that effect to the Contractor while taking over.
- 53) No accommodation/ guest house/ transportation facility will be provided by the BHAVNAGAR MUNICIPAL CORPORATION (BMC) to Contractor.
- 54) For smooth & efficient O & M of the plant, and in case of emergency just like fire, fault, accidents, or other rescue operation, the contractor must keep at least one four-wheeler like jeep or Matador type with seating arrangement. In working condition for 24 hours of a day & 365 days of the year for the whole contract period.
- 55) While handing over the spares to the contractor, Contractor should maintain the record of spares of inventory of utilization of the spares.
- 56) In the event of any dispute or difference arising, the Jurisdiction of the court shall be Gandhinagar (Gujarat) only.
- 57) It is mandatory for the contractor to operate the pumping machinery not less than limit efficiency of pump. If deviation is noted in respective energy bill for succeeding month then corrective

measures shall have to be taken by the contractor immediately otherwise the difference in amount based on m<sup>3</sup>/KWH will be invoked through O & M bills of successful bidders.

- 58) All protective Relays testing, Calibration system for service and maintenance of Relay shall be carried out systematically by trained personnel authorized in Power system protection at once in a Two-year during O & M contract Period Without any extra cost. The Contractor/Agency should be approved first prior to commence of work for such special testing of job. Proper testing equipment shall be used so to avoid the misleading of settings & call for nuisance tripping.
- 59) Contractor shall have to bear the expense for annual inspection fee for Electrical installation during the O&M contract period. No extra payment shall be given. Energy audit has been made mandatory by the Government of Gujarat; vide Gujarat Use of Electrical energy (Regulation) Order, 1999. Contractor shall have to carry out energy audit per the said regulation in the first year and thereafter strictly as per prevailing regulation.
- 60) Repair of PLC based instrumentation and Automation work shall have to be carried out by System Integrator. The agency for System Integrator should be approved first prior to commence the work of such special type of job.
- 61) Contractor should provide security guard round the clock with uniform. He should also maintain register for visitors.
- 62) If any work specified in the scope of tender but not carried by the contractor, the recovery will be done at the double the market rate from the contractor.



**ANNEXURE –I**  
**SCHEDULE FOR ESTABLISHMENT**

The contractor shall employ the minimum staff for each package as under with qualification and experience stated below, Contractor may employ additional staff over and above minimum prescribed as per his requirement in order to run the system efficiently. The staff metion below its obligatory.

Sr. No.	Designation	Qualification	Experience
1.	Supervisor	Diploma Mechanical / Civil with 1 year experience of O&M of Water Supply Scheme.	<ul style="list-style-type: none"> <li>• 1 Person for overall coordination and reporting purpose to be deployed at HW site. Contact number of the person is to be declared to beneficiaries for complain redressal.</li> </ul>
2	Electrician <b>(If Applicable)</b>	PWD supervisory certificate pass & having license of Govt. of Gujarat for HT Installations or ITI (Electrician) with NCTVT Certificate	<ul style="list-style-type: none"> <li>• 1 Competent electrician with qualification is to be provided separately at WTP HW site (Total 1 Nos). Services of electrician should be available 24X7 when required for which extra person can be deployed by agency.</li> </ul>
3	Operators: <b>(If Applicable)</b>	Diploma/ ITI. Experience of water supply scheme is preferable.	<ul style="list-style-type: none"> <li>• At HW - Round the clock 2 Operators at main Headwork in shift shall be provided for operation of WTP and Pumping Machinery</li> <li>• 1 Operator at each sub headwork as per the requirement of pumping hours are to be deployed in shift manner.</li> <li>• Appropriate arrangements for substitute shall be made in case of leave.</li> </ul>
4	Helper	Stout Body physique (Unskilled)	<ul style="list-style-type: none"> <li>• 1 helper with each Operator as mentioned above shall be provided in shift manner according to operator.</li> <li>• Appropriate arrangements for substitute shall be made in case of leave.</li> </ul>

5	Pipe Fitter/ Linemen/Valve men for MS/AC /HDPE/PVC pipe	Experience of maintenance and repairing work of pipeline network.	<ul style="list-style-type: none"> <li>• Fitter/ Lineman/ Valve man shall be provided as per requirement to operate and maintain scheme smoothly and as instructed by Engineer in Charge. Enforced labor laws shall be followed. Manpower shall provide such that all the Main Valves/ Branch valves shall be operated regularly on daily basis. Repairing of pipeline shall be carried out as per schedule.</li> </ul>
6	Security	From registered licensee service provider.	<ul style="list-style-type: none"> <li>• Round the clock 2 security persons at Main head work and all Sub head works are required to be deployed in 8 hour shift manner.</li> <li>• Security provided must be hired from registered licensed security service provider.</li> <li>• Appropriate arrangements for substitute shall be made in case of leave.</li> </ul>
7	Gardner <b>(If Applicable)</b>	Gardening experience	<ul style="list-style-type: none"> <li>• A Gardner with proper gardening equipment's should be provided for maintenance of horticulture, cutting of grass etc. at WTP head works separately. The services of same Gardener shall made available to all sub head works also.</li> </ul>
8	Sweeper <b>(If Applicable)</b>	Stout Body physique (Unskilled)	<ul style="list-style-type: none"> <li>• Force of cleaning persons should be provided for good housekeeping. Toilets are to be cleaned regularly at least twice a day.</li> </ul>
9	Utility Vehicle with Driver	Utility Vehicle for Maintenance with driver having valid License.	<ul style="list-style-type: none"> <li>• 2 Utility Vehicle shall be provided with skilled driver having valid Indian driving license.</li> </ul>
10	Basic Water Testing Laboratory Instruments with analyst	Science Pass out with appropriate experience	<ul style="list-style-type: none"> <li>• Basic laboratory instruments like 1) Turbidity meter (handheld), 2) table top pH meter, 3) Chloro scope, 4) water distiller, 5) Jar test apparatus with accessories shall be provided in addition to the online water testing analyzer for stationary or mobile water</li> </ul>

			testing at site with science passed out analyst having water testing experience.
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**Note:**

The above staff shall be required minimum as per mutual agreement between contractor & BHAVNAGAR MUNICIPAL CORPORATION (BMC). The arrangement of reliever for weekly off/all holidays etc. shall be made by the contractor separately.

The adequate staff is required for normal operation & maintenance. The contractor has to call respective engineer for rectification of fault at any time of the day, during contract period. The contractor shall have to provide additional manpower for maintenance and repair on as and when require basis. No extra payment shall be made for hiring services of additional manpower.

However Superintending Engineer may give relaxation in qualification and experience for suitable cases and necessary recovery if any, will be made accordingly.

## ANNEXURE- II

### SCHEDULE OF ROUTINE CHECKING OF VALVES (If Applicable)

**A) Daily in each shift:**

- 1) Leakages through gland packing and tightening, loosening to ensure that extent of leakages is in drip form.
- 2) Bearing temperature if highly check-up cause and take remedial action.
- 3) Noise & Vibration: If undue check-up cause and take remedial action.
- 4) Pressure: If high or low, check-up cause.
- 5) Check oil level for bearing lubricant and topping up if necessary.
- 6) Clean and remove dust from pumps, piping and valves etc.

**B) Weekly:**

- 1) Greasing to the stuffing boxes. Greasing to valve actuator gear

**C) Monthly:**

- 1) Check tightness of all nut bolts. Check coupling bushes for wear.
- 2) Checking and replacing gland packing if necessary ( valve)
- 3) Check oil in air compressor. Check valve actuator bushes.

**D) Quarterly:**

- 1) Inspection of gland packing and replacing if necessary. Cleaning and oiling of gland bolts.
- 2) Checking and lubrication of all bearings.

**E) Half Yearly:**

- 1) Removing plant packing and checking wear on line shaft at gland portion.
  - 2) Replacing gland packing.
  - 3) Cleaning and examination of all bearings for flaws and checking and play. Replace oil/grease of bearing.
  - 4) Replacing gland packing of sluice valves.
- F) Records/Messages through Electronic Media.

**Agency has to give SMS every day to concerned officer of BHAVNAGAR MUNICIPAL CORPORATION (BMC) stating water pumped from each station from specific pump with flow meter reading, water supplied to villages etc as asked officers.**

Sr. No	Name of Head Work	Capital cost of Electro-mechanical component
1	All Components Included in this Contract	

**ANNEXURE- III**

**LIST OF THE TOOLS AND TACKLES TO BE PROVIDED AT EACH PUMPING STATION,  
TREATMENT PLANT FOR OPERATION AND MAINTENANCE.**

21.	Kaichin (For Gardening)	2 Nos.
22.	Vile(For Gardening)	3 Nos.
23.	Plastic Bucket 10 Litres	2 Nos.
24.	Rope 1/2"	30 meter
25.	Torch/Battery	2 Nos.
26.	Multi Meter Digital	1 Nos.
27.	Crimping Tool Set	1 Set
28.	Bearing and Coupler puller	1 No. Of Each
29.	Portable Air blower for cleaning & De rusting of Panel	1 No.
30.	Heavy Duty Grease gun	1 No.
31.	Garden Scissors	1 No.
32.	Dial Gauge with Magnetic stand for alignment checking	1 Set
33.	Precision Spirit Level	1 No.
34.	Filler Gauge with Magnetic stand for alignment checking	1 set
35.	Storage Bins & rack/cupboard for above tools	1 No.
36.	Portable Welding Set	1 No.
37.	Portable DG Set	1 No.
38.	Portable Dewatering Pump Set.	1 No.

**Note:**

Above list is only for guidance purpose. Requirement of any other tools or tackles for ensuring smooth & uninterrupted operation, maintenance & repairs of all the equipment in all the pumping stations shall have to be arranged by the Contractor as per instructions of the EIC.

**Statement- 1 (If Applicable)**

**Name of Project:**

**Period:** Month

**Monthly report of material consumed for O & M**

<b>Sr. No.</b>	<b>Materials Used</b>	<b>Qty.</b>	<b>Average Cost</b>	<b>Issued/ Purchase by</b>	<b>Remarks</b>
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
1					
2					
3					
4					
5					
6					
7					

**Signature of Contractor**

**Statement- 2**

**Name of Project:**

**Period:** Month

**Quarterly report of material consumed for O & M**

<b>Sr. No.</b>	<b>Material</b>	<b>Part No(if any)</b>	<b>Qty.</b>	<b>Average Cost</b>	<b>Remarks</b>
1	2	3	4	5	6
1					
2					
3					
4					
5					
6					
7					

**Signature of Contractor**

**Statement- 3 (If Applicable)**

**Name of Project:**

**Period:** Month

**Monthly report of Vehicles deployed for O &M work**

<b>Sr. No.</b>	<b>Type of Vehicle</b>	<b>Model &amp;Year of Manufacture.</b>	<b>Registration no.</b>	<b>Working condition</b>	<b>Remarks</b>
1	2	3	4	5	7
1					
2					
3					
4					
5					
6					
7					

**Signature of Contractor**



**Statement- 4**

**Name of Project: As Per Mentioned in Tender Notice**

**Period: Month**

**Monthly report of Staff deployed for O &M work**

<b>Sr. No.</b>	<b>Name of Person</b>	<b>Designation</b>	<b>Age</b>	<b>Qualification</b>	<b>Experience.</b>	<b>Remarks</b>
1	2	3	4	5	6	7
1						
2						
3						
4						
5						
6						
7						

**Signature of Contractor**

**Statement- 5**

**Name of Project: As Per Mentioned in Tender Notice**

**Period: Month**

**Monthly report of maintenance work**

<b>Sr. No.</b>	<b>Date</b>	<b>Nature of work attended</b>	<b>Remarks</b>
1	2	3	4
1			
2			
3			
4			
5			
6			
7			

**Signature of Contractor**

## SCHEDULE B1

### (RCC NP 3 SEWERGAGE LINE ) (ZONE 1)

#### ITEM WISE SPECIFICATION

#### Item No.1

##### Horizontal cast

Providing and supplying ISI Standard R.C.C. pipes(of Sulphate Resisting Cement) in standard lengths of following class and diameter suitable for either collar joints or rubber ring joints including all taxes, insurance, transportation, freight charges, octroi, inspection charges, loading, unloading, conveyance to departmental stores, stacking etc. complete. (IS - 458/ 1989)

Note : One collar should be supplied with each full length plain ended RCC pipe, cost included in rates below. One rubber ring should be supplied with each full length socketed pipe, cost included in rates

Sr.No	Dia (in mm)
1.0	200 mm
1.1	300 mm

- **Specification of RCC NP3 Pipe:**

#### 1.1 Scope

This specification covers the requirements for manufacturing, testing, supplying, jointing and testing at work sites of Reinforced Cement Concrete (RCC) pipes, of non-pressure varieties, sewers and storm water drains. R.C.C. NP3 class pipes are to be used for sewer collecting system

#### Applicable Codes

The manufacturing, testing, supplying, jointing and testing at work sites of RCC pipes shall comply with all currently applicable statutes, regulations, standards and codes. In particular, the following standards, unless otherwise specified herein, shall be referred. In all cases, the latest revision of the codes shall be referred to. If requirements of this specification conflict with the requirements of the codes and standards, this specification shall govern.

#### 2.0 Materials

- (a) IS: 458 - Specification for precast concrete pipes (with and without reinf.)-2003
- (b) IS: 3597 - Method of tests for concrete pipes.
- (c) IS: 5382 - Specification for rubber sealing rings for gas mains, water mains and sewers
- (d) IS: 516 - Method of test for strength of concrete.

#### 2.1 Codes of Practice

- (a) IS: 456 - Code of practice for plain and reinforced concrete.

- (b) IS: 783 - Code of practice for laying of concrete pipes.

### **3.0 Design**

Design of RCC pipes including reinforcement details and the ends of pipes shall be in accordance with the relevant clauses of IS: 458-2003.

### **4.0 Manufacturing**

#### **4.1 General**

**Pipe can be manufactured by spinning process or by vibrated casting process**

- 4.1.1** The method of manufacture shall be such that the form and the dimensions of the finished pipes are accurate within the limits specified in relevant clause of IS: 458. The surfaces and edges of the pipes shall be well defined and true, and their ends shall be square with the longitudinal axis. The ends of the pipes shall be further reinforced by an extra ring of reinforcement to avoid breakage during transportation.

- 4.1.2** The RCC pipes and rubber rings shall be systematically checked for any manufacturing defects by experienced supervisors so as to maintain a high standard of quality.

- 4.1.3** Owner/Engineer shall at all reasonable times have free access to the place where the pipes and collars/rubber rings are manufactured for the purpose of examining and testing the pipes and collars/rubber rings and of witnessing the test and manufacturing.

- 4.1.4** All tests specified either in this specification or in the relevant Indian Standards shall be performed by the supplier/contractor at his own cost and in presence of Owner/Engineer if desired. For this, sufficient notice before testing of the pipes and fittings shall be given to Owner/Engineer.

- 4.1.5** If the test is found unsatisfactory, Owner/Engineer may reject any or all pipes of that lot. The decision of Owner/Engineer in this matter shall be final and binding on Contractor and not subject to any arbitration or appeal

#### **4.2 MATERIALS**

##### **4.2.1 Cement**

Cement used for the manufacture of RCC pipes should be **Sulphate Resisting Cement (SRC)** only and shall conform to relevant IS codes.

##### **4.2.2 Aggregates**

Aggregates used for the manufacture of RCC pipes shall conform to IS: 383. The maximum size of aggregate should not exceed one-third the thickness of the pipe or 20 mm, whichever is smaller.

#### **4.2.3 Mixing and Curing Water**

Water shall be clean, colorless and free from objectionable quantities of organic matter, alkali, acid, salts or other impurities that might reduce the strength, durability or other desirable qualities of concrete and mortar

#### **4.2.4 Reinforcement**

Reinforcement used for the manufacture of the RCC pipes shall be mild steel Grade I or medium tensile steel bars conforming to IS: 432 (Part-I) or hard-drawn steel wire conforming to IS: 421 (Part-2). Reinforcement cages for pipes shall be as per relevant requirements of IS: 458

#### **4.2.5 Concrete**

Concrete used for the manufacture of RCC pipes shall conform to IS: 456. The minimum cement content and minimum compressive strength of concrete shall be as per relevant requirements of IS:458 (Latest Edition). Compressive strength tests shall be conducted on 15 cm cubes in accordance with the relevant requirements of IS: 456 and IS: 516.

#### **4.2.6 Rubber Ring**

Rubber ring chords used in pipe joints shall be EPDM rubbering as per IS 5382: 1985.

#### **4.2.7 Curing**

Pipes manufactured in compliance with IS:458 (Latest Edition) shall be either water cured or steam cured for minimum stipulated curing period in accordance with relevant requirements of the latest revised IS:458 (Latest Edition).

### **4.3 Dimensions**

**4.3.1** The internal diameter, wall thickness and length of barrel and collar of pipes, reinforcement (longitudinal and spiral), type of ends and minimum clear cover to reinforcement and strength test requirements shall be as per the relevant clauses/tables of IS: 458 for different classes of pipes.

**Table – 1**  
**Design and Strength Test Requirements of Concrete Pipes of Class NP3**  
**Reinforced Concrete, Medium Duty, Non-Pressure Pipes**

Internal Diameter of Pipes in mm	Barrel Wall Thickness	Reinforcements			Strength Test Requirements for Three Edge Bearing Test	
		Longitudinal, Mild Steel or Hard Drawn Steel		Spirals, Hard Draws Steel	Load to Produce 0.25 mm Crack kN/linear meter	Ultimate Load
		Minimum number	Kg/linear meter	Kg/linear meter		
(1)	(2)	(3)	(4)	(5)	(6)	(7)
300	40	8	0.78	1.80	15.50	23.25
400	75	8	0.78	3.30	19.16	28.74
600	85	8 or 6+6	1.18	7.01	28.74	43.11
800	95	8 or 6+6	2.66	13.04	38.32	57.48
900	100	6 + 6	2.66	18.30	43.11	64.67
1000	115	6 + 6	2.66	21.52	47.90	71.85
1200	120	8 + 8	3.55	33.57	57.48	86.22
1400	135	8 + 8	3.55	46.21	67.06	100.60
1600	140	8 + 8	3.55	65.40	76.64	114.96
1800	150	12 + 12	9.36	87.10	86.22	129.33
2000	170	12 + 12	9.36	97.90	95.80	143.70
2200	185	12 + 12	9.36	133.30	105.38	158.07

**Note:**

1. If mild steel is used for spiral reinforcement, the weight specified under col.5 shall be increased to 140/125.
2. The longitudinal reinforcement given in this table is valid for pipes up to 2.5 m. effective length for internal diameter of pipe up to 250 mm and up to 3 m. effective length for higher diameter pipes.
3. Total mass of longitudinal reinforcement shall be calculated by multiplying the values given in col.4 by the length of the pipe and then deducting for the cover length provided at the two ends.
4. Concrete for pipes shall have a minimum compressive strength of 35 N/mm<sup>2</sup> at 28 days.

**Table – 2**  
**Design and Strength Test Requirements of Concrete Pipes of Class NP3**  
**Reinforced Concrete, Medium Duty, Non-Pressure Pipes Made by Vibrated Casting Process**

Internal Diameter of Pipes in mm	Minimum Barrel Wall Thickness	Reinforcements			Strength Test Requirements for Three Edge Bearing Test	
		Longitudinal, Mild Steel or Hard Drawn Steel		Spirals, Hard Draws Steel	Load to Produce 0.25 mm Crack kN/linear meter	Ultimate Load kN/linear meter
		Minimum number	Kg/linear meter	Kg/linear meter		
(1)	(2)	(3)	(4)	(5)	(6)	(7)
300	50	8	0.78	1.53	15.5	23.25
400	60	8	0.78	1.6	19.16	28.74
600	75	8 or 6 +6	1.18	2.2	28.74	43.11
800	95	8 or 6 +6	2.66	6.87	38.32	57.48
900	100	6 + 6	2.66	11.55	43.11	64.67
1000	115	6 + 6	2.66	15.7	47.9	71.85
1200	125	8 + 8	3.55	21.25	57.48	86.22
1400	140	8 + 8	3.55	30	67.06	100.6
1600	165	8 + 8	3.55	50.63	76.64	114.96
1800	180	12 + 12	9.36	64.19	86.22	129.33
2000	190	12 + 12	9.36	83.12	95.8	143.7
2200	210	12 + 12	9.36	105.53	105.4	158.07

**Note:** Concrete for pipes shall have a minimum compressive strength of 35 N/mm<sup>2</sup> at 28 days

#### **4.4 Workmanship and Finish**

**4.4.1** Pipes shall be straight and free from cracks except that craze cracks may be permitted. The ends of the pipes shall be square with their longitudinal axis so that when placed in a straight line in the trench no opening between ends in contact shall exceed 3 mm in pipes up to 600 mm diameter (inclusive), and 6 mm in pipes larger than 600 mm diameter

**4.4.2** The outside and inside surfaces of the pipes shall be smooth, dense and hard, and shall not be coated with cement wash or other preparation unless otherwise agreed to between Owner/Engineer and the manufacturer or supplier.

**4.4.3** The pipes shall be free from defects resulting from imperfect grading of the aggregate, mixing or molding.

**4.4.4** The pipes shall be free from local dents or bulges greater than 3 mm in depth and extending over a length in any direction greater than twice the thickness of barrel..

**4.4.5** The deviation from straight in any pipe throughout its effective length, tested by means of a rigid straight edge parallel to the longitudinal axis of the pipe shall not exceed, for all diameters 3 mm forever meter run

#### **4.5 Testing**

All pipes for testing purposes shall be selected at random from the stock of the manufacturer and shall be such as would not otherwise be rejected under the criteria of tolerances as mentioned in IS: 458.(Latest Edition)

During manufacture, tests on concrete shall be carried out as per IS: 456. The manufacturer shall supply, when required to do so by Owner/Engineer the results of compressive tests of concrete cubes and split tensile tests of concrete cylinders made from the concrete used for the pipes. The manufacturer shall supply cylinders or cubes for test purposes required by the Owner/Engineer and such cylinders or cubes shall withstand the tests prescribed by the manufacturer for the hydrostatic test pressure. For non-pressure pipes, 2 percent of the pipes shall be tested for hydrostatic test pressure.

The specimen of pipes for the following tests shall be selected in accordance with relevant Clause of IS: 458 (Latest Edition) and tests in accordance with the methods described in IS: 3597.

- i) Hydrostatic test
- ii) Three edge bearing test
- iii) Absorption test.

**Note:** Three edge bearing strength to produce 0.25 mm crack in case of special design of pipes shall be as per IS:458:2003.

For Inspection at manufacturing site 24 hrs. Access shall be provided to BMC Engineers as well as engineer appointed by PMC/TPI agency. Apart from this BMC will establish its own pipe testing facility where pipes will be randomly tested. The cost of transporting the pipe to the testing facility & testing charges shall be borne by the contractor

#### **4.6 Sampling and Inspection**

**4.6.1** In any consignment, all the pipes of same class and size and manufactured under similar conditions of production shall be grouped together to constitute a lot. The conformity of a lot to the requirements of this specification shall be ascertained on the basis of tests on pipes selected from it



- 4.6.2** The number of pipes to be selected from the lot for testing shall be in accordance with Table 15 of IS: 458 (Latest Edition).
- 4.6.3** Pipes shall be selected at random. In order to ensure randomness, all the pipes in the lot may be arranged in a serial order and starting from any pipe, every 'n'th pipe be selected till the requisite number is obtained, n being the integral part of  $N/n$ , where N is the lot size and n is the sample size.
- 4.6.4** All pipes selected as per IS: 458 shall be inspected for dimensional requirements, finish and deviation from straight. A pipe failing to satisfy one or more of these requirements shall be considered as defective.
- 4.6.5** The number of pipes to be tested for tests under IS: 458 shall be in accordance with column 4 of Table 15 of IS: 458 (Latest Edition). These pipes shall be selected from pipes that have satisfied the requirements mentioned in Clause above.
- 4.6.6** A lot shall be considered as conforming to the requirements of IS:458 (Latest Edition) of the following conditions are satisfied.
- (a)** The number of defective pipes shall not be more than the permissible number given in column 3 of Table 15 of IS: 458 (Latest Edition).
- (b)** All the pipes tested for various tests as per IS-458 shall satisfy corresponding requirements of the tests.
- (c)** In case the number of pipes not satisfying requirements of any one or more tests, one or two further samples of same size shall be selected and tested for the test or tests in which failure has occurred. All these pipes shall satisfy the corresponding requirements of the test

#### **4.7 Marking**

The following information shall be clearly marked on each pipe:

- (a)** Internal diameter of pipe.
- (b)** Class of pipe.
- (c)** Date of manufacture, and
- (d)** Name of manufacturer or his registered trademark or both.
- (e)**

#### **LAYING OF PIPES**

The laying of RCC pipes shall conform to Technical Specifications: Item:-6

## **JOINTING**

### **GENERAL**

Jointing of RCC pipes shall be done with SRC cement only and as per the requirements of following specifications and as per the relevant IS. The type of joints shall be as below. After jointing, extraneous material, if any, shall be removed from the inside of the pipe and the newly made joints shall be thoroughly cured. In case, rubber-sealing rings are used for jointing, these shall conform to IS 5382 and shall be of such type as mentioned in IS-458:2003.

#### **1. FLUSH JOINT (INTERNAL)**

This joint shall be generally used for culvert pipes of 900-mm diameter and over. The ends of the pipes are specially shaped to form a self-centering joint with an internal jointing space 13-mm wide. The finished joint is flush with both inside and outside with the pipe wall. The jointing space is filled with cement mortar in the proportion as specified in IS-458-2003, mixed sufficiently dry to remain in position when forced with a trowel or rammed.

#### **2. FLUSH JOINT (EXTERNAL)**

This joint is suitable for pipes which are too small for jointing from inside. This joint is composed of specially shaped pipe ends. Each end shall be butted against each other and adjusted in correct position. The jointing space shall then be filled with cement mortar as specified in IS-458-2003, sufficiently dry and finished off flush. Great care shall be taken to ensure that the projecting ends are not damaged as no repairs can be readily affected from inside the pipe

#### **3. Spigot and Socket Joint (Flexible)**

The RCC pipe with the rubber ring accurately positioned on the spigot shall be pushed well home into the socket of the previously laid pipe by means of uniformly applied pressure with the aid of a jack or similar appliance. The RCC pipes shall be of spigot and socket type and rubber rings as specified in IS-458-2003, shall be used, and the manufacturer's instructions shall be deemed to form a part of these specifications. The rubber rings shall be lubricated before making the joint and the lubricant shall be soft soap water or an approved lubricant supplied by the manufacturer. Socket & Spigot NP3 & NP4 pipe with rubber ring roll on joint for diameter up to 900 mm should be provided as per table 14 of IS 458 : 2003. Socket & spigot NP3 & NP4 pipe with rubber ring confined joint for diameter 1000 mm to 2200 mm should be provided as per Table -17 of IS 458:2003

#### **4. Cleaning Of Pipes**

As soon as a stretch of RCC pipes has been laid complete from manhole to manhole or for a stretch as directed by Owner/Engineer, contractor shall run through the pipes both backwards and forwards a double disc or solid or closed cylinder 75 mm less in diameter than the internal diameter of pipes. The open end of the incomplete stretch of pipeline shall be securely closed as may be directed by Owner/Engineer to prevent entry of mud or silt etc.

If as a result of the removal of any obstructions Owner/Engineer considers that damages may have been caused to the pipelines, he shall be entitled to order the stretch to be tested immediately. Should such test prove unsatisfactory, contractor shall amend the work and carry out such further tests as are required by Owner/Engineer.

It shall also be ascertained by contractor that each stretch from manhole to manhole or the stretch as directed by Engineer is absolutely clear and without any obstruction by means of visual examination of the interior of the pipeline suitably enlightened by projected sunlight or otherwise.

#### **5. Testing At Work Site**

After laying and jointing of RCC pipes is completed the pipe line shall be tested at work site as per the following specifications and as directed by Owner / Engineer In-Charge. All equipment for testing at work site shall be supplied and erected by contractor and shall be rectified by him to the full satisfaction of Owner / Engineer In-Charge.

After the joints have thoroughly set and have been checked by Owner/Engineer and before backfilling the trenches, the entire section of the sewer or storm water drain shall be proved by contractor to be water tight by filling in pipes with water to the level of 1.50 m above the top of the highest pipe in the stretch and heading the water up for the period of one hour. The apparatus used for the purpose of testing shall be approved by Owner/Engineer. Contractor if required by Owner/Engineer shall dewater the excavated pit and keep it dry during the period of testing. The loss of water over a period of 30 minutes should be measured by adding water from a measuring vessel at regular 10 minutes intervals and noting the quantity required to maintain the original water level. For the approval of this test the average quantity added should not exceed 1 liter/hour/100 linear meters/10 mm of nominal internal diameter. Any leakage including excessive sweating which causes a drop in the test water level will be visible and the defective part of the work should be removed and made good.

In case of pressure pipeline, the completed stretch of pipeline shall be tested for site test pressure as specified in IS-458-2003. The site test pressure should not be less than the maximum operating pressure plus the calculated surge pressure, but in no case should it exceed the hydrostatic test pressure as specified in IS:458 (Latest Edition).

#### **Measurement**

All RCC pipes shall be measured according to the work actually done and no allowance will be made for any waste in cutting to the exact length required. The measurement for pipes shall be in running meter nearest to a cm. of length along the center line of pipe as actually laid at work sites.

The rate for providing, laying and jointing of RCC pipes shall be deemed to include the cost of rubber rings, jointing material, testing and extra excavation required for ordinary bedding of pipes and also for pipe sockets, if any.

**Notes:**

- 1 If any damage is caused to the pipeline during the execution of work or while cleaning/testing the pipeline as specified. Contractor shall be held responsible for the same and shall replace the damaged pipeline and retest the same at his own cost to the full satisfaction of Engineer.
2. Water for testing of pipeline shall be arranged by Contractor at his own cost.
3. Pipes shall be brought on site proportionate to the required progress for Thirty days only.

## **Item No.2.**

### **Vertical cast**

**Providing and supplying ISI Standard and marked R.C.C. pipes(of Sulphate Resisting Cement) in standard lengths of following class and diameter spigot socket or Tongue and grove joint or Rebated Rubber Ring jointed flushing from inside suitable for rubber ring joints including all taxes, insurance, transportation, freight charges, octroi, inspection charges, loading, unloading, conveyance to departmental stores, stacking etc. complete. (IS - 458/ 1989)**

**Note : One rubber ring should be supplied with each full length socketed pipe, cost included in rates below.**

### **400 mm dia pipe**

- **Specification of RCC NP3 Pipe:**

#### **1.1 Scope**

This specification covers the requirements for manufacturing, testing, supplying, jointing and testing at work sites of Reinforced Cement Concrete (RCC) pipes, of non-pressure varieties, sewers and storm water drains. R.C.C. NP3 class pipes are to be used for sewer collecting system

### **Applicable Codes**

The manufacturing, testing, supplying, jointing and testing at work sites of RCC pipes shall comply with all currently applicable statutes, regulations, standards and codes. In particular, the following standards, unless otherwise specified herein, shall be referred. In all cases, the latest revision of the codes shall be referred to. If requirements of this specification conflict with the requirements of the codes and standards, this specification shall govern.

#### **2.0 Materials**

- (a) IS: 458 - Specification for precast concrete pipes (with and without reinf.)-2003
- (b) IS: 3597 - Method of tests for concrete pipes.
- (c) IS: 5382 - Specification for rubber sealing rings for gas mains, water mains and sewers
- (d) IS: 516 - Method of test for strength of concrete.

#### **2.1 Codes of Practice**

(a) IS: 456 - Code of practice for plain and reinforced concrete.

(b) IS: 783 - Code of practice for laying of concrete pipes.

### 3.0 Design

Design of RCC pipes including reinforcement details and the ends of pipes shall be in accordance with the relevant clauses of IS: 458-2003.

### 4.0 Manufacturing

#### 4.1 General

Pipe can be manufactured by spinning process or by vibrated casting process

4.1.1 The method of manufacture shall be such that the form and the dimensions of the finished pipes are accurate within the limits specified in relevant clause of IS: 458. The surfaces and edges of the pipes shall be well defined and true, and their ends shall be square with the longitudinal axis. The ends of the pipes shall be further reinforced by an extra ring of reinforcement to avoid breakage during transportation.

4.1.2 The RCC pipes and rubber rings shall be systematically checked for any manufacturing defects by experienced supervisors so as to maintain a high standard of quality.

4.1.3 Owner/Engineer shall at all reasonable times have free access to the place where the pipes and collars/rubber rings are manufactured for the purpose of examining and testing the pipes and collars/rubber rings and of witnessing the test and manufacturing.

4.1.4 All tests specified either in this specification or in the relevant Indian Standards shall be performed by the supplier/contractor at his own cost and in presence of Owner/Engineer if desired. For this, sufficient notice before testing of the pipes and fittings shall be given to Owner/Engineer.

4.1.5 If the test is found unsatisfactory, Owner/Engineer may reject any or all pipes of that lot. The decision of Owner/Engineer in this matter shall be final and binding on Contractor and not subject to any arbitration or appeal

#### 4.2 **MATERIALS**

##### 4.2.1 Cement

Cement used for the manufacture of RCC pipes should be Sulphate Resisting Cement (SRC) only and shall conform to relevant IS codes.

##### 4.2.2 Aggregates

Aggregates used for the manufacture of RCC pipes shall conform to IS: 383. The maximum size of aggregate should not exceed one-third the thickness of the pipe or 20 mm, whichever is smaller.

##### 4.2.3 Mixing and Curing Water

Water shall be clean, colorless and free from objectionable quantities of organic matter, alkali, acid, salts or other impurities that might reduce the strength, durability or other desirable qualities of concrete and mortar

#### 4.2.4 Reinforcement

Reinforcement used for the manufacture of the RCC pipes shall be mild steel Grade I or medium tensile steel bars conforming to IS: 432 (Part-I) or hard-drawn steel wire conforming to IS: 421 (Part-2). Reinforcement cages for pipes shall be as per relevant requirements of IS: 458

#### 4.2.5 Concrete

Concrete used for the manufacture of RCC pipes shall conform to IS: 456. The minimum cement content and minimum compressive strength of concrete shall be as per relevant requirements of IS:458 (Latest Edition). Compressive strength tests shall be conducted on 15 cm cubes in accordance with the relevant requirements of IS: 456 and IS: 516.

#### 4.2.6 Rubber Ring

Rubber ring chords used in pipe joints shall be EPDM rubbering as per IS 5382: 1985.

#### 4.2.7 Curing

Pipes manufactured in compliance with IS:458 (Latest Edition) shall be either water cured or steam cured for minimum stipulated curing period in accordance with relevant requirements of the latest revised IS:458 (Latest Edition).

### 4.3 Dimensions

4.3.1 The internal diameter, wall thickness and length of barrel and collar of pipes, reinforcement (longitudinal and spiral), type of ends and minimum clear cover to reinforcement and strength test requirements shall be as per the relevant clauses/tables of IS: 458 for different classes of pipes.

Table – 1

Design and Strength Test Requirements of Concrete Pipes of Class NP3

Reinforced Concrete, Medium Duty, Non-Pressure Pipes

Internal Diameter of Pipes in mm	Barrel Wall Thickness	Reinforcements			Strength Test Requirements for Three Edge Bearing Test	
		Longitudinal, Mild Steel or Hard Drawn Steel		Spirals, Hard Draws Steel	Load to Produce 0.25 mm Crack kN/linear meter	Ultimate Load
		Minimum number	Kg/linear meter	Kg/linear meter		kN/linear meter
(1)	(2)	(3)	(4)	(5)	(6)	(7)

300	40	8	0.78	1.80	15.50	23.25
400	75	8	0.78	3.30	19.16	28.74
600	85	8 or 6+6	1.18	7.01	28.74	43.11
800	95	8 or 6+6	2.66	13.04	38.32	57.48
900	100	6 + 6	2.66	18.30	43.11	64.67
1000	115	6 + 6	2.66	21.52	47.90	71.85
1200	120	8 + 8	3.55	33.57	57.48	86.22
1400	135	8 + 8	3.55	46.21	67.06	100.60
1600	140	8 + 8	3.55	65.40	76.64	114.96
1800	150	12 + 12	9.36	87.10	86.22	129.33
2000	170	12 + 12	9.36	97.90	95.80	143.70
2200	185	12 + 12	9.36	133.30	105.38	158.07

Note:

1. If mild steel is used for spiral reinforcement, the weight specified under col.5 shall be increased to 140/125.
2. The longitudinal reinforcement given in this table is valid for pipes up to 2.5 m. effective length for internal diameter of pipe up to 250 mm and up to 3 m. effective length for higher diameter pipes.
3. Total mass of longitudinal reinforcement shall be calculated by multiplying the values given in col.4 by the length of the pipe and then deducting for the cover length provided at the two ends.
4. Concrete for pipes shall have a minimum compressive strength of 35 N/mm<sup>2</sup> at 28 days.

Table – 2

Design and Strength Test Requirements of Concrete Pipes of Class NP3

Reinforced Concrete, Medium Duty, Non-Pressure Pipes Made by Vibrated Casting Process

Internal Diameter	Minimum	Reinforcements	Strength Test Requirements for Three Edge Bearing Test
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of Pipes in mm	Barrel Wall Thickness	Longitudinal, Mild Steel or Hard Drawn Steel		Spirals, Hard Draws Steel	Load to Produce 0.25 mm Crack kN/linear meter	Ultimate Load kN/linear meter
		Minimum number	Kg/linear meter	Kg/linear meter		
(1)	(2)	(3)	(4)	(5)	(6)	(7)
300	50	8	0.78	1.53	15.5	23.25
400	60	8	0.78	1.6	19.16	28.74
600	75	8 or 6 +6	1.18	2.2	28.74	43.11
800	95	8 or 6 +6	2.66	6.87	38.32	57.48
900	100	6 + 6	2.66	11.55	43.11	64.67
1000	115	6 + 6	2.66	15.7	47.9	71.85
1200	125	8 + 8	3.55	21.25	57.48	86.22
1400	140	8 + 8	3.55	30	67.06	100.6
1600	165	8 + 8	3.55	50.63	76.64	114.96
1800	180	12 + 12	9.36	64.19	86.22	129.33
2000	190	12 + 12	9.36	83.12	95.8	143.7
2200	210	12 + 12	9.36	105.53	105.4	158.07

Note: Concrete for pipes shall have a minimum compressive strength of 35 N/mm<sup>2</sup> at 28 days

#### 4.4 Workmanship and Finish

4.4.1 Pipes shall be straight and free from cracks except that craze cracks may be permitted. The ends of the pipes shall be square with their longitudinal axis so that when placed in a straight line in the trench no opening between ends in contact shall exceed 3 mm in pipes up to 600 mm diameter (inclusive), and 6 mm in pipes larger than 600 mm diameter

4.4.2 The outside and inside surfaces of the pipes shall be smooth, dense and hard, and shall not be coated with cement wash or other preparation unless otherwise agreed to between Owner/Engineer and the manufacturer or supplier.

4.4.3 The pipes shall be free from defects resulting from imperfect grading of the aggregate, mixing or molding.



4.4.4 The pipes shall be free from local dents or bulges greater than 3 mm in depth and extending over a length in any direction greater than twice the thickness of barrel..

4.4.5 The deviation from straight in any pipe throughout its effective length, tested by means of a rigid straight edge parallel to the longitudinal axis of the pipe shall not exceed, for all diameters 3 mm forever meter run

#### 4.5 Testing

All pipes for testing purposes shall be selected at random from the stock of the manufacturer and shall be such as would not otherwise be rejected under the criteria of tolerances as mentioned in IS: 458.(Latest Edition)

During manufacture, tests on concrete shall be carried out as per IS: 456. The manufacturer shall supply, when required to do so by Owner/Engineer the results of compressive tests of concrete cubes and split tensile tests of concrete cylinders made from the concrete used for the pipes. The manufacturer shall supply cylinders or cubes for test purposes required by the Owner/Engineer and such cylinders or cubes shall withstand the tests prescribed by the manufacturer for the hydrostatic test pressure. For non-pressure pipes, 2 percent of the pipes shall be tested for hydrostatic test pressure.

The specimen of pipes for the following tests shall be selected in accordance with relevant Clause of IS: 458 (Latest Edition) and tests in accordance with the methods described in IS: 3597.

- i) Hydrostatic test
- ii) Three edge bearing test
- iii) Absorption test.

Note: Three edge bearing strength to produce 0.25 mm crack in case of special design of pipes shall be as per IS:458:2003.

For Inspection at manufacturing site 24 hrs. Access shall be provided to BMC Engineers as well as engineer appointed by PMC/TPI agency. Apart from this BMC will establish its own pipe testing facility where pipes will be randomly tested. The cost of transporting the pipe to the testing facility & testing charges shall be borne by the contractor

#### 4.6 Sampling and Inspection

4.6.1 In any consignment, all the pipes of same class and size and manufactured under similar conditions of production shall be grouped together to constitute a lot. The conformity of a lot to the requirements of this specification shall be ascertained on the basis of tests on pipes selected from it

4.6.2 The number of pipes to be selected from the lot for testing shall be in accordance with Table 15 of IS: 458 (Latest Edition).

4.6.3 Pipes shall be selected at random. In order to ensure randomness, all the pipes in the lot may be arranged in a serial order and starting from any pipe, every 'n'th pipe be selected till the requisite number is obtained, n being the integral part of  $N/n$ , where N is the lot size and n is the sample size.

4.6.4 All pipes selected as per IS: 458 shall be inspected for dimensional requirements, finish and deviation from straight. A pipe failing to satisfy one or more of these requirements shall be considered as defective.

4.6.5 The number of pipes to be tested for tests under IS: 458 shall be in accordance with column 4 of Table 15 of IS: 458 (Latest Edition). These pipes shall be selected from pipes that have satisfied the requirements mentioned in Clause above.

4.6.6 A lot shall be considered as conforming to the requirements of IS:458 (Latest Edition) of the following conditions are satisfied.

**(a)** The number of defective pipes shall not be more than the permissible number given in column 3 of Table 15 of IS: 458 (Latest Edition).

**(b)** All the pipes tested for various tests as per IS-458 shall satisfy corresponding requirements of the tests.

**(c)** In case the number of pipes not satisfying requirements of any one or more tests, one or two further samples of same size shall be selected and tested for the test or tests in which failure has occurred. All these pipes shall satisfy the corresponding requirements of the test

#### 4.7 Marking

The following information shall be clearly marked on each pipe:

(a) Internal diameter of pipe.

(2) Class of pipe.

(3) Date of manufacture, and

(4) Name of manufacturer or his registered trademark or both.

(5)

#### LAYING OF PIPES

The laying of RCC pipes shall confirm to Technical Specifications: Item:-6

#### JOINTING

##### GENERAL

Jointing of RCC pipes shall be done with SRC cement only and as per the requirements of following specifications and as per the relevant IS. The type of joints shall be as below. After jointing, extraneous material, if any, shall be removed from the inside of the pipe and the newly made joints shall be thoroughly cured. In case, rubber-sealing rings are used for jointing, these shall conform to IS 5382 and shall be of such type as mentioned in IS-458:2003.

#### 1. FLUSH JOINT (INTERNAL)

This joint shall be generally used for culvert pipes of 900-mm diameter and over. The ends of the pipes are specially shaped to form a self-centering joint with an internal jointing space 13-mm wide. The finished joint is flush with both inside and outside with the pipe wall. The jointing space is filled with cement mortar in the proportion as specified in IS-458-2003, mixed sufficiently dry to remain in position when forced with a trowel or rammed.

#### 2. FLUSH JOINT (EXTERNAL)

This joint is suitable for pipes which are too small for jointing from inside. This joint is composed of specially shaped pipe ends. Each end shall be butted against each other and adjusted in correct position. The jointing space shall then be filled with cement mortar as specified in IS-458-2003, sufficiently dry and finished off flush. Great care shall be taken to ensure that the projecting ends are not damaged as no repairs can be readily affected from inside the pipe

### 3. Spigot and Socket Joint (Flexible)

The RCC pipe with the rubber ring accurately positioned on the spigot shall be pushed well home into the socket of the previously laid pipe by means of uniformly applied pressure with the aid of a jack or similar appliance. The RCC pipes shall be of spigot and socket type and rubber rings as specified in IS-458-2003, shall be used, and the manufacturer's instructions shall be deemed to form a part of these specifications. The rubber rings shall be lubricated before making the joint and the lubricant shall be soft soap water or an approved lubricant supplied by the manufacturer. Socket & Spigot NP3 & NP4 pipe with rubber ring roll on joint for diameter up to 900 mm should be provided as per table 14 of IS 458 : 2003. Socket & spigot NP3 & NP4 pipe with rubber ring confined joint for diameter 1000 mm to 2200 mm should be provided as per Table -17 of IS 458:2003

### 4. Cleaning Of Pipes

As soon as a stretch of RCC pipes has been laid complete from manhole to manhole or for a stretch as directed by Owner/Engineer, contractor shall run through the pipes both backwards and forwards a double disc or solid or closed cylinder 75 mm less in diameter than the internal diameter of pipes. The open end of the incomplete stretch of pipeline shall be securely closed as may be directed by Owner/Engineer to prevent entry of mud or silt etc.

If as a result of the removal of any obstructions Owner/Engineer considers that damages may have been caused to the pipelines, he shall be entitled to order the stretch to be tested immediately. Should such test prove unsatisfactory, contractor shall amend the work and carry out such further tests as are required by Owner/Engineer.

It shall also be ascertained by contractor that each stretch from manhole to manhole or the stretch as directed by Engineer is absolutely clear and without any obstruction by means of visual examination of the interior of the pipeline suitably enlightened by projected sunlight or otherwise.

### 5. Testing At Work Site

After laying and jointing of RCC pipes is completed the pipe line shall be tested at work site as per the following specifications and as directed by Owner / Engineer In-Charge. All equipment for testing at work site shall be supplied and erected by contractor and shall be rectified by him to the full satisfaction of Owner / Engineer In-Charge.

After the joints have thoroughly set and have been checked by Owner/Engineer and before backfilling the trenches, the entire section of the sewer or storm water drain shall be proved by contractor to be water tight by filling in pipes with water to the level of 1.50 m above the top of the highest pipe in the stretch and heading the water up for the period of one hour. The apparatus used for the purpose of testing shall be approved by Owner/Engineer. Contractor if required by Owner/Engineer shall dewater the excavated pit and keep it dry during the period of testing. The loss of water over a period of 30 minutes should be measured by adding water from a measuring vessel at regular 10 minutes intervals and noting the quantity required to maintain the original water level. For the approval of this test the average quantity added should not exceed 1 liter/hour/100 linear meters/10 mm of nominal internal diameter. Any leakage including excessive sweating which causes a drop in the test water level will be visible and the defective part of the work should be removed and made good.

In case of pressure pipeline, the completed stretch of pipeline shall be tested for site test pressure as specified in IS-458-2003. The site test pressure should not be less than the maximum operating pressure

plus the calculated surge pressure, but in no case should it exceed the hydrostatic test pressure as specified in IS:458 (Latest Edition).

#### Measurement

All RCC pipes shall be measured according to the work actually done and no allowance will be made for any waste in cutting to the exact length required. The measurement for pipes shall be in running meter nearest to a cm. of length along the center line of pipe as actually laid at work sites.

The rate for providing, laying and jointing of RCC pipes shall be deemed to include the cost of rubber rings, jointing material, testing and extra excavation required for ordinary bedding of pipes and also for pipe sockets, if any.

#### Notes:

1. If any damage is caused to the pipeline during the execution of work or while cleaning/testing the pipeline as specified. Contractor shall be held responsible for the same and shall replace the damaged pipeline and retest the same at his own cost to the full satisfaction of Engineer.
2. Water for testing of pipeline shall be arranged by Contractor at his own cost.
3. Pipes shall be brought on site proportionate to the required progress for Thirty days only.

#### Item No. 3, 3.1

**RCC precast M.H. Frame & Cover Manufacture, supply & Delivery at store or at site of work precast RCC M.200 Frame & cover suitable to drainage M.H. and as per type design & Drawing including cost of reinforcement M.S. Angles or Flate, curing mold work etc.**

#### Heavy Duty

- **Frame.**
- **Cover**

Precast RCC Manhole Frame & cover shall be as per IS: 12592 (part – I & II). The M.H. Frame & Cover shall be of Heavy duty of Grade designation HD- 20 – Circular of Internal clear opening 500 mm.

Materials such as cement, aggregate, water, reinforcement shall be of standard as prescribed in the material part. Other materials to be used for Frame & Cover shall be as under:

#### Concrete:

The mix proportions of concrete shall be determined by the manufacturer and shall be such as will produce a dense concrete without voids, honey combing, etc. (IS: 456 – 1978). The minimum cement content in the concrete shall be 360 Kg/m<sup>3</sup> with a maximum water content ratio of 0.45. Concrete weaker than grade M 30 shall not be used. Compaction of concrete shall be done by machine vibration.

#### Steel Fibers:

The diameter/equivalent diameter of steel fibers shall not be greater than 0.75 mm. The aspect ratio of the fibers shall be in the range of 50 to 80. The minimum volume of fibers, where used, shall be 0.5 percent of the volume of the concrete.

**Additives or Admixtures:**

Additives or admixtures may be added either as additives to the cement during manufacture, or as admixtures to the concrete mix. Additives or admixtures used for covers may be:

- a) Accelerating, water-reducing and air-entertaining admixtures confirming to IS: 9103-1979.
- b) Coloring pigments
- c) Fly ash confirming to IS: 3812-1981
- d) Water proofing agents conforming to IS: 2645-1975.

**Dimensions and Tolerances:**

Length, breadth and diameter of precast concrete manhole covers shall be such that the maximum clearance at top between the cover & frame of corresponding grade and shape shall be 5 mm. The minimum thickness of heavy-duty precast manhole cover shall be 70 mm. The top surface of frame & cover is in level within a tolerance of  $\pm 5$  mm.

Placing of reinforcement, compaction of concrete & curing shall be attended as per IS: 12592. Edge Protection & Finishing shall be provided as per IS.

**Physical requirements**

All the frame & covers shall be sound and shall be free from cracks & other defects, which interferes with the proper placing of the units or impair the strength or performance of the units. Minor chippings resulting from the customary methods of handling and transportation shall not be deemed ground for rejection.

**Marking: Each Cover shall have following marking:**

Date of manufacture

Grade Designation

ISI mark

BMC - Identification mark

**Testing:**

Frame & covers will be tested at factory by owner / consultant & accepted goods shall be procured on site of work.

**Payment:**

The rate shall be paid on number basis for set of Frame & Cover.

#### Item No. 4 to 4.4

#### Sewer Manholes

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 ,inside and outside 15mm thick plastering in C. M. 1:3 necessary 100 mm coping in R.C.C.M. 200 fixing C. I. steps and fixing manhole frame and covers (But excluding supply of manhole frame and covers) over manholes and house connection chambers and fixing Manhole covers (but excluding supplying of manhole covers) over scraper manhole etc. complete, providing and fixing safety chain wherever necessary as per the stipulations in the type desing complete (excl. excavation).

Sr.No	Description
4.0	Manhole type "A" Circular type having inside diameter of 1200 mm for depth upto 1.5 m depth (for 150 mm to 500 mm dia sewer) (A)Manhole type "A" as above but up to 1.0 M depth.
4.1	Extra depth beyond 1.0 M but up to 1.5 M depth for "A" type manhole above.
4.2	(B)Manhole type "B" circular type having inside diameter of minimum 1500 mm and for depth from 1.5 M to 4.0 M (for 150 mm to 600 mm dia sewers) Manhole type "B" as above but up to 1.5 M depth.
4.3	Extra depth beyond 1.5 M but up to 4.0 M depth for type B manhole above.
4.4	Manhole type "C" circular type having inside diameter of minimum 1500 mm and for depth beyond 4.0 m to 6.0 m (for 150 mm to 1800 mm dia sewers) Manhole type "C" as above but up to 4.0 M depth.

#### 1. MATERIALS :

Water shall conform to M-1,Cement Conform, Stone coarse aggregate of nominal size shall conform , Grit shall conform , Steel reinforcement shall conform. Brick shall conform, Cement mortar of specified proportion shall conform, The cast iron steps shall conform.

Manhole cover with frame of required size and weight shall be procured by the contractor. Supply of manhole frame and cover shall be paid separately under respective item.

#### 2. WORKMANSHIP :

The manhole of different types and sizes as specified shall be constructed in sewer line at such place and to such levels and dimension as shown in drawing or as directed.

#### Excavation :-

The excavation for construction of manhole including dismantling of all types of roads surface guarding, barricading, lightening the trenches, baling out water 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 consolation etc. complete shall be carried out as per relevant specification, including disposal of surplus soil as directed.

#### Concrete work :-

The bed concrete in C.C. 1:3:6, Coping in C.C. 1:1.5:3 and benching concrete in proportion C.C. 1:2:4 (1 Cement : 2 coarse sand : stone aggregate of 20 mm nominal size) by volume with necessary centering and

shuttering work shall be provided. It shall be placed, deformed and or vibrated and cured as directed by Engineer-in-charge.

#### **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 in size and by using stay block or metal chair spacers, metal hangers, supporting wires or other approved devices at sufficiently close intervals. Bars shall not be allowed to lag between supports nor displaced during concrete or 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 bent 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 bent 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 bars which are not round and in case of deformed bars, the diameter shall be taken as the diameter of circle having an equivalent effective area. The cold twisted steel bars shall be used 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 neither shear nor 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 so staggered 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.

#### **PLASTER WORK :**

The surface shall be cleaned of all dust, loose mortar droppings, traces of algae efflorescence and other foreign matter by water or by brushing. Smooth surface shall be roughened by wire brushing not hard by racking if it is hard. In case of concrete surface, if a chemical retarder has been applied to the form work the surface shall be roughened by wire brushing and all the resulting dust and loose particles cleaned off



and care shall be taken that none of the retarders is left on the surface. Trimming of projections on brick / concrete surface where necessary shall be carried out to get an even surface.

The work shall be soaked but only damped evenly before applying the plaster. If the surface become dry, such areas shall be moistened again.

The plaster about 15 x 15 cms. shall be first applied horizontally and vertically at not more than 2 meters intervals over the entire surface to serve as gauge. The surface of these gauges shall be truly in plane of the finished plastered surface. The mortar shall then be applied in uniform surface slightly more than the specified thickness, then brought to a true surface by working a wooden straight edge reaching across the gauges with small upward and sideways movements at a time. Finally, the surface shall be finished off true with a trowel of wooden float accordingly excessive troweling of over working the float shall be avoided. All corners, arises, angles and junctions shall be truly vertical or horizontal as the case may be and shall be carefully finished. Rounding or chamfering corners, arises, junctions etc. shall be carried out with proper templates the size required.

Cement mortar for plaster shall be used within half an hour after addition of water. And mortar for plaster which is partially set shall be rejected and removed forthwith from the site.

In suspending the work at the end of the day, the plaster shall be left out clean to the line both horizontally and vertically, when recommencing the plaster the edge of the old work shall be scraped clear and wetted with cement putty before plaster is applied to the adjacent areas to enable the two to properly get together. Plastering work shall be closed at the end of the day on the body of the wall and nearer than 15 cm. to any corners or arises. It shall not be closed on the body of features such as plaster bends and cornices not at the corners or arises. Horizontal joints in plaster work shall not also occur on walls and copings these invariably leads to leakage. No portion of the surface shall be depth out initially to be packed up later on.

#### **POINTING :**

The flush pointing work shall be carried out with cement mortar of required proportion by volume. Before pointing to be started the joints shall be raked to such depth that the average of new mortar measured from the sunk surface of the finished pointing or from the edge of the brick shall be average 10 mm.

The mortar shall be pressed into the raked out joints with a pointing trowel according to the type of pointing specified in item or as directed. The mortar shall not spread over the corners of finished work i.e at fixing of C.I. Steps and M.H. cover.

#### **RCC WORK :**

Vertical shaft of manhole shall be in RCC M-30 pre-cast.

The entries and exits of main sewers as well as house service sewers requires careful detailing because the issue of puncturing the walls for insertions of especially house service sewers later on is impossible. These shall be managed as detailed below.



- The cone portion shall be separately cast and its design standardized with respect to the diameter of its base.
- The vertical shaft is best pre-cast to have a better quality control of raw materials and workmanship, which is otherwise very suspect in local situations of every manhole.
- The shaft itself shall be made of rings with lap joints of the annular rim and duly jointed at site by cement mortar or elasto-polymers. The varying heights of the manhole are obtained by choosing the bottom ring deeper than the fractional height needed there and filling up the bottom floor after placing the ring such that the invert level of the sewer is obtained thereby.
- This ring shall have a vertical inverted U cut out in casting itself to insert the sewer pipes and caulk the annular space using cement concrete with cement-based water proofing admixtures. The dimensions of the U cut out shall be standardized to match the OD of proposed sewers and a clear cover of 50 cm all round for caulking.
- The position of the vertical inverted U cut outs will normally be 180 degrees apart in plan but in cases of junction manholes and drop manholes it may be at differing angles in plan and needs to be precast suitably and shall not be chiseled out in the field.
- For insertion of the house service sewers into the manholes, it is necessary to have a precast ring section below the corbel portion, with holes at 45 degrees to the public sewer line to facilitate insertion of three house service sewers on each side of the public sewer axis. Usually the house service sewers shall be 110 mm or 160 mm UPVC 4 kg/sqcm (as detailed in sewer laying section). Accordingly, the height of the ring shall be 250 mm and 300 mm to permit filling of the annular interspaces between the sewer and the opening with cement concrete of at least 50 mm around the finished sewer.

Trimming of projections on brick / concrete surface where necessary shall be carried out to get an even surface.

#### **FIXING OF POLY PROPYLENE STEPS AND MANHOLE COVER :**

During the construction of masonry wall of the manhole the cement mortar of required proportion shall be used for embedding the Poly propylene steps in the wall masonry. The spacing of steps in the masonry shall be 300 mm center to center in the staggered position in the vertical direction with two staggered rows at 385 mm center to center in the horizontal direction. The top of the manhole shall not be more than 300 mm above the first step from top of manhole frame and cover and the center line of two staggered rows shall be the center line of the shorter side of manhole frame in the roof of chamber.

#### **The detailed specifications for the "Poly propylene steps as below:**

The Polypropylene conforming to an ASTM D-4101, injection molded around a 12 mm dia. IS 1786 grade Fe-415 steel reinforcing bar and should meet the load required 225 Kg. as per IS-5455. The measurement should be as per attached drawing. The tolerance in the length and width is +/- 5 mm and +/- 1 mm in thickness. The weight of the steps should not be less than 0.900 Kg. Un chequered portion of the step shall be inserted with the rich cement mortar during the course of masonry work so constructed around the steps as to keep the step on its right position. The non-slip grip chequered portion of the steps shall be well kept outside the masonry.

During fixing of the steps, the wall should not be damaged and shall not vibrate or shall not shake during ascents and descents otherwise they shall have to be re fixed correctly as per the drawings or as mentioned above.

Manhole frame shall be firmly and securely laid on top of shafts of conical tops in 25 mm thick cement mortar and shall be embedded in 150 mm thick cement concrete of proportion 1:2:4 (1 Cement : 2 coarse sand : 4 Kapchi as aggregate of 20 mm nominal size) in such a way that the top of M.H. frame shall be flush with concrete surface and top surface neatly finished 25 mm thick with cement mortar 1:3 in conformity with ground or road levels.

• **OTHER REQUIREMENTS :**

As per line and level and size of the manhole pit shall be excavated as per drawing or as ordered by the Engineer.

The foundation concrete 1:3:6 with required thickness as per drawing or as directed shall be laid after compacting the bottom of the pit. The cement concrete shall conform to specified specification of Cement Concrete.

The clear inside chamber size of opening shall be as per the drawing or as directed by the Engineer-in-charge.

The masonry wall shall be plastered inside and outside with 15 mm thick 1:3 cement mortar. The offset for the concrete foundation shall be 100 mm on all sides beyond walls of chamber.

Whenever pipes enter or leave the masonry chamber bricks on edge must be so laid around the upper half of the pipes so as to form the arch to prevent the weight of the masonry chamber over it.

On the top of masonry walls RCC coping 1:1.5:3 150mm thick or as directed shall be laid and then 1:1 cement mortar shall be laid and then R.C.C. slab of grade 1:2:4 necessary and as directed by the Engineer with coarse aggregate of trap metal of 20 mm nominal shall be laid necessary from work and centering shall have to be provided by the contractor at his own cost as per relevant specification of cement concrete.

In the bottom of manhole the channel and benching shall be done in C.C. 1:2:4 (1 Cement : 2 Coarse sand : 4 graded stone aggregate of 20 mm nominal size) The channel at the bottom of the chamber shall be plastered 15 mm thick in c.m. 1:3 (1 Cement : 3 fine sand) and steel trowel smooth.

Channels shall be in semicircular in the bottom half and a diameter equal to the sewer. Above the horizontal diameter, the side shall be extended vertically to the same level as the crown of the outgoing pipe and the top edge shall be suitably rounded off. The branch channels shall also be similarly constructed with respect to the benching but at their junctions with the main channel an appropriate fall suitably rounded off in the direction of flow in the main channel shall be given.

For conical shaft of manhole necessary conical portion shall be treated from 750 mm below the bottom of concrete of slab for fixing of manhole cover and frame.

The item includes curing of all the cement work for 14 days.

If dewatering is required by installing pumping sets the same shall be paid separately

Under respective item.

• **MODE OF MEASUREMENTS & PAYMENTS :**

Payment shall be made on the basis as per number of masonry manholes chambers constructed with all constructing materials labours, refilling curing, finishing providing and fixing C.I. steps, constructing laying half round gutter fixing R.C.C. manhole cover etc. complete in all respect for incomplete item. Payment will be made on part rate basis.

The item will be paid per No. of construction of complete RCC manhole chamber as shown in the drawing up to the depth specified and shown in the type design drawing. For every increase or decrease in the minimum specified depth of masonry manhole chamber increase or decrease in rate shown in schedule B will be paid taking in consideration every 10 CM increase or decrease depth of masonry chambers. For the purpose of payment of RCC chamber every increase or decrease of the 10 cm depth than the specified minimum depth of masonry manhole chambers as shown in drawing/ or in Schedule-B will paid more or less for every 10 cm depth.

The measurements shall be made for number of chamber constructed and for additional depth plus or minus the rate shall be paid for meter length correct up to 10 cm depth plus or minus. The surplus excavated stuff shall be disposed of within municipal limits. as directed by Engineer-in-charge without any extra claim.

The depth of manholes shall be the distance between the top manhole cover and the invert level of the main drain. The rate includes all labours, materials, tools and plant etc. required for satisfactory completion of this item as directed above.

The item include :-

- (i) Bed concrete slab concrete and copping with necessary reinforcement.
- (ii) Providing and fixing polypropylene steps.
- (iv) Carting, conveying and fixing of manhole frame cover with necessary concrete and finishing.
- (v) Refilling with necessary watering and consolidation.
- (vi) Excavation with shoring is required.
- (vii) Leveling coarse concrete
- (viii) Disposal of surplus soil
- (ix) Curing for 14 days.

## Item No.5 & 5.1

### Vertical Drop Manhole.

Providing and constructing vertical drop arrangement of 0.6 m and more height as required including providing and jointing special such as double T. Bend required stoneware pipe fixed in m-100 C. C. at required level as type design cutting, jointing and filleting as per specification etc. complete.

Sr.No	Description
5.0	Vertical drop arrangement as above up to 0.6 m height.
5.1	Extra over item No.4 above for additional drop beyond 0.6 m

### Workmanship:

All the materials such as cement, sand, water aggregate, stone ware pipe fittings etc shall be as per general specification of materials of this document. The work of excavation, plain cement concrete shall be executed as detail furnished elsewhere in this document.

When a sewer connects a main sewer, and where the difference in level between sewer line (peak flow levels) of main line and the invert level of branch line is more than 600 mm or a drop of more than 600 mm is required to be given in the same sewer line and it is uneconomical or impractical to arrange the connection within 600 mm, a drop connection shall be provided for which a manhole shall be constructed as per relevant drawing, incorporating a vertical drop pipe from the higher sewer to the lower one. This pipe shall be provided outside the shaft and encased in concrete.

A continuation of the branch sewer should be built through the shaft wall to form a ridding and inspection eye, which should be provided with a half blank flange. The diameter of the backdrop should be at least as large as that of the incoming pipe. The drop pipe should terminate at its lower end with a plain or duck-foot bend turned so as to discharge its flow at 45 degrees or less to the direction of the flow in the mains sewer.

This shall be accomplished by providing a S.W. cross piece at junction joint and encasing the ground pipe with C.C. M-10. The pipe unless of cast iron should be surrounded with 150 mm thick concrete as per drawing. The Stoneware pipe & fitting shall be as per relevant IS specification. Detail specification of Stoneware pipe & fitting as given in general material specification shall be followed.

### Mode of Measurement & payment:

The measurement of Drop will be taken on Number basis as per type design. Additional depth more than 0.60 m will be paid as an additional depth on R.mt. basis.

## Item No.6

Excavation for pipeline trenches for water supply, sewerage line, manhole etc. all with shoring and strutting if required as per required gradient and line including safety provisions using site rails and stacking excavated stuff including up to all required lead cleaning the site etc. complete for all lifts and strata as specified. Depth up to 0.00 m to 1.5 m depth.

Sr. No.	Size
6.0	In all sorts of soil & soft murrum
6.1	In hard murrum,boulders
6.2	In soft rock and/or masonry in CM or L M or Lime Concrete.
6.3	In hard rock with blasting and chiseling or by chilling only for finishing.

### 1.0 GENERAL

1.1 The excavation for trenches will generally, refer to open excavation for trenches in wet / dry conditions for pipe laying work.

### 2.0 CLEARING OF SITES:

2.1 The site on which the pipelines are to be laid and shown on plan and the area required for setting out and other operations shall be cleared and all obstruction loose stones and materials, rubbish of all kinds, stumps, brushwood as trees shall be removed as directed the roots shall be entirely grubbed up.

2.2 The products of the clearing to restocked in such a place and in such a manner, as directed by the engineer in charge.

2.3 In jungle clearings, all trees not specially marked for preservation, bamboo's jungle wood and brushwood shall be cut down their roots grubbed up. All wood and materials from the clearing shall be the property of the local body shall be arranged as directed by the Engineer-in-charge or his authorized agent, the material pronounced as useful by the Engineer will be conveyed and properly stacked as directed within the specified limit. Unless materials will be burnt or otherwise disposed off as directed.

2.4 All holes or hollows whether originally existing or produced by digging up roots, shall be carefully filled up with earth, well earth, well rammed leveled off, as may be directed.

### 3.0 SETTING OUT:

The center lines of all pipe trenches etc. shall be given by the Engineer-in-charge and it will be the responsibility of the contractor to install substantial reference marks, bench marks, etc. and maintain them as long as required true to line, level curve and slopes. The contractor shall assure full responsibility for alignment, and dimension of trench.

The labor materials etc. required for setting out and establishing benchmarks and other reference marks shall be arranged by the contractor at his own cost.

## 4 EXCAVATIONS

4.1 The excavation incl. Bailing out of water for the pipe trenches shall also incl. Removal of all materials of whatever nature and whether wet or dry condition necessary for laying of pipelines exactly in accordance with alignment, levels grades and curves shown on the plans or as directed by the Engineer-in-charge. Trenches shall be excavated to the exact width and depth according to the size of pipe and the sides shall be left vertical as far as possible or according to the angle of repose various soils. Unless there is a specific extra provision in the contract for shoring and strutting or for cutting side slopes the contractor shall at his own cost do the necessary shoring and strutting or cutting of slopes to a safe of repose or both

approved by the Engineer-in-charge. The contractor shall notify the Engineer before starting excavation to enable him to take cross sectional levels for purpose of measurements before the ground is disturbed. The bottom of the trenches shall be leveled both longitudinally and transversely or slopped as directed by the Engineer. The contractor shall at his own cost to remove such portions of boulders or rocks, as are rectified to make the bottom of the trench level. No filling shall be allowed to bring the trench to level. If by contractor's mistake excavation is made deeper than shown on the plans and if ordered by the Engineer the extra depth shall have to be made with selected excavated stuff only with watering, remedying etc. as directed, by the Engineer and at the cost of the contractor. Other hard excavation shall be cleared of all sorts and loose materials and cut to firm surface, either level, stepped as directed by the Engineer. The Engineer may order such charges in the dimensions and alignment of pipe trench as may be deemed necessary to secure satisfactory cover over pipeline. The contractor shall, at his own expense, make provision for bailing out of draining water and the trenches shall be kept free of water, during laying work.

After each excavation is completed, the contractor shall notify the Engineer to that effect and no laying of pipeline will be allowed to laid until Engineer has approved the depth and dimensions of trenches level and measurements.

## **5.0 SHORING AND STRUTTING:**

**5.1** Shoring & strutting and dewatering if required shall have to be carried out by the contractor, for which any extra charge will not be paid

**5.2** During excavation if water connections, sewage connections, telephone lines khalkuva (soak pits) etc. are damaged by the contractor, the same shall have to be restored by the contractor without any extra payment.

## **6.0 PROTECTION**

**6.1** The trenches shall be strongly fenced and red light signal shall be kept at night and arrangement of watchman to prevent accidents should be done, sufficient care protective measure shall be taken to see that the excavation shall not affect or damage the adjoining structure. The contractor shall be entirely responsible for any injury to life and damage to the properties etc. Necessary protection work such as guide ropes, crossing places, barricades, caution boards etc. shall be provided by the contractor.

**7.0** The excavation in all sorts of soil, hard murrum, soft rock or hard rock or any type of soil shall have to be carried out up to the required depth by the agency

## **8 DISPOSALS OF EXCAVATED STUFF**

**8.1** No excavated stuff from trench are to be placed even temporarily nearer than 1.5 meter or greater distance up to 90 meter or as prescribed by the Engineer from the outer edge of trench. All excavated material will be the property of the board. The rate of excavated includes sorting out of useful materials and stacking then separately as directed within specified lead. The excavated stuff suitable and useful for refilling or for other use shall be stacked at convenient places. The materials not useful in any wet shall be disposal off as directed by the Engineer from the outer edge of trench.

**8.2** The site should be cleared off on completion of work.

## **9.0 ADDITIONAL REQUIREMENTS**

### **9.1**

At the joints of pipes, the trench shall be excavated to an additional depth of 15 cm. and width of 30 cm. And length of 15 cm. beyond the edge of collar on both the sides or as directed. The rate includes for such extra excavation made at the joints. The trenches shall be excavated perfectly in straight line. The bottom of the trench shall be kept as per invert level or as directed. To maintain the proper slop the usual method of site rails and boning rods shall be adopted. The contractor shall have to provide and fix and maintain sight rails and boning rod without any extra cost.

If the contractor fails or makes delay to give hydraulic test of the pipe line laid in any of the section, without any genuine reason, he shall be responsible to get any part of the length trenches refill in such case i.e. before tasting for safety of pedestrian and/or vehicular traffic as found necessary by the engineer-

in-charge without any extra cost. If found necessary any directed by the Engineer-in-charge. The contractor shall have to excavate the refilled trenches, during hydraulic test without any extra cost.

At all road crossings, trenches shall be excavated only for half width of the road and pipe shall be laid. The other half shall be excavated only after back filling over the laid pipeline is done so as to make it suitable for the traffic. The contractor shall provide direction when the pipeline is to be laid along the road as required and shall maintain the diversion or any part of it, without any extra cost. At all road crossings, the pipe shall be laid below the crest of road.

**9.2** The contractor shall break the road surface by excavation chiseling to the exact width and length as shown on the drawing or as directed by the Engineer-in-charge.

The excavated stuff shall be deposited in uniform layers to avoid mixing with other kind of materials at non-objectionable place or as directed by the Engineer-in-charge.

**10.0 MEASUREMENT AND PAYMENT**

**10.1** The payment of excavation shall be made at the unit rate per cubic meter for the quantity actually excavated and accepted by the Engineer in charge limited to dimensions shown in the sanctioned plans or as directed by the Engineer. Excavation in excess of the sanctioned dimensions shall not be measured not paid for and if an ordered by the Engineer the contractor shall have to fill up the excess depth with excavated stuff with watering ramming etc. (Completed as specified) for trench without any extra payment to the contractor.

**10.2** Dimension shall be correct to two places of decimals of a meter and individual quantity shall of decimals of a meter and individual quantity shall be calculated to two places of decimals of a cubic meter.

**10.3** The rate for the item of excavation shall include unless and otherwise mentioned.

- (a) Clearing of site.
- (b) Setting out work including all materials and labour.
- (c) Providing and subsequently removing, shoring and strutting outing slopes etc.
- (d) Excavation and removal and staking of all excavated stuff as directed.
- (e) Necessary protection including labour materials equipment etc. to ensure safety and protection against risk or accident.
- (f) Providing facilities for inspection and damage to property if caused during **progress** of work.
- (g) Compensation for injury to life and damage to property if caused during progress of work.
- (h) Restoring of water supply connections, sewer connections, telephone lines, khalkuva soapiest etc. if damaged by contractor without extra payment.
- (i) Dewatering of excavated pit trench during the progress of work.
- (j) Clearing the site on completion of works directed by the Engineer.

**Item No.7**

**Excavation for pipeline trenches for water supply, sewerage line, manhole etc. all with shoring and strutting if required as per required gradient and line including safety provisions using site rails and stacking excavated stuff including up to all required lead cleaning the site etc. complete for all lifts and strata as specified.**

**(1.50 m to 3.0 m depth)**

Sr. No.	Size
7.0	<b>In all sorts of soil &amp; soft murrum</b>
7.1	<b>In hard murrum, boulders</b>



7.2	<b>In soft rock and/or masonry in CM or L M or Lime Concrete.</b>
7.3	<b>In hard rock with blasting and chiseling or by chiselling only for finishing.</b>

## **2.0 GENERAL**

2.1 The excavation for trenches will generally, refer to open excavation for trenches in wet / dry conditions for pipe laying work.

### **2.0 CLEARING OF SITES:**

2.1 The site on which the pipelines are to be laid and shown on plan and the area required for setting out and other operations shall be cleared and all obstruction loose stones and materials, rubbish of all kinds, stumps, brushwood as trees shall be removed as directed the roots shall be entirely grubbed up.

2.2 The products of the clearing to restocked in such a place and in such a manner, as directed by the engineer in charge.

2.3 In jungle clearings, all trees not specially marked for preservation, bamboo's jungle wood and brushwood shall be cut down their roots grubbed up. All wood and materials from the clearing shall be the property of the local body shall be arranged as directed by the Engineer-in-charge or his authorized agent, the material pronounced as useful by the Engineer will be conveyed and properly stacked as directed within the specified limit. Unless materials will be burnt or otherwise disposed off as directed.

2.4 All holes or hollows whether originally existing or produced by digging up roots, shall be carefully filled up with earth, well earth, well rammed leveled off, as may be directed.

### **3.0 SETTING OUT:**

The center lines of all pipe trenches etc. shall be given by the Engineer-in-charge and it will be the responsibility of the contractor to install substantial reference marks, bench marks, etc. and maintain them as long as required true to line, level curve and slopes. The contractor shall assure full responsibility for alignment, and dimension of trench.

The labor materials etc. required for setting out and establishing benchmarks and other reference marks shall be arranged by the contractor at his own cost.

## **4 EXCAVATIONS**

4.1 The excavation incl. Bailing out of water for the pipe trenches shall also incl. Removal of all materials of whatever nature and whether wet or dry condition necessary for laying of pipelines exactly in accordance with alignment, levels grades and curves shown on the plans or as directed by the Engineer-in-charge. Trenches shall be excavated to the exact width and depth according to the size of pipe and the sides shall be left vertical as far as possible or according to the angle of repose various soils. Unless there is a specific extra provision in the contract for shoring and strutting or for cutting side slopes the contractor shall at his own cost do the necessary shoring and strutting or cutting of slopes to a safe of repose or both approved by the Engineer-in-charge. The contractor shall notify the Engineer before starting excavation to enable him to take cross sectional levels for purpose of measurements before the ground is disturbed. The bottom of the trenches shall be leveled both longitudinally and transversely or slopped as directed by the Engineer. The contractor shall at his own cost to remove such portions of boulders or rocks, as are rectified to make the bottom of the trench level. No filling shall be allowed to bring the trench to level. If by contractor's mistake excavation is made deeper than shown on the plans and if ordered by the Engineer the extra depth shall have to be made with selected excavated stuff only with watering, remedying etc. as directed, by the Engineer and at the cost of the contractor. Other hard excavation shall be cleared of all sorts and loose materials and cut to firm surface, either level, stepped as directed by the Engineer. The Engineer may order such charges in the dimensions and alignment of pipe trench as may be deemed necessary to secure satisfactory cover over pipeline. The contractor shall, at his own expense, make provision for bailing out of draining water and the trenches shall be kept free of water, during laying work.



After each excavation is completed, the contractor shall notify the Engineer to that effect and no laying of pipeline will be allowed to laid until Engineer has approved the depth and dimensions of trenches level and measurements.

#### **5.0 SHORING AND STRUTTING:**

**5.3** Shoring & strutting and dewatering if required shall have to be carried out by the contractor, for which any extra charge will not be paid

**5.4** During excavation if water connections, sewage connections, telephone lines khalkuva (soak pits) etc. are damaged by the contractor, the same shall have to be restored by the contractor without any extra payment.

#### **6.0 PROTECTION**

**6.1** The trenches shall be strongly fenced and red light signal shall be kept at night and arrangement of watchman to prevent accidents should be done, sufficient care protective measure shall be taken to see that the excavation shall not affect or damage the adjoining structure. The contractor shall be entirely responsible for any injury to life and damage to the properties etc. Necessary protection work such as guide ropes, crossing places, barricades, caution boards etc. shall be provided by the contractor.

**7.0** The excavation in all sorts of soil, hard murrum, soft rock or hard rock or any type of soil shall have to be carried out up to the required depth by the agency

#### **8 DISPOSALS OF EXCAVATED STUFF**

**8.1** No excavated stuff from trench are to be placed even temporarily nearer than 1.5 meter or greater distance up to 90 meter or as prescribed by the Engineer from the outer edge of trench. All excavated material will be the property of the board. The rate of excavated includes sorting out of useful materials and stacking then separately as directed within specified lead. The excavated stuff suitable and useful for refilling or for other use shall be stacked at convenient places. The materials not useful in any wet shall be disposal off as directed by the Engineer from the outer edge of trench.

**8.2** The site should be cleared off on completion of work.

#### **10.0 ADDITIONAL REQUIREMENTS**

##### **9.1**

At the joints of pipes, the trench shall be excavated to an additional depth of 15 cm. and width of 30 cm. And length of 15 cm. beyond the edge of collar on both the sides or as directed. The rate includes for such extra excavation made at the joints. The trenches shall be excavated perfectly in straight line. The bottom of the trench shall be kept as per invert level or as directed. To maintain the proper slop the usual method of site rails and boning rods shall be adopted. The contractor shall have to provide and fix and maintain sight rails and boning rod without any extra cost.

If the contractor fails or makes delay to give hydraulic test of the pipe line laid in any of the section, without any genuine reason, he shall be responsible to get any part of the length trenches refill in such case i.e. before tasting for safety of pedestrian and/or vehicular traffic as found necessary by the engineer-in-charge without any extra cost. If found necessary any directed by the Engineer-in-charge. The contractor shall have to excavate the refilled trenches, during hydraulic test without any extra cost.

At all road crossings, trenches shall be excavated only for half width of the road and pipe shall be laid. The other half shall be excavated only after back filling over the laid pipeline is done so as to make it suitable for the traffic. The contractor shall provide direction when the pipeline is to be laid along the road as required and shall maintain the diversion or any part of it, without any extra cost. At all road crossings, the pipe shall be laid below the crest of read.

**9.2** The contractor shall break the road surface by excavation chiseling to the exact width and length as shown on the drawing or as directed by the Engineer-in-charge.

The excavated stuff shall be deposited in uniform layers to avoid mixing with other kind of materials at non-objectionable place or as directed by the Engineer-in-charge.

## 10.0 MEASUREMENT AND PAYMENT

**10.1** The payment of excavation shall be made at the unit rate per cubic meter for the quantity actually excavated and accepted by the Engineer in charge limited to dimensions shown in the sanctioned plans or as directed by the Engineer. Excavation in excess of the sanctioned dimensions shall not be measured not paid for and if an ordered by the Engineer the contractor shall have to fill up the excess depth with excavated stuff with watering ramming etc. (Completed as specified) for trench without any extra payment to the contractor.

**10.2** Dimension shall be correct to two places of decimals of a meter and individual quantity shall of decimals of a meter and individual quantity shall be calculated to two places of decimals of a cubic meter.

**10.3** The rate for the item of excavation shall include unless and otherwise mentioned.

- (a) Clearing of site.
- (b) Setting out work including all materials and labour.
- (c) Providing and subsequently removing, shoring and strutting outing slopes etc.
- (d) Excavation and removal and staking of all excavated stuff as directed.
- (e) Necessary protection including labour materials equipment etc. to ensure safety and protection against risk or accident.
- (f) Providing facilities for inspection and damage to property if caused during **progress** of work.
- (g) Compensation for injury to life and damage to property if caused during progress of work.
- (h) Restoring of water supply connections, sewer connections, telephone lines, khalkuva soapiest etc. if damaged by contractor without extra payment.
- (i) Dewatering of excavated pit trench during the progress of work.
- (j) Clearing the site on completion of works directed by the Engineer.

### Item No.8

**Excavation for pipeline trenches for water supply, sewerage line, manhole etc. all with shoring and strutting if required as per required gradient and line including safety provisions using site rails and stacking excavated stuff including up to all required lead cleaning the site etc. complete for all lifts and strata as specified.**

**(3.00 m to 4.50 m depth)**

Sr. No.	Size
8.0	In all sorts of soil & soft murrum (Taking quantity of 10 % in 1.50 m to 3.0 m depth)
8.1	In hard murrum,boulders(Taking quantity of 25 % in 3.00 mt. to 4.50 mt depth)
8.2	In soft rock and/or masonry in CM or L M or Lime Concrete.(Taking quantity of 40 % in 3.00 mt. to 4.50 mt depth)
8.3	In hard rock and / or in C. C. 1:2:4 only..(Taking quantity of 25 % in 3.00 mt. to 4.50 mt depth)

### 3.0 GENERAL

3.1 The excavation for trenches will generally, refer to open excavation for trenches in wet / dry conditions for pipe laying work.

### 2.0 CLEARING OF SITES:

**2.1** The site on which the pipelines are to be laid and shown on plan and the area required for setting out and other operations shall be cleared and all obstruction loose stones and materials, rubbish of all kinds, stumps, brushwood as trees shall be removed as directed the roots shall be entirely grubbed up.

**2.2** The products of the clearing to restocked in such a place and in such a manner, as directed by the engineer in charge.

**2.3** In jungle clearings, all trees not specially marked for preservation, bamboo's jungle wood and brushwood shall be cut down their roots grubbed up. All wood and materials from the clearing shall be the property of the local body shall be arranged as directed by the Engineer-in-charge or his authorized agent, the material pronounced as useful by the Engineer will be conveyed and properly stacked as directed within the specified limit. Unless materials will be burnt or otherwise disposed off as directed.

**2.4** All holes or hollows whether originally existing or produced by digging up roots, shall be carefully filled up with earth, well earth, well rammed leveled off, as may be directed.

### **3.0 SETTING OUT:**

The center lines of all pipe trenches etc. shall be given by the Engineer-in-charge and it will be the responsibility of the contractor to install substantial reference marks, bench marks, etc. and maintain them as long as required true to line, level curve and slopes. The contractor shall assure full responsibility for alignment, and dimension of trench.

The labor materials etc. required for setting out and establishing benchmarks and other reference marks shall be arranged by the contractor at his own cost.

## **4 EXCAVATIONS**

**4.1** The excavation incl. Bailing out of water for the pipe trenches shall also incl. Removal of all materials of whatever nature and whether wet or dry condition necessary for laying of pipelines exactly in accordance with alignment, levels grades and curves shown on the plans or as directed by the Engineer-in-charge. Trenches shall be excavated to the exact width and depth according to the size of pipe and the sides shall be left vertical as far as possible or according to the angle of repose various soils. Unless there is a specific extra provision in the contract for shoring and strutting or for cutting side slopes the contractor shall at his own cost do the necessary shoring and strutting or cutting of slopes to a safe of repose or both approved by the Engineer-in-charge. The contractor shall notify the Engineer before starting excavation to enable him to take cross sectional levels for purpose of measurements before the ground is disturbed. The bottom of the trenches shall be leveled both longitudinally and transversely or slopped as directed by the Engineer. The contractor shall at his own cost to remove such portions of boulders or rocks, as are rectified to make the bottom of the trench level. No filling shall be allowed to bring the trench to level. If by contractor's mistake excavation is made deeper than shown on the plans and if ordered by the Engineer the extra depth shall have to be made with selected excavated stuff only with watering, remedying etc. as directed, by the Engineer and at the cost of the contractor. Other hard excavation shall be cleared of all sorts and loose materials and cut to firm surface, either level, stepped as directed by the Engineer. The Engineer may order such changes in the dimensions and alignment of pipe trench as may be deemed necessary to secure satisfactory cover over pipeline. The contractor shall, at his own expense, make provision for bailing out of draining water and the trenches shall be kept free of water, during laying work.

After each excavation is completed, the contractor shall notify the Engineer to that effect and no laying of pipeline will be allowed to laid until Engineer has approved the depth and dimensions of trenches level and measurements.

### **5.0 SHORING AND STRUTTING:**

**5.5** Shoring & strutting and dewatering if required shall have to be carried out by the contractor, for which any extra charge will not be paid

**5.6** During excavation if water connections, sewage connections, telephone lines khalkuva (soak pits) etc. are damaged by the contractor, the same shall have to be restored by the contractor without any extra payment.

## **6.0 PROTECTION**

**6.1** The trenches shall be strongly fenced and red light signal shall be kept at night and arrangement of watchman to prevent accidents should be done, sufficient care protective measure shall be taken to see that the excavation shall not affect or damage the adjoining structure. The contractor shall be entirely responsible for any injury to life and damage to the properties etc. Necessary protection work such as guide ropes, crossing places, barricades, caution boards etc. shall be provided by the contractor.

**7.0** The excavation in all sorts of soil, hard murrum, soft rock or hard rock or any type of soil shall have to be carried out up to the required depth by the agency

## **8 DISPOSALS OF EXCAVATED STUFF**

**8.1** No excavated stuff from trench are to be placed even temporarily nearer than 1.5 meter or greater distance up to 90 meter or as prescribed by the Engineer from the outer edge of trench. All excavated material will be the property of the board. The rate of excavated includes sorting out of useful materials and stacking then separately as directed within specified lead. The excavated stuff suitable and useful for refilling or for other use shall be stacked at convenient places. The materials not useful in any wet shall be disposal off as directed by the Engineer from the outer edge of trench.

**8.2** The site should be cleared off on completion of work.

## **11.0 ADDITIONAL REQUIREMENTS**

### **9.1**

At the joints of pipes, the trench shall be excavated to an additional depth of 15 cm. and width of 30 cm. And length of 15 cm. beyond the edge of collar on both the sides or as directed. The rate includes for such extra excavation made at the joints. The trenches shall be excavated perfectly in straight line. The bottom of the trench shall be kept as per invert level or as directed. To maintain the proper slop the usual method of site rails and boning rods shall be adopted. The contractor shall have to provide and fix and maintain sight rails and boning rod without any extra cost.

If the contractor fails or makes delay to give hydraulic test of the pipe line laid in any of the section, without any genuine reason, he shall be responsible to get any part of the length trenches refill in such case i.e. before tasting for safety of pedestrian and/or vehicular traffic as found necessary by the engineer-in-charge without any extra cost. If found necessary any directed by the Engineer-in-charge. The contractor shall have to excavate the refilled trenches, during hydraulic test without any extra cost.

At all road crossings, trenches shall be excavated only for half width of the road and pipe shall be laid. The other half shall be excavated only after back filling over the laid pipeline is done so as to make it suitable for the traffic. The contractor shall provide direction when the pipeline is to be laid along the road as required and shall maintain the diversion or any part of it, without any extra cost. At all road crossings, the pipe shall be laid below the crest of read.

**9.2** The contractor shall break the road surface by excavation chiseling to the exact width and length as shown on the drawing or as directed by the Engineer-in-charge.

The excavated stuff shall be deposited in uniform layers to avoid mixing with other kind of materials at non-objectionable place or as directed by the Engineer-in-charge.

## **10.0 MEASUREMENT AND PAYMENT**

**10.1** The payment of excavation shall be made at the unit rate per cubic meter for the quantity actually excavated and accepted by the Engineer in charge limited to dimensions shown in the sanctioned plans or as directed by the Engineer. Excavation in excess of the sanctioned dimensions shall not be measured not paid for and if an ordered by the Engineer the contractor shall have to fill up the excess depth with excavated stuff with watering ramming etc. (Completed as specified) for trench without any extra payment to the contractor.

**10.2** Dimension shall be correct to two places of decimals of a meter and individual quantity shall of decimals of a meter and individual quantity shall be calculated to two places of decimals of a cubic meter.

**10.3** The rate for the item of excavation shall include unless and otherwise mentioned.

- (a) Clearing of site.
- (b) Setting out work including all materials and labour.
- (c) Providing and subsequently removing, shoring and strutting outing slopes etc.
- (d) Excavation and removal and staking of all excavated stuff as directed.
- (e) Necessary protection including labour materials equipment etc. to ensure safety and protection against risk or accident.
- (f) Providing facilities for inspection and damage to property if caused during **progress** of work.
- (g) Compensation for injury to life and damage to property if caused during progress of work.
- (h) Restoring of water supply connections, sewer connections, telephone lines, khalkuva soapiest etc. if damaged by contractor without extra payment.
- (i) Dewatering of excavated pit trench during the progress of work.
- (j) Clearing the site on completion of works directed by the Engineer.

**Item No.09 & 10 Dewatering Item:**

**In all sorts of soil and soft murrum, hard Murrum and boulders, Soft Rock, Hard Rock, upto 1.5 mt. depth from G. L. Extra for dewatering in all sorts of strata's, for each 1.5 mt. or part thereof beyond 1.5 mt. depth. (Total for Dewatering)**

**3.00 m to 4.50 m depth**

Sr. No.	Size
<b>09.0</b>	<b>In all sorts of soil &amp; soft murrum</b>
<b>09.1</b>	<b>In hard murrum,boulders</b>
<b>09.2</b>	<b>In soft rock and/or masonry in CM or L M or Lime Concrete</b>
<b>09.3</b>	<b>In hard rock and / or in C. C. 1:2:4 only.</b>

The Contractor shall ensure that the excavation and the structures are free from water during construction and shall take all necessary precautions and measures to exclude ground/rain water so as to enable the works to be carried out in reasonably dry conditions in accordance with the construction programmed. Sumps made for dewatering must be kept clear of the excavations/trenches required for further work. The method of pumping shall be approved by Employer's Representative, but in any case, the pumping arrangement shall be such that there shall be no movement of subsoil or blowing in due to differential head of water during pumping. Pumping arrangements shall be adequate to ensure no delays in construction. The dewatering shall be continued for adequate time so that concrete, Brick work of M.H. & cement mortar used for sewer line jointing shall attain adequate strength. The Contractor shall, however, ensure that no damage to the sewer, M.H. results on stopping of dewatering.

The Contractor shall study the sub-soil conditions carefully and shall conduct any tests necessary at the site with the approval of the Employer's Representative to test the permeability and drainage conditions of the sub-soil for excavation, concreting etc., below ground level.

The scheme for dewatering and disposal of water shall be approved by the Employer's Representative. The Contractor shall suitably divert the water obtained from dewatering from such areas of site where a buildup of water in the opinion of the Employer's Representative obstructs the progress of the work, leads

to unsanitary conditions by stagnation, retards the speed of construction and is detrimental to the safety of men, materials, structures and equipment.

**Measurement and Payment**

Payment shall be made on cubic meter basis of excavation for single time only.

**Item No.11**

**Add for restoration of infrastructures like Soak well, Electrical line, Water Supply line, Telephone cables all type, Gas line, Septic Tank etc.**

Sr. No.	Description
11.0	Add for restoration of infrastructures like Soak well. 0.00 m to 1.5 m depth
11.1	Add for restoration of infrastructures like Soak well. 1.50 m to 3.0 m depth

This item shall consist of excavation, removal and satisfactory disposal of all materials necessary for specification including all lead and lift and conformity with the lines all underground utilities, services and structures have been located and clearly marked on the ground surface in all areas involved in the construction process including access lanes. In many areas, a single number such as Miss Utilities may be called.

Items to be located are:

- Electrical line • Sanitary sewer • Gas • Septic tank • Water supply
- Telephone • Storm sewer • Cable TV • Drain field • Irrigation piping.

**• SITE ACCESS**

Before any demolition, delivery or construction equipment is allowed on site, make sure that there are no hazardous conditions such as overhead electric lines in the way. Plan all activities so that no damage will occur to existing pavements, structures, trees, shrubbery, gardens or other site amenities.

**Procedure:**

- Pull perpendicular string or snap chalk lines on all four sides of the opening.
- Lay pavers on one side, then the other.
- Count the courses needed to surround the openings on each side. They should be equal in number on both sides.
- Then fill around the remaining side of the opening.
- Cut pavers to fit and fill against the edge restraint around the opening.
- Plan your installation to begin along a straight line and preferably in a way which is easily accessible.
- At the joints of cable lines, shall be excavated to an additional depth of 15 cm. and width of 30 cm. And length of 15 cm. beyond the edge of collar on both the sides or as directed.
  - Snap a line from the point where the two tape measures cross to the center of the line.
  - Take a second tape measure and extend it from the other end of the line at an angle toward the center.
  - Overlap one tape on the other and match the length of both tapes. The same marked dimensions on



each tapes should be touching each other.

The products of the clearing to be restacked in such a place and in such a manner, as directed by the engineer in charge.

All holes or hollows whether originally existing or produced by digging up roots, shall be carefully filled up with earth, well-watered, well rammed leveled off, as may be directed.

The center lines of all trenches etc. shall be given by the Engineer-in-charge and it will be the responsibility of the contractor to install substantial reference marks, bench marks, etc. and maintain them as long as required true to line, level curve and slopes. The contractor shall assure full responsibility for alignment, and dimension of trench.

The labour materials etc. required for setting out and establishing benchmarks and other reference marks shall be arranged by the contractor at his own cost.

### **Mode of payments**

Restoring of water supply connections, sewer connections, telephone lines, Electrical line, Telephone line, Gas line, Cable TV line, Storm sewer line, khalkuva soak pits etc. if damaged by contractor without extra payment.

### **Item No. 12**

#### **Shoring or timbering for trench with 50 mm thick planks and suitable size truts etc. complete.1.1**

##### **GENERAL:**

This item is applicable only when the trench having more than 5.0 mt. depth and if the sides of trenches cannot be sloped or stepped due to any reason and the Engineer-in-charge feel the necessity for safety of trench and adjacent property and traffic. The Contractor should have to take previous approval from Engineer-in-charge before commencing this item.

##### **1.2 MATERIALS:**

**1.2.1** Sheathing, planks, wales, struts etc. required for shoring and strutting shall be of approved quality of wood or structural steel as per requirements of IS-3764-1966.

##### **1.3 WORKMANSHIP:**

**1.3.1** The Contractor before execution shall get approval of design of shoring from Engineer-in-charge. The shoring shall be of sufficient strength to resist side pressure and ensure safety from slips and below and to prevent damage to work and to prevent injury to persons. It shall be removed after getting permission of Engineer-in-charge, after all items for which it is required area completed. Shoring and strutting shall conform to IS - 3764 - 1966 or its latest version.

**1.3.2** The sheeting shall be placed against the side of trench so that length of each piece of sheeting is vertical. The sheeting shall be held securely in place against the Wales by ensuring that sheeting is kept firmly placed against the wall of the trench. Where the trench is excavated in loose, sandy or soft soil or soil which has been previously excavated or soil which is under hydrostatic pressure, each piece of sheeting shall be driven into the bottom of trench so has to be firmly held in place.

**1.3.3** Where two or more pieces of sheeting are used one above another, the sheeting shall be so arranged that the lower piece of sheeting overlap the lowest Wales supporting the pieces of sheeting next above next above it. These pieces of sheeting shall be firmly driven in to the soil and securely supported by Wales and struts as the trench is made deeper.

**1.3.4** The wales shall be supported parallel to the bottom or the proposed bottom of the trench. Each wale shall be supported on cleats spliced to the sheathing or by posts set on the wales next below it and in the case of lowest wale on the bottom of the trench itself. Where necessary, wedges may be provided between a wale and sheathing is supports to that roughly uniform support is given to all individual pieces of sheathing.

**1.3.5** Struts shall be horizontal and at right angles to the wales of sheathing supported thereby. Struts shall be cut to the proper length required to fit in tightly between wales, where necessary, the struts shall be held securely in place by wedges, driven between struts and the wales. Struts shall be placed on cleats spliced or bolted to posts supporting wales.

**1.3.6** The sizes and spacing of sheathing, wales struts and wedges used for shoring and timbering for different depth shall conform the requirement of IS-3764-1966 or its latest version.

**1.3.7** The extra width of excavation that may be deemed necessary for the purpose of shoring and strutting will be under-stood to be covered in the rate for item of shoring and strutting for drain side.

**1.3.8** The contractor shall have to make all the necessary arrangements while removing shoring strutting. However, if contractor fails to remove the shoring strutting safely, the corporation shall not be responsible for any type of damages and contractor shall have to bear all the cost for the same and the corporation shall not pay any extra payment for the same.

**1.3.9** Shoring and strutting shall be close or open depending on the nature of soil and the depth of trench. The type of shoring and strutting shall be determined by the Engineer in charge. It shall be the responsibility of the contractor to take all necessary steps to prevent the sides of trenches from collapse. Engineer in charge should take guidance from IS: 3764-1966 for designing the shoring and strutting arrangements and specifying the profile of excavation.

#### **1.4 Measurement:**

**1.4.1** The item includes all labours, materials, equipments, tools etc. complete for whole the period for satisfactory completion of the item.

**1.4.2** No extra payment shall be given for extra excavation that required doing shoring or strutting.

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

**1.4.4** No payment shall be made to any wood which has been left out by the contractor while removing the shoring, strutting etc.



### Item No.13

**Lowering, Laying & Jointing R.C.C. pipes(Horizontal-Vertical) in C. M. 1:1 1/2 of following diameters in proper position, grade and alignment as directed by Engineer-in-charge including conveyance from stores to site of work, labour, giving hydraulic testing as per ISI code. Class NP3 Test Pressure, 0.7 Kg / Sq.m.**

Sr. No.	Size
13.0	200 mm Dia Pipe
13.1	300 mm Dia Pipe
13.2	400 mm Dia Pipe

#### 1.0 SCOPE

The specification covers the requirements for laying of pipes and fittings/specials below ground. The two parts are complementary and are to be read together for a correct interpretation of the provisions of this specification.

#### 2 APPLICABLE CODES

The laying of pipes and fittings/specials shall comply with all currently applicable statutes, regulations, standards and codes. In particular, the following standards, unless otherwise specified herein, shall be referred to. In all cases, the latest revision of the standards/codes shall be referred to. If requirements of this specification conflict with the requirements of the standards/codes, these specifications shall govern.

#### 2.0 CODES OF PRACTICE

- a) IS: 783 -Code of practice for laying of concrete pipes
- b) IS: 3114 -Code of practice for laying of cast iron pipes
- c) IS: 3764 -Excavation work - Code of Safety
- d) IS: 4127 -Code of practice for laying of glazed stoneware pipes
- e) IS: 5822 -Code of practice for laying of electrically welded steel pipes for water supply
- f) IS: 6530 -Code of practice for laying of asbestos cement pressure pipes

#### 3 CARTING AND HANDLING

Pipes and fittings/specials shall be transported from the factory to the work sites at places along the alignment of pipeline as directed by Owner/ Engineer. Contractor shall be responsible for the safety of pipes and fittings/specials in transit, loading/unloading. Every care shall be exercised in handling pipes and fittings/specials to avoid damage. While unloading, the pipes and fittings/specials shall not be thrown down from the truck on to hard surfaces. They should be unloaded on timber skids with steadying ropes or by any other approved means. Padding shall be provided any other approved means. Padding shall be provided between coated pipes, fittings/ specials and timber skids to avoid damage to the coating. Suitable

gaps between pipes should be left at intervals in order to permit access from one side to the other. In case of spigot socket pipes, care should be taken regarding orientation of pipes while unloading. As far as possible pipes shall be unloaded on one side of the trench only. The pipes shall be checked for any visible damage (such as broken edges, cracking or spalling of pipe) while unloading and shall be sorted out for reclamation. Any pipe, which shows sufficient damage to preclude it from being used, shall be discarded. Dragging of pipes and fittings/specials along concrete and similar pavement with hard surfaces shall be prohibited. Pipes can be brought to site only after the mandatory tests i.e. are completed and pipe lots accepted. I.e. Cube tests, T.E.B., Hydrostatic, water absorption test.

#### **4.0 STORAGE**

Each stack of pipes shall contain only pipes of same class and size, with consignment or batch number marked on it with particulars of suppliers wherever possible. Storage shall be done on firm level and clean ground and wedges shall be provided at the bottom layer to keep the stack stable. The stack shall be in pyramid shape or the pipes laid length-wise and crosswise in alternate layers. The pyramid stack shall be made for smaller diameter pipes for conserving space in storing them. The height of the stock shall not exceed 1.5m. Fittings/specials shall be stacked under cover and separated from pipes. Rubber rings shall be stored in a clean, cool store away from windows, boiler, electrical equipment and petrol, oils or other chemicals. Particularly in the field where the rubber rings are being used it is desirable that they are not left out on the ground in the sun or overnight under heavy frost or snow conditions.

#### **5.0 LAYING**

##### **EXCAVATION**

Before excavating the trench, the alignment of pipeline shall be approved by Owner/Engineer. The excavation of trenches and pits for manholes/ chambers shall be carried out in accordance with the Technical Specification: Section D1 and shall be done such that it does not get far ahead of the laying operating as approved by Owner/Engineer.

To protect persons from injury and to avoid damage to property, adequate barricades, construction signs, red lanterns and guards as required shall be placed and maintained during the progress of the construction work and until it is safe for the traffic to use the roadways. The relevant Indian Standards and the rules and regulations of local authorities in regards to safety provisions shall be observed.

Suitable barricading shall be provided along the sides of trenches and pits. The posts of fencing shall be of timber securely fixed in the ground not more than 3 m apart and they shall not be less than 75 mm in diameter or less than 1.2m above surface of the ground. There shall be two rails, one near the top of the post and the other about 450mm above the ground and each shall be from 50 mm to 70mm in diameter and sufficiently long to run from post to post to which they shall be bound with strong rope. The method of projecting rails beyond the post and trying them together where they meet will not be allowed on any account. All along the edges of the excavation trenches a bank of earth about 1.2m high shall be formed where required by owner/ engineer for further protection.

The road metal and also the rubble packing shall first be stripped off for the whole width of the trench/pit

and separately deposited in such place or places as may be determined by Owner/Engineer.

During excavation, large stones and rubble shall be separated and removed from the excavated soil and stacked separately. The material from excavation shall be deposited on either side of the trench leaving adequate clear distance from the edges of the trench and pit, or as may be necessary to prevent the sides of the trench pit to slip or fall, or at such a distance and in such a manner as to avoid covering fire hydrants, sluice valves, manholes covers etc. and so as to avoid abutting the wall or structure or causing inconvenience to the public and other service organizations or otherwise as Owner/engineer may direct.

Contractor shall take into account additional excavation if any as Owner/ Engineer may require in order locating the position of water pipes, drains, sewers etc. Or any other works which may be met with, in or about the excavation of trenches/pits while quoting the rates for excavation. Such service lines if met with during excavation shall be properly maintained by Contractor, by means of shoring, strutting, planking over, padding or otherwise as Owner/Engineer may direct, and shall be protected by the Contractor from damage during the progress of the work. All precautions shall be taken during excavation and lying operations to guard against possible damage to any existing structure/pipeline of water, gas, sewage etc.

If the work for which the excavation has been made is not completed by the expected date of the setting of monsoon as stipulated in "Data Sheet -A" or the setting in of rain whichever is earlier, or before the day fixed by Owner/ Engineer for filling in any excavation on account of any festival or special occasion. Contractor shall backfill such excavation and consolidates the filling.

Utmost care shall be taken to see that the width of the trench at the top of pipe is not more than that specified in drawing. In case additional width is required it shall be provided only in the top portion from the ground level up to 300mm above the top of pipe. If any extra width is provided in the area below this portion, Contractor shall have to provide remedial measures in the form of lime concrete or rubble masonry otherwise at the discretion and to the satisfaction of Owner/Engineer. If rock is met with, it shall be removed to 15 cm below the bottom of pipes and fittings/specials and the space resulting shall be refilled with granular materials and properly consolidated. Bottom of trenches/pits shall be saturated with water well rammed wherever Owner/ Engineer may consider it necessary to do so.

Wherever a socket or collar of pipe or fitting/special occurs, a grip is to be cut in the bottom of the trench or concrete bed to a depth of at least 75 mm below the bed of the pipe so that the pipe may have a fair bearing on its shaft and does not rest upon its socket. Such grip shall be of sufficient size in every respect to admit the hand all around the socket in order to make the joint and the grip shall be maintained clear until the joint has been approved by Owner/Engineer.

When welding is to be carried out with the pipes and specials in the trench, additional excavation of not more than 60 cm in depth and 90 cm in length shall be made at joints in order to facilitate welding.

The excess excavated material shall be carried away from site of works to a place up to a distance as directed by Owner/Engineer. This shall be done immediately so as not to cause any inconvenience to the public or traffic. If the instructions from Engineer are not implemented within seven days from the date of instructions to cart the materials and to clear the site, the same shall be carried out by Owner/Engineer and any claim or dispute shall not be entertained in this respect.

#### **6.0 DEWATERING**

During the excavation, if subsoil water is met with Contractor shall have to provide necessary equipment and laborers for dewatering the trenches/pits by bailing out water or water mixed with clay; if pumping out subsoil water is found to be necessary, Contractor shall provide sufficient number of pumps for the same. In both the above cases the excavation shall be done to the required level and the pipes shall be laid to proper alignment and gradient. Contractor shall also make necessary arrangement for the disposal of drained water to nearby storm water drain or in a pit if allowed by Owner/Engineer. In no case the water shall be allowed to spread over the adjoining area. Before discharging this water into public sewer/drain, Contractor shall take necessary permission from the local authorities.

#### **7.0 SPECIAL FOUNDATION IN POOR SOIL**

Where the bottom of the trench and sub-grade is found to consist of material which is unstable to such a degree that in the opinion of Owner/Engineer, it cannot be removed and replaced with an approved material thoroughly compacted in place to support the pipe properly, a suitable foundation for the pipes, consisting of piling, timbers or other materials, in accordance with relevant drawings and as instructed by Owner/Engineer shall be constructed.

#### **8.0 WOODEN SHORING**

Contractor shall suitably design polling bards, walling and struts to meet different soil conditions that might be encountered in excavating trenches/ pits. The horizontal and vertical spacing of struts shall be such that not only the sides of trenches shall be prevented from collapse but also easy lowering of pipe in trenches shall be ensured without creating undue obstructions for the excavation of the work. Any inconvenience and/or delay that might be caused in lowering pipes in trenches as a result of adopting improper spacing of struts by Contractor shall be his sole responsibility. No part of shoring shall be at any time be removed by Contractor without obtaining permission from Owner/Engineer. While taking out shoring planks the hollows of any form must simultaneously be filled in with soft earth well rammed with rammers and with water.

Owner/Engineer may order portions of shoring to be left in the trenches/pits at such places, where it is found absolutely necessary to do so to avoid any damage, which may be caused to buildings, cables, gas-mains, water mains, sewers etc. in close proximity of the excavation, by pulling out the shoring from the excavations. Contractor shall not claim, on any reason whatsoever, for the shoring which may have been left in by him at his own discretion.

## **9.0 STEEL PLATE SHORING**

Where the subsoil conditions are expected to be of a soft and unstable character in trench/pit excavation, the normal method of timbering may prove insufficient to avoid subsidence of the adjoining road surfaces and other services. In such circumstances Contractor will be required to use steel trench sheeting or sheet piling adequately supported by timber struts, walling etc., as per the instructions, manner and method directed by Owner/ Engineer. Contractor shall supply, pitch, drive and subsequently remove trench sheeting or piling in accordance with other items of the specification.

## **10.0 BONING STAVES AND SIGHT RAILS**

In laying the pipes and fittings/specials the center for each manhole/chamber or pipeline shall be marked by a peg. Contractor shall dig holes for and set up two posts (about 100 x 100 x 1800 mm) at each manhole/chamber or junction of pipelines at nearly equal distance from the peg and at sufficient distances there from to be well clear of all intended excavation, so arranged that a sight rail when fixed at a certain level against the post shall cross the center line of the manhole/chamber or pipelines. The sight rail shall not in any case be more than 30m apart. Intermediate rails shall be put up if directed by Owner/Engineer.

Boning staves of 75mm x 50 mm size shall be prepared by Contractor in various lengths, each length being of a certain whole number of meters and with a fixed tee head and fixed intermediate cross pieces, each about 300 mm long. The top-edge of the cross piece must be fixed below the top-edge of the cross piece must be fixed below the top-edge of the tee-head at a distance equal to the outside diameter of the pipe or the thickness of the concrete bed to be laid as the case may be. The top of cross pieces shall indicate different levels such as excavation for pipeline, top of concrete bed, top of pipe etc. as the case may be.

The sight rail of size 250-mm x 40 mm shall be screwed with the top edge resting against the level marks. The center line of the pipe shall be marked on the rail and this mark shall denote also the meeting point of the center lines of any converging pipes. A line drawn from the top edge of one rail to the top edge of the next rail shall be vertically parallel with the bed of the pipe, and the depth of the bed of pipe at any intermediate point may be determined by letting down the selected boning staff until the tee head comes in the line of sight from rail to rail.

The post and rails shall be perfectly square and planned smooth on all sides and edges. The rails shall be painted white on both sides and the tee-heads and crosspiece of the boning staves shall be painted black.

For the pipes converging to a manhole/chamber at various levels, there shall be a rail fixed for every different level. When a rail comes within 0.60 M of the surface of the ground, a higher sight-rail shall be fixed for use with the rail over the next point.

The posts and rails shall in no case be removed until the trench is excavated, the pipes are laid and Owner/Engineer gives permission to proceed with the backfilling.

## **11 BEDDING**

The type of bedding for pipes shall be as per Drawing and Schedule-B.

## **12 LYING OF PIPES AND FITTINGS/SPECIALS**

All precautions shall be taken during excavation and laying operations to guard against possible damage to any existing structure/pipeline of water, gas, sewage etc. After excavation of trenches, pipes shall not be lowered unless the dimensions of trenches and bedding work for pipes at the bottom of the trenches are approved and measured by Owner/Engineer. Pipes and fittings/specials shall be carefully lowered in the trenches. Special arrangements such as cranes, tripods with chain pulley block for lowering the pipes and fitting/specials shall be made by Contractor. In no case pipes and fittings/specials shall be dropped. Slings of canvas or equally non-abrasive material of suitable width or special attachment to fit the ends of pipes and fittings/specials shall be used to lift and lower the coated pipes and fittings/specials. The pipes and fittings/specials shall be inspected for defects and is rung with slight hammer preferably while suspended to detect cracks. If doubt persists, further confirmation shall be done by pouring a little kerosene /dye on the inside of the pipe at the suspected spot. No sign of kerosene/dyke should appear on the outside surface. Pipes and fittings/specials damaged during lowering or aligning shall be rejected by Owner/Engineer.

All the pipes are to be laid perfectly true both in alignment and to gradient specified. In case of spigot and socket pipe the socket end of the pipe shall face upstream, except when the pipeline runs uphill in which case the socket ends should face the upgrade. The laying of pipes shall always precede upgrade of a slope. After placing a pipe in the trench, the spigot end shall be centered in the socket and the pipe forced home and aligned to required gradient. The pipes shall be secured in place with approved backfill material tamped under it except at the socket. Pipes and fittings/specials, which do not allow a sufficient and uniform space for joints, shall be removed and replaced with pipes and fittings/specials of proper dimensions to ensure such uniform space. Precautions shall be taken to prevent dirt from entering the jointing space. At times when pipe laying is not in progress, the open ends of pipe shall be closed by a watertight plug or other means approved by Owner/Engineer. During the period that the plug is on, the Contractor shall take proper precautions against floating of the pipe owing to entry of water into the trench. Wherever it is necessary to deflect pipe from a straight line, either in the vertical or horizontal plane, to avoid obstructions or where long radius curves are permitted the deflection allowed at joints shall not exceed 2½%. In case of pipes, with joints to be made with loose collars, the collars shall be slipped on before the next pipe is laid. The pipes shall be laid such that the marking on pipes appears at the top of the pipes. To the pipe so as to leave a smooth end at right angles to the axis of the pipe. For this purpose, the cutting of pipe for inserting valves, fittings or specials shall be done in a neat and workman like manner without damage, pipe-cutting machine shall be used.

### **13 JOINTING**

Jointing for pipes and fittings/specials shall be as per IS-783 (latest revision) done in accordance with the relevant specifications depending upon the type of pipes being used. Basic requirements for jointing the pipes are

Cleanliness of all parts, particularly joint surface.

- a) Correct location of components.
- b) Centralization of spigot within socket.
- c) Provision of the correct gap between the end of the spigot and the back of the socket to ensure flexibility at each joint.
- d) Any lubricant used shall be approved as to composition and method of application.

### **14 TESTING AND COMMISSIONING**

Testing and commissioning of pipes shall be as per IS-783 (latest Revision) clause 15.5 done in accordance with the relevant specifications.

#### **1.4 Mode of Measurement & payments;**

**1.4.1** The item includes all labours, materials, equipment, tools etc. complete for whole the period for satisfactory completion of the item.

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

#### **Item No.14**

**Refilling the pipeline trenches incl. ramming, watering, consolidating disposal of surplus stuff as directed within a radius of 3 km**

Refilling materials shall be from excavated stuff.

- Excavated stuff to be used shall be cleared off all rubbish, large size stone bricks bats etc. big clods shall 50 mm or less. The selected soil sand or any other materials shall be got approved before filling, Refilling shall be done in a systematic manner in layers by the contract. Before refilling the trenches the contractor shall got checked the trenches, ready for refilling.
- All space between pipe line and the sides of excavation shall be refilled to the original surface with earth or selected material in layers of 15 cms to 10 cms, well-watered and rammed. Each layers shall be watered and compacted with heavy manner, before the upper layer is laid till the final level is reached to the thoroughly compacted base.
- Refilling on top of pipe shall be carried out carefully with selected soft stuff out of the excavated stuff. The filling shall be raised about 15 cms. to take care of subsequent settlement.
- The contractor shall be responsible for any settlement. The contractor shall be responsible for any settlement during passage of time during monsoon and the same shall be refilled with stuff brought from the outside if necessary at his cost.
- The process of refilling trenches, watering, ramming shall be carried out in such a way that no damage is done to the pipe line already laid.



- Disposal of the Excavated Stuff:

The excavated stuff of the selected type shall be used for filling the trenches and plinth or leveling the ground in layers including ramming and watering etc. complete. The Contractor shall remove the balance of the excavated from the site of work to a place as directed within a lead up to 3 km.

#### **Item no.15**

**Extra lead for transportation of Surplus stuff spreading or stacking as directed (removal of excavated stuff from site of U/G sump sewage pumping station, filter Plant etc.)**

The distance which constitutes lead shall be determined along the shortest practical route and note necessarily the route actually taken the decision of the Engineer-in-charge in this regard shall be taken as final. No materials shall be stored prior to, during and after execution of a structure in such a way as to cause or lead to damage or overloading of the various components of the structure.

The balance of the excavated quantity shall be removed by the contractor from the site of work to a place as directed with lead up to 50 M. and all lift. The materials available from soft excavation shall be properly stacked within 50 M. lead and 1 5 m. lift and shall be the property of department.

Useful materials obtained from clearing site and excavation shall be stacked within a lead of 50 M beyond the building areas is directed. Materials suitable for back-filling shall be stacked at convenient places within a lead of 50 M. from the structure for reuse. Useful stones from rock excavation shall be stacked neatly. within a lead of 50 M. and will be allowed to be used by the contractor on payment at rates laid down in the contract or if not so laid down, at scheduled rates of the Division or at a mutually agreed rates if there are no such rates in the schedule of rates.

#### **Mode of measurements & Payment**

The work shall be measured for the work limited to the dimensions shown on drawings or directed Excavation to dimension in excess of the above will not be measured or paid for and if so ordered by the Engineer the contractor shall have to fill up the excess depth with cement concrete specified for foundation without extra payment.

Removal of slips and blows in the foundation trenches will not be measured or paid for.

if it is necessary in the opinion of the Engineer-in-charge to carry foundation below the levels shown on the plans, the excavations for the 1.5 M of addition depth will be included in the quantity for the particular classification and will be paid for as extra at rate to be decided under the general conditions of contract unless, the contractor is willing to accept payment as tendered rates.

The payment Shall be for a unit of one cubic meter.

#### **Item no. 16**

**Providing bedding incl. ramming, watering, levelling, consolidating etc. Complete As above with required quality Sand brought from outside including all lead as per standard and instruction of engineer in-charge.**

#### **Workmanship**

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

As soon as the work in foundation has been completed and measured the site of foundation shall be cleared of all debris, brick bats: mortar dropping etc., and filled with earth in layers not exceeding 20 cms.



Each layer shall be adequately watered, rammed and consolidated before the succeeding layer is laid. The earth shall be rammed with iron rammers where feasible and with the butt ends of crow-bars, where rammer cannot be used.

As soon as the work in foundation has been completed and measured, the site of foundation shall be cleared of all debris, brick bats, mortar dropping etc; and filled with earth in layers not exceeding 20 Cms. Each layer shall be adequately watered, rammed and consolidated before the succeeding layer is laid. The earth shall be rammed with iron rammers where feasible and with the butt ends of crow-bars, where rammer cannot be used.

The plinth shall be similarly filled with earth in layers not exceeding 20 cms. adequately watered and consolidated by ramming with iron or wooden rammers. When filling reaches finished level the surface shall be flooded with water for at least 24 hours and allowed to dry and then rammed and consolidated.

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

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

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

## **2.0. Mode of Measurements & Payment**

The payment shall be made for filling in plinth and trenches. No deduction shall be made for shrinkage or voids, if consolidated as instructed above.

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

### **Item No. 17**

**Providing C.C.M.:100 for encasing pipes using trap metal size 12 mm to 50 mm incl. form work curing consolidation etc. complete for various location on pipe line. using trap metal 20 mm nominal size.**

**Using trap metal 20 mm nominal size.**

The work shall be carried out with Ready Mix system in M-100 grade maintaining cement level @ 380.00 Kg./Cum. for Foundations, Footing, Base of Columns and the like and Mass Concrete as per detailed drawing 1.1 Ready Mix concrete.

1.1 Mixing Thorough mixing is essential for production of uniform concrete. Equipment and methods used shall be capable of effectively mixing concrete materials to produce in form mixes of the lowest slump practical for the work.

#### ***Charging of mixer:-***

Mixers both stationary and truck mounted shall be so charged that there is a pre blending of the ingredients as the stream flows into the mixer.

Water shall enter the mixer first, but must continue to flow while other ingredients are entering the mixer. Water charging pipes shall be of proper design and of adequate size so that water enters at a point well inside the mixer. Water charging shall be complete within the first 25% of the mixing

Cement shall be charged along with other materials, but it shall be ensured that cement enters the stream after approximately 10% of the aggregate is in the mixer. When it is necessary to charge cement into truck mixers separately, additional mixing time shall be allowed to obtain desired uniformity to mix.

Admixtures shall be charged to the mixer at the same time in the mixing sequence for every batch. Liquid admixtures shall be charged with the water, powdered admixtures shall be sprinkled in to the mixer with other dry ingredients. When more than one admixture is used. They shall be batched separately and they shall not be premixed before entering the mixer. 1

#### ***Mixer performance:-***

Mixer performance checks shall be made at regular intervals to ensure uniformity of the concrete. Visual examination of the concrete shall be one of the aids for maintaining and checking mixer performance.

Results of tests on air content, slump unit weight of air free mortar shall be guide lines on mixer performance.

#### ***Mixing Time.***

Mixing time shall be measured from the time all ingredients are in the mixer.

Mixing time shall be established from mixer performance tests conducted at frequent intervals throughout the period of the work. However, as an initial guide, mixer manufacture's recommendation may be followed. Other guide line being 1.33 mins. For 1 cum capacity of mixer and 0.33 min for every additional 1 cum of mixer capacity.

Mixer shall be designed to have audible indicators and combination inter locks which prevent mixer discharge prior to completion of a preset mixing time. Mixer shall also be designed to start and stop operation with full load.

#### ***Re-Tempering***

Provided that design water cement ratio is not exceeded, small increments of remembering water may be added to mixed batches to obtain the desired. Slump

Addition of water in excess of designed water cement ratio to compensate for slump loss resulting from delays in delivery or placing of concrete shall be permitted

#### ***Mix Temperature***

Batch to batch uniformity of concrete regard to slump, water requirement and air content is dependent on temperature of concrete. It shall therefore, be ensured that the maximum and minimum temperatures of concrete throughout all seasons of the year do not vary beyond the limits given below.

Necessary measures shall be taken to lower or raise the temperature of water to maintain the mixed concrete between the specified temperature limits

#### ***Discharging of mixer.***

Mixer shall be capable of and handled properly so that concrete of lowest desired slump can be effectively discharged without causing segregation.

#### ***Ready- Mix concrete may be:***

Mixed in a central plant and transported to the job in agitating or no agitating truck bodies. Mixed entirely in transit. Mixed entirely after reaching the job site. Mixed partially in a central plant and completed in transit or after reaching the job site (Shrink mixing)

In ready mix concrete special at tension shall be given the addition of mixing water quantity, which if incorrect, shall result in reduction of concrete quality.

Concrete consistency (Slump) is also affected by : Amount and rate of mixing. Length of haul Time period for unloading Temperature conditions.

In cool weather or short haul and with prompt delivery concrete quality may not be significantly affected. But with reverse conditions, quality of concrete may be significantly affected. Addition of water to compensate for slump loss shall not exceed that quantity necessary to compensate for a maximum 25mm slump loss However, by this additional quantity of water, the design water cement ratio shall not be exceeded.

Loss in workability in warm weather shall be minimized by expediting delivery and placement, and by controlling the concrete temperature

If it becomes necessary to use retarders to prolong the time the concrete will respond to vibration

In hot weather conditions or delays in delivery<sup>1</sup> placement, use may be made of the procedure of withholding some of the mixing water till the mixer arrives at the job site, in such cases after addition of the balance ( Withheld) quantity. of water an additional 30 revolutions of mixer at mixing speed shall be given to adequately incorporate the additional water into the mix.

When loss of slump or workability cannot be controlled by measures stated above. complete mixing shall be done at the job site using centrally dry batched ingredients.

#### ***Supply and placing of ready-mix concrete.***

Responsibility of in-place quality of ready-mix concrete shall be shared by the manufacturer<sup>1</sup> supplier of ready mix concrete and the placing contractor.

They shall work in close coordination. The placing crew shall be in direct radio <sup>1</sup> telecommunication contract with the batch plant to ensure. Avoidance of delay in dispatching concrete from batch plant. Inform batching plant delays in formwork, reinforcement work, handling or placing The placement contractor shall give in writing his requirement of a particular batch of concrete to the supplier.

The ready - mix concrete manufacturer / supplier shall along with each batch of concrete delivered to the placement contractor give him a concrete delivery ticket. The supplier shall give copies of all such delivery tickets to the Engineer- in Charge for his record and also shall get duplicate Copies of all such delivery tickets duly received and signed from the placement contractor.

Ready mixed concrete as supplied by the manufacturer and as placed by the contractor shall in no way be different from the specifications of concrete as approved by the Engineer-in - Charge.

#### ***Transportation.***

Fresh concrete can be transported to the placement area by a variety of methods common among them are: -Mixer trucks. -Stationary truck bodies with or without agitators. -Bucketshauled by trucks. - Conveyor belts. -House or pipe line by pumping. Each type of transportation has specific advantages and limitations depending on the condition of use, mix , accessibility and location of placing.

#### ***Transportation by mixer trucks.***

These are essentially revolving drums mounted on truck chassis. Truck mixers used in the job shall be labeled permanently to indicate the manufacture specifications. for mixing like. .Capacity of drum. .Total number of drum revolutions required for complete mixing.c. Mixing speed. d. Maximum time limit before completion of discharge and after cement e. has entered the drum. f. Reduction in time period of discharge. g. Due to warm weather or other variables. All above information shall only form

guidelines for the manufacture/ producer of concrete. Fulfillment of the stipulated number of revolutions or elapsed time shall not be acceptable criterion. As long as the mixing water limit not exceeded and the concrete has satisfactory plastic physical properties and is of satisfactory consistency and homogeneity for satisfactory placement and consolidation and is without initial set the concrete shall be acceptable.

When the concrete is totally mixed in transporting trucks or in case of shrink- mix concrete, cede 63% of the rated capacity of the drum. In case the concrete is totally mixed in the central batching plant, the transporting truck may be loaded up to 80% of the rated capacity of the drum. In this case the drum shall be rotated at charging speed during loading and reduced to agitating speed after loading is complete.

When transporting concrete by truck mixers, delivery time shall be restricted to 1.50 hours from the time cement has entered the mixer to completion of discharge.

#### ***Transporting by Agitating.***

Transporting ready mix concrete by this method shall consist of truck chassis mounted with open top bodies. The metal body shall be smooth and streamlined for easy discharge. Discharge may be from the rear when the body is mechanically tilted. Body of the truck shall have a provision of discharge gate. Mechanical vibrators shall be installed at the discharge gate for control of discharge flow. Agitators, if mounted, also aid in the discharging of concrete from the truck in addition to keeping the concrete alive.

Water shall not be added to concrete in transport through this system. Bodies of trucks shall be provided with protective covers during period of inclement weather

Delivery period when adopting this system of transporting, concrete shall be restricted to 30 minutes from the moment all ingredients including cement and water enters in mixer to completion of discharge.

#### ***Transporting by buckets.***

This method of transportation is very common for transportation of centrally mixed concrete. Buckets of suitable capacities may be fitted with concrete which is totally mixed in central plant and hauled to the job site. Buckets then may be conveyed to the actual point of placement either with the help of crane / hoist or they may be carted.

As in the case of open truck transportation water shall not be added to concrete transported in buckets. Concrete shall be protected from inclement weather by necessary covering arrangements. Also, maximum delivery period for this system of transportation from the time cement is introduced into the mixer to completion of discharge shall not exceed 30 minutes.

#### ***Cleaning***

Before loading concrete in either truck mixer open bodied trucks or buckets, the containers shall be thoroughly cleaned, washed and dried so that there is no water or moisture in the container which may affect the designed water content of the concrete.

Other methods of transportation.

Transportation of concrete either by belt conveyors or by pumping is envisaged in this work. If, however, producer/ manufacturer/ purchaser or ready mix concrete desires to use such methods of transportation, they may do so provided their

Scheme and complete specifications are submitted to the Engineer- in - Charge for his record and approval.

### ***Objective***

Method of transportation used shall ensure. -Efficient delivery of concrete -No significant alteration of properties. -with regard to water cement ratio. -slump, air content and homogeneity.

All variables in transportation considering type and accessibility of placement locations. Distance, time interval etc. shall be carefully studied before arriving at the method used.

### ***PLACING CONCRETE BY PUMPING METHODS.***

Concrete conveyed by pressure through either rigid pipes or flexible hoses and discharged directly into the desired area is termed as pumped concrete. The method of conveying the concrete through pipe lines is dealt with in these specifications.

Method of applying pressure to concrete is by pumps. Pumps to be used shall be either of the two types as mentioned below. a) Piston type pumps. b) Squeeze pressure type pumps. Compressed air pressure pumps shall not be used in the works.

### ***Pumping Equipment's***

Piston pumps Piston pump to be used in the works shall consist of a receiving hopper for mixed concrete an inlet valve, an outlet valve, and the pump shall be a twin piston pump. The two pistons shall be so arranged that one piston retracts when the other is moving forward and pushing concrete into the pipe line to maintain reasonably steady flow of concrete Single piston pumps shall not be acceptable. Inlet and outlet valves shall be any one of the following types

-Rotating plug type -Sliding plate type -Guided plunger type -Swing type -Flapper type -or any combination of the above. The pistons shall be mechanically driven using crank or chain or hydraulically driven using oil water. The receiving hopper shall have a minimum capacity of 1.0 cum and the hopper shall be fitted with mixing rotating blades capable of maintaining consistency and uniformity of concrete. The primary power for pumps may be supplied by gasoline, diesel, or electric motors. The primary power unit and the pump unit may be truck trailer or skid mounted.

Squeeze pressure pumps Squeeze pressure pumps shall consist of a receiving hopper fitted with re-mixing blade re- mixing blades shall be such that these can put the concrete into the flexible hose connected at the bottom of the hopper. The flexible hose shall pass through a metal drum around the inside periphery of the drum and come out through the top part of the drum. The drum shall be maintained under a very high degree of a vacuum during operation The drum shall be so fitted with hydraulically operated metal rollers, which when rotating, create a squeeze pressure on the flexible hose carrying and forces the concrete out into the pipe line. **Effective Range and Discharge of pumps.**

Effective range of pumps to be used in the work shall be decided by the contractors after studying the site conditions. However, the minimum horizontal range shall not be less than 150 meters and minimum vertical range shall not be less than 50 meters.

Selection of pumps based on discharge capacity shall be decided by the contractors after studying the requirements for the project Discharge capacity shall be worked out by the contractors and approval obtained from the Engineer- in - Charge. As a guide line figure the contractors may assume a discharge capacity of 15 cubic meter / hour / pump. Pipe Lines. All concrete carrying pipe lines shall generally be rigid pipe lines. flexible pipelines may only be used at bend curves in lines or at discharge ends if required. placements of flexible units shall be done judiciously and connected to the pipe lines only when it meets the approval of the Engineer- in Charge.

Rigid line / Hard Line/ slick line such lines shall be made either of steel or plastic Aluminum alloy pipes shall not be used. Minimum pipeline diameter shall be 100.

#### **Item no.18**

**Supplying cutting, bending, binding and placing in position steel as per plan and design and as per ISS 2502 including cost of steel and binding wire for reservoirs/structures only including lift up to 6 meter height or depth below G.L. for all diameters Do – deformed (TMT) bars confirming to relevant IS Fe – 500 grade for all diameters**

#### ***Workmanship***

The work shall consist of furnishing and-placing reinforcement to the shape and dimensions shown as on the drawings or as directed by the engineering – charge.

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

Reinforcing steel shall conform accurate to the dimensions given in the bar bending schedules shown on relevant drawings. Bars shall be bent cold to specified shape and dimensions or as directed, using a proper bar bender, operated by hand or power to attain proper radius of bends. Bars shall not be bent or straightened in a manner that will injure the material. Bars bent during transport-or handling shall be straightened before being used on the work. They shall not be heated to facilitate bending Unless otherwise specified a "U" type hook at the end of each bar shall invariably be provided to main reinforcement. The radius of the bend shall not be less than twice the diameter of the round bar and the length of the straight part of the bar beyond the end of the curve shall be at least four times the diameter of the round bar. In case of bars which are not round and in case of deformed bars, the diameter shall be taken as the diameter of circle having an equivalent effective area. The hooks shall be suitably encased to prevent any splitting of the concrete.

All the reinforcement bars shall lie accurately placed in exact position shown on the drawings, and shall be securely held in position during placing of concrete by annealed binding wire not less than 1 mm in size, and confirming to IS : 280 and by using stay blocks or metal chair spacers, metal hangers supporting wires or other approved devices at sufficiently close intervals, Bars shall not be allowed to sag between supports nor displaced during concreting or any other operations of the work. All devices used for positioning shall be of non-corrodible material. Wooden and metal supports shall not extend to the surface of concrete, except where shown on drawings. Placing bars on layers of freshly laid concrete as the work progresses for adjusting bar spacing shall not be allowed Pieces of broken stone or brick and wooden blocks shall not be used Layers of bars shall be separated by spacer bars, precast mortar blocks or other approved devices Reinforcement after being placed in position shall be maintained in a clean condition until completely embedded in concrete. Special care shall be exercised to prevent any displacement of reinforcement in concrete already placed. To prevent reinforcement form corrosion, concrete cover shall be provided as indicated on drawings. All the bars protruding from concrete and to which other bars are to be sliced and which are likely to be exposed for a period exceeding 10 days shall be protected by a thick coat of neat cement grout.

Bars crossing each other where required shall be secured by binding wire (annealed) of size not less than 1 mm. in such a manner that they do not slip over each other at the time of fixing and concreting.

As far possible, bars of full length shall be used. In case this is not possible. Over lapping of bars shall be done as directed When practicable, overlapping bars shall not touch each other, but be kept apart by 25 mm. Where not feasible, overlapping bars shall be bound with annealed wires not less than 1 mm. thick twisted tight. The overlaps shall be staggered for different bars and located at points, along the span where neither shear nor bending moment is maximum.



Whenever indicated on the drawings or desired by the Engineer-in-charge, bars shall be jointed by couplings which shall have a cross-section sufficient to transmit the full stresses of bars. The ends of the bars that are joined by coupling shall be upset for sufficient length so that the effective cross section at the base of threads is not less than the normal cross-section of the bar. Threads shall be standard threads. Steel for coupling shall conform to I.S. 226.

When permitted or specified on the drawings, joints of reinforcement bars shall be welded so as to transmit their full stresses. Welded joints shall preferably be located at points when steel will not be subject to more than 75 percent of the maximum permissible stresses and welds so staggered that at any one section not more than 20 percent of the rods are welded. Only electric arc welding using a piece which excludes air from the molten metal and conforms to any or all other special provisions for the work shall be accepted. Suitable means shall be provided for holding bars securely in position during welding. It shall be ensured that no voids are left in welding and when welding is done in two or three stages, previous surface shall be cleaned properly. Ends of the bars shall be cleaned of all loose scale, rust, stains, paint and other foreign matter before welding. Only competent welders shall be employed on the work. The M.S. electrodes used for welding shall conform to I.S. 814. Welded pieces of reinforcement shall be tested. Specimen shall be taken from the actual site and their number and frequency of test shall be as directed.

#### ***Mode of Measurement & Payment***

For the purpose of calculating consumption, wastage shall not be permitted beyond 5 percent. Excess consumption over 5% will be charged at penal rate.

Reinforcement shall be measured in length including overlaps, separately for different diameters as actually used in the work. Where welding or coupling is resorted to in place lap joints, such joints shall be measured for payment as equivalent length of overlap as per design requirement. From the length so measured, the weight of reinforcement shall be calculated in tones on the same basis as per M-18 even though steel is supplied to the contractor by the department on actual weight. Length shall include hooks at the ends. Wastage and annealed steel wire for binding shall not be measured and the cost of these items shall be deemed to be included in the rate for reinforcement.

The rate for reinforcement includes cost of steel binding wires, its carting from Department store to work site, cutting, bending, placing, binding and fixing in position as shown on the drawings and as directed. It shall also include all devices for keeping reinforcement in approved position, cost of joining as per approved method and all wastage and spacer bars. The rate shall be for a unit of One kg.

#### **Item.19**

**Supplying of graded stone aggregate of following sizes (for W.B.M. Road)(2) Hand broken stone aggregate 40 mm to 63 mm size.**

**aggregate 40 mm to 63 mm size.**

The stone metal shall be obtained from quarries approved by the Executive Engineer prior to collections. The metal shall be of approved quality with all leads and lift.

The metal shall be obtained from hard tough, sound durable stone of close texture as is locally available and reasonably free from decay and weathering. Pieces of the stone shall be angular and roughly cubical in shape and round, elongated or flaky materials shall be allowed.

The size of metal shall be 25 mm to 90 mm and shall be hand broken.

All unsound weathered or disintegrated stone obtained from the upper surface layer of the quarry or other layers of boulders shall be rejected.

2. The samples of metal collected from approved quarries shall be got tested at Government recognized laboratory as may be directed to the contractor at his own cost. The test results shall conform to the standard requirements laid down for metal to be used for W.B.M. work.

3. The physical requirement for standard size metal shall conform to the test results indicated in the Table below :-

Type of Const,	Test	Test Method	Requirement
Base	(a) Los Angeles Abrasion Value	IS 2386 Part IV	50% (Maximum)
	(b) Flakiness Index	IS 2386 Part- IV IS 5640 IS 2386 Part - 1	or 40% (Maximum) 15% (Maximum)

Frequency of test shall be as per Ministry of Surface Transport Specifications. The 4. grading requirements of the metal to be used for W.B.M. shall be as under ;

Sr. NO	Size Range	Sieve designation	Percentage by weight Passing through the sieve
1.	25 mm to 90 mm	100 mm	100
		90 mm	90-100
		50 mm	40-60
		25 mm	0-10
		20 mm	0-5

The size of metal for W.B.M shall be 25 mm to 90 mm. wherein tolerance limit for oversize shall be up to 10% and that for lower size should be up to 10%.

5. Wherever any doubt exists as to whether the above requirements are satisfied, in whole or any part of the collection, metal shall be got screened by the contractor at his own cost, if so ordered by Engineer-in-charge.

Stacking shall be done by filling in the standard steel boxes of 2 m x 1.5 m x 0.5 m size which shall be supplied by the Department if available on rent. Otherwise contractor shall make his own arrangements. No deduction for voids shall be made from the gross measurements.

Where any doubt exists as to whether the quantity of stacks of metal in any hectometre is not confirming with the cubical content of the standard pharas ( 2 m x 1-5 m x 0.5 m) shall be got corrected by the contractor if so ordered by the Engineer-in-charge for which no extra payment shall be claimed by the contractor.

If the quantity of metal in any stack in a particular Hectometre shall be paid on the basis of the quantity so found. Regular stacks shall be done by the contractor on a fairly level ground. Stacking of the metal shall be done in a manner as directed by the Engineer-in-charge.



Collection of metal shall be completed in two hectometre wise as per the final requirement and measurement shall be recorded two hectometre-wise. Until the quantity of metal as per the final requirement is not collected in any two consecutive HM. and std. boxes are not filled in completely in two hectometres, measurements shall not be recorded and payments shall not be done.

For road work complete staking of metal as per requirement shall be carried out in 2 Km. length before spreading. The metal stacks shall be measured and recorded and got cross checked by other Executive Engineer as per rules before spreading. The collection shall always, commence at one end of the Km. and be carried continuously towards the other end unless the Engineer-in-charge shall direct otherwise.

. The payment shall be on cubic metre basis without deduction for voids. The contractor shall maintain all stacks in regular and proper size till the whole materials shall not measure and finally accepted by the Department. The spreading of materials shall not be allowed till the materials are fully stacked and completed kilometre wise.

The rate includes cost of collection, conveyance to the site with all lead and lift and filling the boxes including all labour, tools, equipment and other incidental expenses. The rates quoted are inclusive of all such tools, duties, fees, royalties, taxes, etc.

## **Item.20**

### **Spreading the stone aggregate for rolling and W.B.M. including filling the interstices to required camber and gradient (excluding spreading of Blindage)(ii) 40mm to 63mm size aggregates (H.B.)**

The stone metal shall be obtained from quarries approved by the Executive Engineer prior to collections. The metal shall be of approved quality with all leads and lift.

The metal shall be obtained from hard tough, sound durable .stone of close texture as is locally available and reasonably free from decay and weathering. Pieces of the stone shall be angular and roughly cubical in shape and round .elongated or flaky materials shall be allowed.

The size of metal shall be 25 mm to 90 mm and shall be hand broken.

All unsound weathered or disintegrated stone obtained form the upper surface layer of the quarry or other layers of boulders shall be rejected.

2. The samples of metal collected from approved quarries shall be got tested at Government recognized laboratory as may be directed to the contractor at his own cost. The test results shall conform to the standard requirements laid down for metal to be used for W.B.M. work.

3. The physical requirement for standard size metal shall conform to the test results indicated in the Table below :-

Type of Const,	Test	Test Method	Requirement
Base	(a) Los Angeles Abrasion Value	IS 2386 Part IV	50% (Maximum)
	(b) Flakiness Index	IS 2386 Part- IV IS 5640 IS 2386 Part - 1	or 40% (Maximum) 15% (Maximum)

Frequency of test shall be as per Ministry of Surface Transport Specifications. The 4. grading requirements of the metal to be used for W.B.M. shall be as under ;

Sr. NO	Size Range	Sieve designation	Percentage by weight Passing through the sieve
1.	25 mm to 90 mm	100 mm	100
		90 mm	90-100
		50 mm	40-60
		25 mm	0-10
		20 mm	0-5

The size of metal for W.B.M shall be 25 mm to 90 mm. wherein tolerance limit for oversize shall be up to 10% and that for lower size should be up to 10%.

5. Wherever any doubt exists as to whether the above requirements are satisfied, in whole or any part of the collection, metal shall be got screened by the contractor at his own cost, if so ordered by Engineer-in-charge.

Stacking shall be done by filling in the standard steel boxes of 2 m x 1.5 m x 0.5 m size which shall be supplied by the Department if available on rent. Otherwise contractor shall make his own arrangements. No deduction for voids shall be made from the gross measurements.

Where any doubt exists as to whether the quantity of stacks of metal in any hectometre is not confirming with the cubical content of the standard pharas ( 2 m x 1-5 m x 0.5 m) shall be got corrected by the contractor if so ordered by the Engineer-in-charge for which no extra payment shall be claimed by the contractor.

If the quantity of metal in any stack in a particular Hectometre shall be paid on the basis of the quantity so found. Regular stacks shall be done by the contractor on a fairly level ground. Stacking of the metal shall be done in a manner as directed by the Engineer-in-charge.

Collection of metal shall be completed in two hectometre wise as per the final requirement and measurement shall be recorded two hectometre-wise. Until the quantity of metal as per the final requirement is not collected in any two consecutive HM. and std. boxes are not filled in completely in two hectometres, measurements shall not be recorded and payments shall not be done.

For road work complete staking of metal as per requirement shall be carried out in 2 Km. length before spreading. The metal stacks shall be measured and recorded and got cross checked by other Executive Engineer as per rules before spreading. The collection shall always, commence at one end of the Km. and be carried continuously towards the other end unless the Engineer-in-charge shall direct otherwise.

. The payment shall be on cubic metre basis without deduction for voids. The contractor shall maintain all stacks in regular and proper size till the whole materials shall not measure and finally accepted by the Department. The spreading of materials shall not be allowed till the materials are fully stacked and completed kilometre wise.

The rate includes cost of collection, conveyance to the site with all lead and lift and filling the boxes including all labour, tools, equipment and other incidental expenses. The rates quoted are inclusive of all such tools, duties, fees, royalties, taxes, etc.

#### **Item.21**

**Rolling and consolidating water bound macadam (except laterite and Kankar) including watering not exceeding 150mm thickness (Main layer including binding materials ) including filling in depressions which occur during the process.(A) With power roller exceeding 8 tonne and not exceeding 12 tonne.**

#### **Workmanship:**

For spreading materials in layers and bringing the appropriate moisture content, the embankment materials shall be spread uniformly over the entire width of the embankment in layers not exceeding 250mm in loose thickness.

Successive layers of embankment shall not be placed until the layer under construction has been thoroughly compacted to the requirements set down here under Moisture content of the materials shall be checked at the source of supply and if found less than that specified for compaction, the same, shall be made good either at the source or after spreading the soil in loose thickness for compaction. In the latter case, water shall be sprinkled directly from a hoseline or from a truck mounted water tank, and flooding shall not be permitted under any circumstances.

If the materials delivered to the road bed is too wet it shall be dried, by evaporation and exposure to the sun. till the moisture content is brought down to acceptable standard for compaction. Should circumstances arise. where owing to wet weather, the moisture content cannot be reduced to the required level by the above procedure, work of compaction shall be suspended.

Moisture content of each layer of soil shall be checked in accordance with IST 2720 (Part-11) and unless otherwise mentioned shall be so adjusted, making due allowance for evaporation losses, that at the time of the compaction it is in the range of 1 percent to 2 percent below the optimum moisture content determined in accordance with ISI (Part-VII). Highly expansive clays shall however be compacted at 2 to 4 percent above the optimum moisture content.

After adding the required amount of water, the soil shall be processed by means of harrows, rotary mixers or as otherwise approved until the layer is uniformly wet. Clods or hard lumps of earth shall be broken to have maximum size of 150mm when being placed in the lower layers of the embankment and a maximum size of Gorman when being placed in the top 0.5 meter portion of the embankment below the subgrade.

Hauling equipment shall be dispersed uniformly over entire surface of the previously constructed layer to minimize cutting of uneven compaction.

Where the embankment is to be constructed on low area ground that will not support the weight of trucks of other hauling equipment, the lower part of the fill should be constructed by dumping successive loads in a uniformly distributed layers of a thickness not greater than that necessary to support the hauling equipment while placing subsequent layers.

**2. COMPACTION:** Only compacting equipment approved by the Engineer-in-charge shall be employed to compact the materials. The contractor shall demonstrate the efficiency of the plants he intends to use for carrying out compaction trials. Each layer of the materials shall be thoroughly compacted to the densities specified in Table 1.2

Table 1.2 Compaction requirements for embankment.

Sr. No.	Type of Work/materials	Field dry density as per centage of maximum laboratory dry density as per IS:2720 (Part-VII)
1.	Top 0.5 meter portion of embankment below subgrade level and shoulders.	Not less than 100.
2.	Other portion of embankment.	Not less than 95
3.	Highly expensive class	85 to 90

When density measurements reveal any soft areas in the embankment further compaction shall be carried out as directed by the Engineer-in-charge. If insite of that the speciated compaction is not achieved, the materials in the soft areas shall be removed and replaced by approved materials and compacted to the density requirement. to the satisfaction of the Engineer-in-charge.

**3. Measurements for Payment :** Consolidation of earth embankment construction shall be measured bytaking cross section at intervals in the original position before the work starts and after its completion and computing of the volume of earthwork in cubic meters by the method of average and areas. The measurement of fill material from borrow are a shall be the difference between the net quantities of suitable materials brought from roadway and drainage excavation. For this purpose it shall be assumed that one cubic meter of suitable materials brought to site from roadway and drainage excavation froms one cubic meter of compacted fill and alt bulking or shrinkage shall Tie ignored. Stripping including storing and reapplication of top soil shall be measured as volume in cubic meter.

4. The contract unit rate includes cost of mechanical roller required for consolidation including ail labour, equipments fuel, hire charges, tolls, and incidentals necessary.

## SCHEDULE B2

### (RCC NP 3 SEWERGAGE LINE ) (ZONE 2)

#### ITEM WISE SPECIFICATION

#### Item No.1

##### Horizontal cast

Providing and supplying ISI Standard R.C.C. pipes(of Sulphate Resisting Cement) in standard lengths of following class and diameter suitable for either collar joints or rubber ring joints including all taxes, insurance, transportation, freight charges, octroi, inspection charges, loading, unloading, conveyance to departmental stores, stacking etc. complete. (IS - 458/ 1989)

Note : One collar should be supplied with each full length plain ended RCC pipe, cost included in rates below. One rubber ring should be supplied with each full length socketed pipe, cost included in rates

Sr.No	Dia (in mm)
1.0	200 mm
1.1	300 mm

- **Specification of RCC NP3 Pipe:**

#### 1.1 Scope

This specification covers the requirements for manufacturing, testing, supplying, jointing and testing at work sites of Reinforced Cement Concrete (RCC) pipes, of non-pressure varieties, sewers and storm water drains. R.C.C. NP3 class pipes are to be used for sewer collecting system

#### Applicable Codes

The manufacturing, testing, supplying, jointing and testing at work sites of RCC pipes shall comply with all currently applicable statutes, regulations, standards and codes. In particular, the following standards, unless otherwise specified herein, shall be referred. In all cases, the latest revision of the codes shall be referred to. If requirements of this specification conflict with the requirements of the codes and standards, this specification shall govern.

#### 2.0 Materials

- (a) IS: 458 - Specification for precast concrete pipes (with and without reinf.)-2003
- (b) IS: 3597 - Method of tests for concrete pipes.
- (c) IS: 5382 - Specification for rubber sealing rings for gas mains, water mains and sewers
- (d) IS: 516 - Method of test for strength of concrete.

#### 2.1 Codes of Practice

- (a) IS: 456 - Code of practice for plain and reinforced concrete.
- (b) IS: 783 - Code of practice for laying of concrete pipes.

### **3.0 Design**

Design of RCC pipes including reinforcement details and the ends of pipes shall be in accordance with the relevant clauses of IS: 458-2003.

### **4.0 Manufacturing**

#### **4.1 General**

**Pipe can be manufactured by spinning process or by vibrated casting process**

**4.1.1** The method of manufacture shall be such that the form and the dimensions of the finished pipes are accurate within the limits specified in relevant clause of IS: 458. The surfaces and edges of the pipes shall be well defined and true, and their ends shall be square with the longitudinal axis. The ends of the pipes shall be further reinforced by an extra ring of reinforcement to avoid breakage during transportation.

**4.1.2** The RCC pipes and rubber rings shall be systematically checked for any manufacturing defects by experienced supervisors so as to maintain a high standard of quality.

**4.1.3** Owner/Engineer shall at all reasonable times have free access to the place where the pipes and collars/rubber rings are manufactured for the purpose of examining and testing the pipes and collars/rubber rings and of witnessing the test and manufacturing.

**4.1.4** All tests specified either in this specification or in the relevant Indian Standards shall be performed by the supplier/contractor at his own cost and in presence of Owner/Engineer if desired. For this, sufficient notice before testing of the pipes and fittings shall be given to Owner/Engineer.

**4.1.5** If the test is found unsatisfactory, Owner/Engineer may reject any or all pipes of that lot. The decision of Owner/Engineer in this matter shall be final and binding on Contractor and not subject to any arbitration or appeal

#### **4.2 MATERIALS**

##### **4.2.1 Cement**

Cement used for the manufacture of RCC pipes should be **Sulphate Resisting Cement (SRC)** only and shall conform to relevant IS codes.

##### **4.2.2 Aggregates**

Aggregates used for the manufacture of RCC pipes shall conform to IS: 383. The maximum size of aggregate should not exceed one-third the thickness of the pipe or 20 mm, whichever is smaller.

#### **4.2.3 Mixing and Curing Water**

Water shall be clean, colorless and free from objectionable quantities of organic matter, alkali, acid, salts or other impurities that might reduce the strength, durability or other desirable qualities of concrete and mortar

#### **4.2.4 Reinforcement**

Reinforcement used for the manufacture of the RCC pipes shall be mild steel Grade I or medium tensile steel bars conforming to IS: 432 (Part-I) or hard-drawn steel wire conforming to IS: 421 (Part-2). Reinforcement cages for pipes shall be as per relevant requirements of IS: 458

#### **4.2.5 Concrete**

Concrete used for the manufacture of RCC pipes shall conform to IS: 456. The minimum cement content and minimum compressive strength of concrete shall be as per relevant requirements of IS:458 (Latest Edition). Compressive strength tests shall be conducted on 15 cm cubes in accordance with the relevant requirements of IS: 456 and IS: 516.

#### **4.2.6 Rubber Ring**

Rubber ring chords used in pipe joints shall be EPDM rubbering as per IS 5382: 1985.

#### **4.2.7 Curing**

Pipes manufactured in compliance with IS:458 (Latest Edition) shall be either water cured or steam cured for minimum stipulated curing period in accordance with relevant requirements of the latest revised IS:458 (Latest Edition).

### **4.3 Dimensions**

- 4.3.1** The internal diameter, wall thickness and length of barrel and collar of pipes, reinforcement (longitudinal and spiral), type of ends and minimum clear cover to reinforcement and strength test requirements shall be as per the relevant clauses/tables of IS: 458 for different classes of pipes.

**Table – 1**  
**Design and Strength Test Requirements of Concrete Pipes of Class NP3**  
**Reinforced Concrete, Medium Duty, Non-Pressure Pipes**

Internal Diameter of Pipes in mm	Barrel Wall Thickness	Reinforcements			Strength Test Requirements for Three Edge Bearing Test	
		Longitudinal, Mild Steel or Hard Drawn Steel		Spirals, Hard Draws Steel	Load to Produce 0.25 mm Crack kN/linear meter	Ultimate Load kN/linear meter
		Minimum number	Kg/linear meter	Kg/linear meter		
(1)	(2)	(3)	(4)	(5)	(6)	(7)
300	40	8	0.78	1.80	15.50	23.25
400	75	8	0.78	3.30	19.16	28.74
600	85	8 or 6+6	1.18	7.01	28.74	43.11
800	95	8 or 6+6	2.66	13.04	38.32	57.48
900	100	6 + 6	2.66	18.30	43.11	64.67
1000	115	6 + 6	2.66	21.52	47.90	71.85
1200	120	8 + 8	3.55	33.57	57.48	86.22
1400	135	8 + 8	3.55	46.21	67.06	100.60
1600	140	8 + 8	3.55	65.40	76.64	114.96
1800	150	12 + 12	9.36	87.10	86.22	129.33
2000	170	12 + 12	9.36	97.90	95.80	143.70
2200	185	12 + 12	9.36	133.30	105.38	158.07

**Note:**

1. If mild steel is used for spiral reinforcement, the weight specified under col.5 shall be increased to 140/125.
2. The longitudinal reinforcement given in this table is valid for pipes up to 2.5 m. effective length for internal diameter of pipe up to 250 mm and up to 3 m. effective length for higher diameter pipes.
3. Total mass of longitudinal reinforcement shall be calculated by multiplying the values given in col.4 by the length of the pipe and then deducting for the cover length provided at the two ends.
4. Concrete for pipes shall have a minimum compressive strength of 35 N/mm<sup>2</sup> at 28 days.



**Table – 2**  
**Design and Strength Test Requirements of Concrete Pipes of Class NP3**  
**Reinforced Concrete, Medium Duty, Non-Pressure Pipes Made by Vibrated Casting Process**

Internal Diameter of Pipes in mm	Minimum Barrel Wall Thickness	Reinforcements			Strength Test Requirements for Three Edge Bearing Test	
		Longitudinal, Mild Steel or Hard Drawn Steel		Spirals, Hard Draws Steel	Load to Produce 0.25 mm Crack kN/linear meter	Ultimate Load kN/linear meter
		Minimum number	Kg/linear meter	Kg/linear meter		
(1)	(2)	(3)	(4)	(5)	(6)	(7)
300	50	8	0.78	1.53	15.5	23.25
400	60	8	0.78	1.6	19.16	28.74
600	75	8 or 6 +6	1.18	2.2	28.74	43.11
800	95	8 or 6 +6	2.66	6.87	38.32	57.48
900	100	6 + 6	2.66	11.55	43.11	64.67
1000	115	6 + 6	2.66	15.7	47.9	71.85
1200	125	8 + 8	3.55	21.25	57.48	86.22
1400	140	8 + 8	3.55	30	67.06	100.6
1600	165	8 + 8	3.55	50.63	76.64	114.96
1800	180	12 + 12	9.36	64.19	86.22	129.33
2000	190	12 + 12	9.36	83.12	95.8	143.7
2200	210	12 + 12	9.36	105.53	105.4	158.07

**Note:** Concrete for pipes shall have a minimum compressive strength of 35 N/mm<sup>2</sup> at 28 days

#### **4.4 Workmanship and Finish**

**4.4.1** Pipes shall be straight and free from cracks except that craze cracks may be permitted. The ends of the pipes shall be square with their longitudinal axis so that when placed in a straight line in the trench no opening between ends in contact shall exceed 3 mm in pipes up to 600 mm diameter (inclusive), and 6 mm in pipes larger than 600 mm diameter

**4.4.2** The outside and inside surfaces of the pipes shall be smooth, dense and hard, and shall not be coated with cement wash or other preparation unless otherwise agreed to between Owner/Engineer and the manufacturer or supplier.

**4.4.3** The pipes shall be free from defects resulting from imperfect grading of the aggregate, mixing or molding.

**4.4.4** The pipes shall be free from local dents or bulges greater than 3 mm in depth and extending over a length in any direction greater than twice the thickness of barrel..

**4.4.5** The deviation from straight in any pipe throughout its effective length, tested by means of a rigid straight edge parallel to the longitudinal axis of the pipe shall not exceed, for all diameters 3 mm forever meter run

#### **4.5 Testing**

All pipes for testing purposes shall be selected at random from the stock of the manufacturer and shall be such as would not otherwise be rejected under the criteria of tolerances as mentioned in IS: 458.(Latest Edition)

During manufacture, tests on concrete shall be carried out as per IS: 456. The manufacturer shall supply, when required to do so by Owner/Engineer the results of compressive tests of concrete cubes and split tensile tests of concrete cylinders made from the concrete used for the pipes. The manufacturer shall supply cylinders or cubes for test purposes required by the Owner/Engineer and such cylinders or cubes shall withstand the tests prescribed by the manufacturer for the hydrostatic test pressure. For non-pressure pipes, 2 percent of the pipes shall be tested for hydrostatic test pressure.

The specimen of pipes for the following tests shall be selected in accordance with relevant Clause of IS: 458 (Latest Edition) and tests in accordance with the methods described in IS: 3597.

- i) Hydrostatic test
- ii) Three edge bearing test
- iii) Absorption test.

**Note:** Three edge bearing strength to produce 0.25 mm crack in case of special design of pipes shall be as per IS:458:2003.

For Inspection at manufacturing site 24 hrs. Access shall be provided to BMC Engineers as well as engineer appointed by PMC/TPI agency. Apart from this BMC will establish its own pipe testing facility where pipes will be randomly tested. The cost of transporting the pipe to the testing facility & testing charges shall be borne by the contractor

#### **4.6 Sampling and Inspection**

**4.6.1** In any consignment, all the pipes of same class and size and manufactured under similar conditions of production shall be grouped together to constitute a lot. The conformity of a lot to the requirements of this specification shall be ascertained on the basis of tests on pipes selected from it

- 4.6.2** The number of pipes to be selected from the lot for testing shall be in accordance with Table 15 of IS: 458 (Latest Edition).
- 4.6.3** Pipes shall be selected at random. In order to ensure randomness, all the pipes in the lot may be arranged in a serial order and starting from any pipe, every 'n'th pipe be selected till the requisite number is obtained, n being the integral part of  $N/n$ , where N is the lot size and n is the sample size.
- 4.6.4** All pipes selected as per IS: 458 shall be inspected for dimensional requirements, finish and deviation from straight. A pipe failing to satisfy one or more of these requirements shall be considered as defective.
- 4.6.5** The number of pipes to be tested for tests under IS: 458 shall be in accordance with column 4 of Table 15 of IS: 458 (Latest Edition). These pipes shall be selected from pipes that have satisfied the requirements mentioned in Clause above.
- 4.6.6** A lot shall be considered as conforming to the requirements of IS:458 (Latest Edition) of the following conditions are satisfied.
- (a)** The number of defective pipes shall not be more than the permissible number given in column 3 of Table 15 of IS: 458 (Latest Edition).
- (b)** All the pipes tested for various tests as per IS-458 shall satisfy corresponding requirements of the tests.
- (c)** In case the number of pipes not satisfying requirements of any one or more tests, one or two further samples of same size shall be selected and tested for the test or tests in which failure has occurred. All these pipes shall satisfy the corresponding requirements of the test

#### **4.7 Marking**

The following information shall be clearly marked on each pipe:

- (a)** Internal diameter of pipe.
- (b)** Class of pipe.
- (c)** Date of manufacture, and
- (d)** Name of manufacturer or his registered trademark or both.
- (e)**

#### **LAYING OF PIPES**

The laying of RCC pipes shall conform to Technical Specifications: Item:-6

## **JOINTING**

### **GENERAL**

Jointing of RCC pipes shall be done with SRC cement only and as per the requirements of following specifications and as per the relevant IS. The type of joints shall be as below. After jointing, extraneous material, if any, shall be removed from the inside of the pipe and the newly made joints shall be thoroughly cured. In case, rubber-sealing rings are used for jointing, these shall conform to IS 5382 and shall be of such type as mentioned in IS-458:2003.

#### **1. FLUSH JOINT (INTERNAL)**

This joint shall be generally used for culvert pipes of 900-mm diameter and over. The ends of the pipes are specially shaped to form a self-centering joint with an internal jointing space 13-mm wide. The finished joint is flush with both inside and outside with the pipe wall. The jointing space is filled with cement mortar in the proportion as specified in IS-458-2003, mixed sufficiently dry to remain in position when forced with a trowel or rammed.

#### **2. FLUSH JOINT (EXTERNAL)**

This joint is suitable for pipes which are too small for jointing from inside. This joint is composed of specially shaped pipe ends. Each end shall be butted against each other and adjusted in correct position. The jointing space shall then be filled with cement mortar as specified in IS-458-2003, sufficiently dry and finished off flush. Great care shall be taken to ensure that the projecting ends are not damaged as no repairs can be readily affected from inside the pipe

#### **3. Spigot and Socket Joint (Flexible)**

The RCC pipe with the rubber ring accurately positioned on the spigot shall be pushed well home into the socket of the previously laid pipe by means of uniformly applied pressure with the aid of a jack or similar appliance. The RCC pipes shall be of spigot and socket type and rubber rings as specified in IS-458-2003, shall be used, and the manufacturer's instructions shall be deemed to form a part of these specifications. The rubber rings shall be lubricated before making the joint and the lubricant shall be soft soap water or an approved lubricant supplied by the manufacturer. Socket & Spigot NP3 & NP4 pipe with rubber ring roll on joint for diameter up to 900 mm should be provided as per table 14 pf IS 458 : 2003. Socket & spigot NP3 & NP4 pipe with rubber ring confined joint for diameter 1000 mm to 2200 mm should be provided as per Table -17 of IS 458:2003

#### **4. Cleaning Of Pipes**

As soon as a stretch of RCC pipes has been laid complete from manhole to manhole or for a stretch as directed by Owner/Engineer, contractor shall run through the pipes both backwards and forwards a double disc or solid or closed cylinder 75 mm less in diameter than the internal diameter of pipes. The open end of the incomplete stretch of pipeline shall be securely closed as may be directed by Owner/Engineer to prevent entry of mud or silt etc.

If as a result of the removal of any obstructions Owner/Engineer considers that damages may have been caused to the pipelines, he shall be entitled to order the stretch to be tested immediately. Should such test prove unsatisfactory, contractor shall amend the work and carry out such further tests as are required by Owner/Engineer.

It shall also be ascertained by contractor that each stretch from manhole to manhole or the stretch as directed by Engineer is absolutely clear and without any obstruction by means of visual examination of the interior of the pipeline suitably enlightened by projected sunlight or otherwise.

#### **5. Testing At Work Site**

After laying and jointing of RCC pipes is completed the pipe line shall be tested at work site as per the following specifications and as directed by Owner / Engineer In-Charge. All equipment for testing at work site shall be supplied and erected by contractor and shall be rectified by him to the full satisfaction of Owner / Engineer In-Charge.

After the joints have thoroughly set and have been checked by Owner/Engineer and before backfilling the trenches, the entire section of the sewer or storm water drain shall be proved by contractor to be water tight by filling in pipes with water to the level of 1.50 m above the top of the highest pipe in the stretch and heading the water up for the period of one hour. The apparatus used for the purpose of testing shall be approved by Owner/Engineer. Contractor if required by Owner/Engineer shall dewater the excavated pit and keep it dry during the period of testing. The loss of water over a period of 30 minutes should be measured by adding water from a measuring vessel at regular 10 minutes intervals and noting the quantity required to maintain the original water level. For the approval of this test the average quantity added should not exceed 1 liter/hour/100 linear meters/10 mm of nominal internal diameter. Any leakage including excessive sweating which causes a drop in the test water level will be visible and the defective part of the work should be removed and made good.

In case of pressure pipeline, the completed stretch of pipeline shall be tested for site test pressure as specified in IS-458-2003. The site test pressure should not be less than the maximum operating pressure plus the calculated surge pressure, but in no case should it exceed the hydrostatic test pressure as specified in IS:458 (Latest Edition).

#### **Measurement**

All RCC pipes shall be measured according to the work actually done and no allowance will be made for any waste in cutting to the exact length required. The measurement for pipes shall be in running meter nearest to a cm. of length along the center line of pipe as actually laid at work sites.

The rate for providing, laying and jointing of RCC pipes shall be deemed to include the cost of rubber rings, jointing material, testing and extra excavation required for ordinary bedding of pipes and also for pipe sockets, if any.

#### **Notes:**

1. If any damage is caused to the pipeline during the execution of work or while cleaning/testing the pipeline as specified. Contractor shall be held responsible for the same and shall replace the damaged pipeline and retest the same at his own cost to the full satisfaction of Engineer.
2. Water for testing of pipeline shall be arranged by Contractor at his own cost.
3. Pipes shall be brought on site proportionate to the required progress for Thirty days only.

**Item No.2.**

**Vertical cast**

**Providing and supplying ISI Standard and marked R.C.C. pipes(of Sulphate Resisting Cement) in standard lengths of following class and diameter spigot socket or Tongue and grove joint or Rebated Rubber Ring jointed flushing from inside suitable for rubber ring joints including all taxes, insurance, transportation, freight charges, octroi, inspection charges, loading, unloading, conveyance to departmental stores, stacking etc. complete. (IS - 458/ 1989)**

**Note : One rubber ring should be supplied with each full length socketed pipe, cost included in rates below.**

Sr.No	Dia (in mm)
2.0	400 mm
2.1	600 mm

- **Specification of RCC NP3 Pipe:**

**1.1 Scope**

This specification covers the requirements for manufacturing, testing, supplying, jointing and testing at work sites of Reinforced Cement Concrete (RCC) pipes, of non-pressure varieties, sewers and storm water drains. R.C.C. NP3 class pipes are to be used for sewer collecting system

**Applicable Codes**

The manufacturing, testing, supplying, jointing and testing at work sites of RCC pipes shall comply with all currently applicable statutes, regulations, standards and codes. In particular, the following standards, unless otherwise specified herein, shall be referred. In all cases, the latest revision of the codes shall be referred to. If requirements of this specification conflict with the requirements of the codes and standards, this specification shall govern.

**2.0 Materials**

- (a) IS: 458 - Specification for precast concrete pipes (with and without reinf.)-2003
- (b) IS: 3597 - Method of tests for concrete pipes.
- (c) IS: 5382 - Specification for rubber sealing rings for gas mains, water mains and sewers

(d) IS: 516 - Method of test for strength of concrete.

## 2.1 Codes of Practice

(a) IS: 456 - Code of practice for plain and reinforced concrete.

(b) IS: 783 - Code of practice for laying of concrete pipes.

## 3.0 Design

Design of RCC pipes including reinforcement details and the ends of pipes shall be in accordance with the relevant clauses of IS: 458-2003.

## 4.0 Manufacturing

### 4.1 General

Pipe can be manufactured by spinning process or by vibrated casting process

4.1.1 The method of manufacture shall be such that the form and the dimensions of the finished pipes are accurate within the limits specified in relevant clause of IS: 458. The surfaces and edges of the pipes shall be well defined and true, and their ends shall be square with the longitudinal axis. The ends of the pipes shall be further reinforced by an extra ring of reinforcement to avoid breakage during transportation.

4.1.2 The RCC pipes and rubber rings shall be systematically checked for any manufacturing defects by experienced supervisors so as to maintain a high standard of quality.

4.1.3 Owner/Engineer shall at all reasonable times have free access to the place where the pipes and collars/rubber rings are manufactured for the purpose of examining and testing the pipes and collars/rubber rings and of witnessing the test and manufacturing.

4.1.4 All tests specified either in this specification or in the relevant Indian Standards shall be performed by the supplier/contractor at his own cost and in presence of Owner/Engineer if desired. For this, sufficient notice before testing of the pipes and fittings shall be given to Owner/Engineer.

4.1.5 If the test is found unsatisfactory, Owner/Engineer may reject any or all pipes of that lot. The decision of Owner/Engineer in this matter shall be final and binding on Contractor and not subject to any arbitration or appeal

## 4.2 MATERIALS

### 4.2.1 Cement

Cement used for the manufacture of RCC pipes should be Sulphate Resisting Cement (SRC) only and shall conform to relevant IS codes.

### 4.2.2 Aggregates

Aggregates used for the manufacture of RCC pipes shall conform to IS: 383. The maximum size of aggregate should not exceed one-third the thickness of the pipe or 20 mm, whichever is smaller.

#### 4.2.3 Mixing and Curing Water

Water shall be clean, colorless and free from objectionable quantities of organic matter, alkali, acid, salts or other impurities that might reduce the strength, durability or other desirable qualities of concrete and mortar

#### 4.2.4 Reinforcement

Reinforcement used for the manufacture of the RCC pipes shall be mild steel Grade I or medium tensile steel bars conforming to IS: 432 (Part-I) or hard-drawn steel wire conforming to IS: 421 (Part-2). Reinforcement cages for pipes shall be as per relevant requirements of IS: 458

#### 4.2.5 Concrete

Concrete used for the manufacture of RCC pipes shall conform to IS: 456. The minimum cement content and minimum compressive strength of concrete shall be as per relevant requirements of IS:458 (Latest Edition). Compressive strength tests shall be conducted on 15 cm cubes in accordance with the relevant requirements of IS: 456 and IS: 516.

#### 4.2.6 Rubber Ring

Rubber ring chords used in pipe joints shall be EPDM rubbering as per IS 5382: 1985.

#### 4.2.7 Curing

Pipes manufactured in compliance with IS:458 (Latest Edition) shall be either water cured or steam cured for minimum stipulated curing period in accordance with relevant requirements of the latest revised IS:458 (Latest Edition).

### 4.3 Dimensions

4.3.1 The internal diameter, wall thickness and length of barrel and collar of pipes, reinforcement (longitudinal and spiral), type of ends and minimum clear cover to reinforcement and strength test requirements shall be as per the relevant clauses/tables of IS: 458 for different classes of pipes.

Table – 1

Design and Strength Test Requirements of Concrete Pipes of Class NP3

Reinforced Concrete, Medium Duty, Non-Pressure Pipes

Internal Diameter of Pipes in mm	Barrel Wall Thickness	Reinforcements		Strength Test Requirements for Three Edge Bearing Test	
		Longitudinal, Mild Steel or Hard Drawn Steel	Spirals, Hard Draws Steel	Load to Produce 0.25 mm Crack kN/linear meter	Ultimate Load



		Minimum number	Kg/linear meter	Kg/linear meter		kN/linear meter
(1)	(2)	(3)	(4)	(5)	(6)	(7)
300	40	8	0.78	1.80	15.50	23.25
400	75	8	0.78	3.30	19.16	28.74
600	85	8 or 6+6	1.18	7.01	28.74	43.11
800	95	8 or 6+6	2.66	13.04	38.32	57.48
900	100	6 + 6	2.66	18.30	43.11	64.67
1000	115	6 + 6	2.66	21.52	47.90	71.85
1200	120	8 + 8	3.55	33.57	57.48	86.22
1400	135	8 + 8	3.55	46.21	67.06	100.60
1600	140	8 + 8	3.55	65.40	76.64	114.96
1800	150	12 + 12	9.36	87.10	86.22	129.33
2000	170	12 + 12	9.36	97.90	95.80	143.70
2200	185	12 + 12	9.36	133.30	105.38	158.07

Note:

1. If mild steel is used for spiral reinforcement, the weight specified under col.5 shall be increased to 140/125.
2. The longitudinal reinforcement given in this table is valid for pipes up to 2.5 m. effective length for internal diameter of pipe up to 250 mm and up to 3 m. effective length for higher diameter pipes.
3. Total mass of longitudinal reinforcement shall be calculated by multiplying the values given in col.4 by the length of the pipe and then deducting for the cover length provided at the two ends.
4. Concrete for pipes shall have a minimum compressive strength of 35 N/mm<sup>2</sup> at 28 days.

Table – 2

Design and Strength Test Requirements of Concrete Pipes of Class NP3

Reinforced Concrete, Medium Duty, Non-Pressure Pipes Made by Vibrated Casting Process

Internal Diameter of Pipes in mm	Minimum Barrel Wall Thickness	Reinforcements			Strength Test Requirements for Three Edge Bearing Test	
		Longitudinal, Mild Steel or Hard Drawn Steel		Spirals, Hard Draws Steel	Load to Produce 0.25 mm Crack kN/linear meter	Ultimate Load kN/linear meter
		Minimum number	Kg/linear meter	Kg/linear meter		
(1)	(2)	(3)	(4)	(5)	(6)	(7)
300	50	8	0.78	1.53	15.5	23.25
400	60	8	0.78	1.6	19.16	28.74
600	75	8 or 6 +6	1.18	2.2	28.74	43.11
800	95	8 or 6 +6	2.66	6.87	38.32	57.48
900	100	6 + 6	2.66	11.55	43.11	64.67
1000	115	6 + 6	2.66	15.7	47.9	71.85
1200	125	8 + 8	3.55	21.25	57.48	86.22
1400	140	8 + 8	3.55	30	67.06	100.6
1600	165	8 + 8	3.55	50.63	76.64	114.96
1800	180	12 + 12	9.36	64.19	86.22	129.33
2000	190	12 + 12	9.36	83.12	95.8	143.7
2200	210	12 + 12	9.36	105.53	105.4	158.07

Note: Concrete for pipes shall have a minimum compressive strength of 35 N/mm<sup>2</sup> at 28 days

#### 4.4 Workmanship and Finish

4.4.1 Pipes shall be straight and free from cracks except that craze cracks may be permitted. The ends of the pipes shall be square with their longitudinal axis so that when placed in a straight line in the trench no opening between ends in contact shall exceed 3 mm in pipes up to 600 mm diameter (inclusive), and 6 mm in pipes larger than 600 mm diameter

4.4.2 The outside and inside surfaces of the pipes shall be smooth, dense and hard, and shall not be coated with cement wash or other preparation unless otherwise agreed to between Owner/Engineer and the manufacturer or supplier.

4.4.3 The pipes shall be free from defects resulting from imperfect grading of the aggregate, mixing or molding.

4.4.4 The pipes shall be free from local dents or bulges greater than 3 mm in depth and extending over a length in any direction greater than twice the thickness of barrel..

4.4.5 The deviation from straight in any pipe throughout its effective length, tested by means of a rigid straight edge parallel to the longitudinal axis of the pipe shall not exceed, for all diameters 3 mm forever meter run

#### 4.5 Testing

All pipes for testing purposes shall be selected at random from the stock of the manufacturer and shall be such as would not otherwise be rejected under the criteria of tolerances as mentioned in IS: 458.(Latest Edition)

During manufacture, tests on concrete shall be carried out as per IS: 456. The manufacturer shall supply, when required to do so by Owner/Engineer the results of compressive tests of concrete cubes and split tensile tests of concrete cylinders made from the concrete used for the pipes. The manufacturer shall supply cylinders or cubes for test purposes required by the Owner/Engineer and such cylinders or cubes shall withstand the tests prescribed by the manufacturer for the hydrostatic test pressure. For non-pressure pipes, 2 percent of the pipes shall be tested for hydrostatic test pressure.

The specimen of pipes for the following tests shall be selected in accordance with relevant Clause of IS: 458 (Latest Edition) and tests in accordance with the methods described in IS: 3597.

- i) Hydrostatic test
- ii) Three edge bearing test
- iii) Absorption test.

Note: Three edge bearing strength to produce 0.25 mm crack in case of special design of pipes shall be as per IS:458:2003.

For Inspection at manufacturing site 24 hrs. Access shall be provided to BMC Engineers as well as engineer appointed by PMC/TPI agency. Apart from this BMC will establish its own pipe testing facility where pipes will be randomly tested. The cost of transporting the pipe to the testing facility & testing charges shall be borne by the contractor

#### 4.6 Sampling and Inspection

4.6.1 In any consignment, all the pipes of same class and size and manufactured under similar conditions of production shall be grouped together to constitute a lot. The conformity of a lot to the requirements of this specification shall be ascertained on the basis of tests on pipes selected from it

4.6.2 The number of pipes to be selected from the lot for testing shall be in accordance with Table 15 of IS: 458 (Latest Edition).

4.6.3 Pipes shall be selected at random. In order to ensure randomness, all the pipes in the lot may be arranged in a serial order and starting from any pipe, every 'n'th pipe be selected till the requisite number is obtained, n being the integral part of  $N/n$ , where N is the lot size and n is the sample size.

4.6.4 All pipes selected as per IS: 458 shall be inspected for dimensional requirements, finish and deviation from straight. A pipe failing to satisfy one or more of these requirements shall be considered as defective.

4.6.5 The number of pipes to be tested for tests under IS: 458 shall be in accordance with column 4 of Table 15 of IS: 458 (Latest Edition). These pipes shall be selected from pipes that have satisfied the requirements mentioned in Clause above.

4.6.6 A lot shall be considered as conforming to the requirements of IS:458 (Latest Edition) of the following conditions are satisfied.

**(a)** The number of defective pipes shall not be more than the permissible number given in column 3 of Table 15 of IS: 458 (Latest Edition).

**(b)** All the pipes tested for various tests as per IS-458 shall satisfy corresponding requirements of the tests.

**(c)** In case the number of pipes not satisfying requirements of any one or more tests, one or two further samples of same size shall be selected and tested for the test or tests in which failure has occurred. All these pipes shall satisfy the corresponding requirements of the test

#### 4.7 Marking

The following information shall be clearly marked on each pipe:

(a) Internal diameter of pipe.

(2) Class of pipe.

(3) Date of manufacture, and

(4) Name of manufacturer or his registered trademark or both.

(5)

#### LAYING OF PIPES

The laying of RCC pipes shall conform to Technical Specifications: Item:-6

#### JOINTING

#### GENERAL

Jointing of RCC pipes shall be done with SRC cement only and as per the requirements of following specifications and as per the relevant IS. The type of joints shall be as below. After jointing, extraneous material, if any, shall be removed from the inside of the pipe and the newly made joints shall be thoroughly cured. In case, rubber-sealing rings are used for jointing, these shall conform to IS 5382 and shall be of such type as mentioned in IS-458:2003.

#### 1. FLUSH JOINT (INTERNAL)

This joint shall be generally used for culvert pipes of 900-mm diameter and over. The ends of the pipes are specially shaped to form a self-centering joint with an internal jointing space 13-mm wide. The finished joint is flush with both inside and outside with the pipe wall. The jointing space is filled with cement mortar in the proportion as specified in IS-458-2003, mixed sufficiently dry to remain in position when forced with a trowel or rammed.

## 2. FLUSH JOINT (EXTERNAL)

This joint is suitable for pipes which are too small for jointing from inside. This joint is composed of specially shaped pipe ends. Each end shall be butted against each other and adjusted in correct position. The jointing space shall then be filled with cement mortar as specified in IS-458-2003, sufficiently dry and finished off flush. Great care shall be taken to ensure that the projecting ends are not damaged as no repairs can be readily affected from inside the pipe

## 3. Spigot and Socket Joint (Flexible)

The RCC pipe with the rubber ring accurately positioned on the spigot shall be pushed well home into the socket of the previously laid pipe by means of uniformly applied pressure with the aid of a jack or similar appliance. The RCC pipes shall be of spigot and socket type and rubber rings as specified in IS-458-2003, shall be used, and the manufacturer's instructions shall be deemed to form a part of these specifications. The rubber rings shall be lubricated before making the joint and the lubricant shall be soft soap water or an approved lubricant supplied by the manufacturer. Socket & Spigot NP3 & NP4 pipe with rubber ring roll on joint for diameter up to 900 mm should be provided as per table 14 pf IS 458 : 2003. Socket & spigot NP3 & NP4 pipe with rubber ring confined joint for diameter 1000 mm to 2200 mm should be provided as per Table -17 of IS 458:2003

## 4. Cleaning Of Pipes

As soon as a stretch of RCC pipes has been laid complete from manhole to manhole or for a stretch as directed by Owner/Engineer, contractor shall run through the pipes both backwards and forwards a double disc or solid or closed cylinder 75 mm less in diameter than the internal diameter of pipes. The open end of the incomplete stretch of pipeline shall be securely closed as may be directed by Owner/Engineer to prevent entry of mud or silt etc.

If as a result of the removal of any obstructions Owner/Engineer considers that damages may have been caused to the pipelines, he shall be entitled to order the stretch to be tested immediately. Should such test prove unsatisfactory, contractor shall amend the work and carry out such further tests as are required by Owner/Engineer.

It shall also be ascertained by contractor that each stretch from manhole to manhole or the stretch as directed by Engineer is absolutely clear and without any obstruction by means of visual examination of the interior of the pipeline suitably enlightened by projected sunlight or otherwise.

## 5. Testing At Work Site

After laying and jointing of RCC pipes is completed the pipe line shall be tested at work site as per the following specifications and as directed by Owner / Engineer In-Charge. All equipment for testing at work site shall be supplied and erected by contractor and shall be rectified by him to the full satisfaction of Owner / Engineer In-Charge.

After the joints have thoroughly set and have been checked by Owner/Engineer and before backfilling the trenches, the entire section of the sewer or storm water drain shall be proved by contractor to be water tight by filling in pipes with water to the level of 1.50 m above the top of the highest pipe in the stretch and heading the water up for the period of one hour. The apparatus used for the purpose of testing shall be approved by Owner/Engineer. Contractor if required by Owner/Engineer shall dewater the excavated pit and keep it dry during the period of testing. The loss of water over a period of 30 minutes should be

measured by adding water from a measuring vessel at regular 10 minutes intervals and noting the quantity required to maintain the original water level. For the approval of this test the average quantity added should not exceed 1 liter/hour/100 linear meters/10 mm of nominal internal diameter. Any leakage including excessive sweating which causes a drop in the test water level will be visible and the defective part of the work should be removed and made good.

In case of pressure pipeline, the completed stretch of pipeline shall be tested for site test pressure as specified in IS-458-2003. The site test pressure should not be less than the maximum operating pressure plus the calculated surge pressure, but in no case should it exceed the hydrostatic test pressure as specified in IS:458 (Latest Edition).

#### Measurement

All RCC pipes shall be measured according to the work actually done and no allowance will be made for any waste in cutting to the exact length required. The measurement for pipes shall be in running meter nearest to a cm. of length along the center line of pipe as actually laid at work sites.

The rate for providing, laying and jointing of RCC pipes shall be deemed to include the cost of rubber rings, jointing material, testing and extra excavation required for ordinary bedding of pipes and also for pipe sockets, if any.

#### Notes:

- 1 If any damage is caused to the pipeline during the execution of work or while cleaning/testing the pipeline as specified. Contractor shall be held responsible for the same and shall replace the damaged pipeline and retest the same at his own cost to the full satisfaction of Engineer.
2. Water for testing of pipeline shall be arranged by Contractor at his own cost.
3. Pipes shall be brought on site proportionate to the required progress for Thirty days only.

#### Item No. 3, 3.1

**RCC precast M.H. Frame & Cover Manufacture, supply & Delivery at store or at site of work precast RCC M.200 Frame & cover suitable to drainage M.H. and as per type design & Drawing including cost of reinforcement M.S. Angles or Flate, curing mold work etc.**

#### Heavy Duty

- **Frame.**
- **Cover**

Precast RCC Manhole Frame & cover shall be as per IS: 12592 (part – I & II). The M.H. Frame & Cover shall be of Heavy duty of Grade designation HD- 20 – Circular of Internal clear opening 500 mm.

Materials such as cement, aggregate, water, reinforcement shall be of standard as prescribed in the material part. Other materials to be used for Frame & Cover shall be as under:

#### Concrete:

The mix proportions of concrete shall be determined by the manufacturer and shall be such as will produce a dense concrete without voids, honey combing, etc. (IS: 456 – 1978). The minimum cement content in

the concrete shall be 360 Kg/m<sup>3</sup> with a maximum water content ratio of 0.45. Concrete weaker than grade M 30 shall not be used. Compaction of concrete shall be done by machine vibration.

**Steel Fibers:**

The diameter/equivalent diameter of steel fibers shall not be greater than 0.75 mm. The aspect ratio of the fibers shall be in the range of 50 to 80. The minimum volume of fibers, where used, shall be 0.5 percent of the volume of the concrete.

**Additives or Admixtures:**

Additives or admixtures may be added either as additives to the cement during manufacture, or as admixtures to the concrete mix. Additives or admixtures used for covers may be:

- a) Accelerating, water-reducing and air-entertaining admixtures confirming to IS: 9103-1979.
- b) Coloring pigments
- c) Fly ash confirming to IS: 3812-1981
- d) Water proofing agents conforming to IS: 2645-1975.

**Dimensions and Tolerances:**

Length, breadth and diameter of precast concrete manhole covers shall be such that the maximum clearance at top between the cover & frame of corresponding grade and shape shall be 5 mm. The minimum thickness of heavy-duty precast manhole cover shall be 70 mm. The top surface of frame & cover is in level within a tolerance of  $\pm 5$  mm.

Placing of reinforcement, compaction of concrete & curing shall be attended as per IS: 12592. Edge Protection & Finishing shall be provided as per IS.

**Physical requirements**

All the frame & covers shall be sound and shall be free from cracks & other defects, which interferes with the proper placing of the units or impair the strength or performance of the units. Minor chippings resulting from the customary methods of handling and transportation shall not be deemed ground for rejection.

**Marking: Each Cover shall have following marking:**

Date of manufacture

Grade Designation

ISI mark

BMC - Identification mark

**Testing:**

Frame & covers will be tested at factory by owner / consultant & accepted goods shall be procured on site of work.

**Payment:**

The rate shall be paid on number basis for set of Frame & Cover.

**Item No. 4 to 4.6****Sewer Manholes**

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, inside and outside 15mm thick plastering in C. M. 1:3 necessary 100 mm coping in R.C.C.M. 200 fixing C. I. steps and fixing manhole frame and covers (But excluding supply of manhole frame and covers) over manholes and house connection chambers and fixing Manhole covers (but excluding supplying of manhole covers) over scraper manhole etc. complete, providing and fixing safety chain wherever necessary as per the stipulations in the type desing complete (excl. excavation).

Sr.No	Description
4.0	Manhole type "A" Circular type having inside diameter of 1200 mm for depth upto 1.5 m depth (for 150 mm to 500 mm dia sewer) (A)Manhole type "A" as above but up to 1.0 M depth.
4.1	Extra depth beyond 1.0 M but up to 1.5 M depth for "A" type manhole above.
4.2	(B)Manhole type "B" circular type having inside diameter of minimum 1500 mm and for depth from 1.5 M to 4.0 M (for 150 mm to 600 mm dia sewers) Manhole type "B" as above but up to 1.5 M depth.
4.3	Extra depth beyond 1.5 M but up to 4.0 M depth for type B manhole above.
4.4	Manhole type "C" circular type having inside diameter of minimum 1500 mm and for depth beyond 4.0 m to 6.0 m (for 150 mm to 1800 mm dia sewers) Manhole type "C" as above but up to 4.0 M depth.
4.5	Scraper manhole type "SI" rectangular type for 600 mm dia to 1200 mm dia sewer pipes and for depth 2.5 m to 9.0 m. Scraper manhole type "SI" as above but upto 2.5 m depth.
4.6	Extra depth beyond 2.5 m and upto 9.0 m depth for type "SI" scraper manhole above.

**1. MATERIALS :**

Water shall conform to M-1, Cement Conform, Stone coarse aggregate of nominal size shall conform, Grit shall conform, Steel reinforcement shall conform. Brick shall conform, Cement mortar of specified proportion shall conform, The cast iron steps shall conform.

Manhole cover with frame of required size and weight shall be procured by the contractor. Supply of manhole frame and cover shall be paid separately under respective item.

**2. WORKMANSHIP :**

The manhole of different types and sizes as specified shall be constructed in sewer line at such place and to such levels and dimension as shown in drawing or as directed.

**Excavation :-**

The excavation for construction of manhole including dismantling of all types of roads surface guarding, barricading, lightening the trenches, baling out water 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



consolation etc. complete shall be carried out as per relevant specification, including disposal of surplus soil as directed.

**Concrete work :-**

The bed concrete in C.C. 1:3:6, Copping in C.C. 1:1.5:3 and benching concrete in proportion C.C. 1:2:4 (1 Cement : 2 coarse sand : stone aggregate of 20 mm nominal size) by volume with necessary centering and shuttering work shall be provided. It shall be placed deemed and or vibrated and cured as directed by Engineer-in-charge.

**REINFORCEMENT :**

All the reinforcement bars shall be accurately placed in exact position shown on the drawings and shall be security held in position during placing of concrete by annealed No. 1 binding work not less than 1 mm is size and by using stay block or metal chair spacers, metal hangers, supporting wires or other approved devices it sufficiently close intervals. Bars shall not be allowed to lag 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 bent 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 of 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 bars which are not round and in case of deformed bars, the diameter shall be taken as the diameter of circle having an equivalent effective area. The cold twisted steel bars shall be used 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 neither shear nor bending moment is maximum.

When permitted or specified on the drawings joints of reinforcement bars shall butt welded so as to transmit their full stresses. Welded joints shall preferably located at points where steel will not be subject to more than 75 percent of the maximum permissible stresses and welds so staggered that at any one section not more than 20 percent of the rods are welded. 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.

**PLASTER WORK :**

The surface shall be cleaned of all dust, loose mortar droppings, traces of algae efflorescence and other foreign mortar by water or by brushing. Smooth surface shall be roughened by wire brushing not hard by racking if it is hard. In case of concrete surface, if a chemical retarder has been applied to the form work the surface shall be roughened by wire brushing and all the resulting dust and loose particles cleaned off and care shall be taken that none of the retarders is left on the surface. Trimming of projections on brick / concrete surface where necessary shall be carried out to get an even surface.

The work shall be soaked but only damped evenly before applying the plaster. If the surface become dry, such areas shall be moistened again.

The plaster about 15 x 15 cms. shall be first applied horizontally and vertically at not more than 2 meters intervals over the entire surface to serve as gauge. The surface of these gauges shall be truly in plane of the finished plastered surface. The mortar shall then be applied in uniform surface slightly more than the specified thickness, then brought to a true surface by working a wooden straight edge reaching across the gauges with small upward and sideways movements at a time. Finally, the surface shall be finished off true with a trowel of wooden float accordingly excessive troweling of over working the float shall be avoided. All corners, arises, angles and junctions shall be truly vertical or horizontal as the case may be and shall be carefully finished. Rounding or chamfering corners, arises, junctions etc. shall be carried out with proper templates the size required.

Cement mortar for plaster shall be used within half an hour after addition of water. And mortar for plaster which is partially set shall be rejected and removed forthwith from the site.

In suspending the work at the end of the day, the plaster shall be left out clean to the line both horizontally and vertically, when recommencing the plaster the edge of the old work shall be scraped clear and wetted with cement putty before plaster is applied to the adjacent areas to enable the two to properly get together. Plastering work shall be closed at the end of the day on the body of the wall and nearer than 15 cm. to any corners or arises. It shall not be closed on the body of features such as plaster bends and cornices not at the corners or arises. Horizontal joints in plaster work shall not also occur on walls and copings these invariably leads to leakage. No portion of the surface shall be depth out initially to be packed up later on.

**POINTING :**

The flush pointing work shall be carried out with cement mortar of required proportion by volume. Before pointing to be started the joints shall be racked to such depth that the average of new mortar measured from the sunk surface of the finished pointing or from the edge of the brick shall be average 10 mm.

The mortar shall be pressed into the raked out joints with a pointing trowel according to the type of pointing specified in item or as directed. The mortar shall not spread over the corners of finished work i.e at fixing of C.I. Steps and M.H. cover.

#### **RCC WORK :**

Vertical shaft of manhole shall be in RCC M-30 pre-cast.

The entries and exits of main sewers as well as house service sewers requires careful detailing because the issue of puncturing the walls for insertions of especially house service sewers later on is impossible. These shall be managed as detailed below.

- The cone portion shall be separately cast and its design standardized with respect to the diameter of its base.
- The vertical shaft is best pre-cast to have a better quality control of raw materials and workmanship, which is otherwise very suspect in local situations of every manhole.
- The shaft itself shall be made of rings with lap joints of the annular rim and duly jointed at site by cement mortar or elasto-polymers. The varying heights of the manhole are obtained by choosing the bottom ring deeper than the fractional height needed there and filling up the bottom floor after placing the ring such that the invert level of the sewer is obtained thereby.
- This ring shall have a vertical inverted U cut out in casting itself to insert the sewer pipes and caulk the annular space using cement concrete with cement-based water proofing admixtures. The dimensions of the U cut out shall be standardized to match the OD of proposed sewers and a clear cover of 50 cm all round for caulking.
- The position of the vertical inverted U cut outs will normally be 180 degrees apart in plan but in cases of junction manholes and drop manholes it may be at differing angles in plan and needs to be precast suitably and shall not be chiseled out in the field.
- For insertion of the house service sewers into the manholes, it is necessary to have a precast ring section below the corbel portion, with holes at 45 degrees to the public sewer line to facilitate insertion of three house service sewers on each side of the public sewer axis. Usually the house service sewers shall be 110 mm or 160 mm UPVC 4 kg/sqcm (as detailed in sewer laying section). Accordingly, the height of the ring shall be 250 mm and 300 mm to permit filling of the annular interspaces between the sewer and the opening with cement concrete of at least 50 mm around the finished sewer.

Trimming of projections on brick / concrete surface where necessary shall be carried out to get an even surface.

#### **FIXING OF POLY PROPYLENE STEPS AND MANHOLE COVER :**

During the construction of masonry wall of the manhole the cement mortar of required proportion shall be used for embedding the Poly propylene steps in the wall masonry. The spacing of steps in the masonry shall be 300 mm center to center in the staggered position in the vertical direction with two staggered rows at 385 mm center to center in the horizontal direction. The top of the manhole shall not be more than 300 mm above the first step from top of manhole frame and cover and the center line of two staggered rows shall be the center line of the shorter side of manhole frame in the roof of chamber.

**The detailed specifications for the "Poly propylene steps as below:**

The Polypropylene conforming to an ASTM D-4101, injection molded around a 12 mm dia. IS 1786 grade Fe-415 steel reinforcing bar and should meet the load required 225 Kg. as per IS-5455. The measurement should be as per attached drawing. The tolerance in the length and width is +/- 5 mm and +/- 1 mm in thickness. The weight of the steps should not be less than 0.900 Kg. Un chequered portion of the step shall be inserted with the rich cement mortar during the course of masonry work so constructed around the steps as to keep the step on its right position. The non-slip grip chequered portion of the steps shall be well kept outside the masonry.

During fixing of the steps, the wall should not be damaged and shall not vibrate or shall not shake during ascents and descents otherwise they shall have to be re fixed correctly as per the drawings or as mentioned above.

Manhole frame shall be firmly and securely laid on top of shafts of conical tops in 25 mm thick cement mortar and shall be embedded in 150 mm thick cement concrete of proportion 1:2:4 (1 Cement : 2 coarse sand : 4 Kapchi as aggregate of 20 mm nominal size) in such a way that the top of M.H. frame shall be flush with concrete surface and top surface neatly finished 25 mm thick with cement mortar 1:3 in conformity with ground or road levels.

• **OTHER REQUIREMENTS :**

As per line and level and size of the manhole pit shall be excavated as per drawing or as ordered by the Engineer.

The foundation concrete 1:3:6 with required thickness as per drawing or as directed shall be laid after compacting the bottom of the pit. The cement concrete shall conform to specified specification of Cement Concrete.

The clear inside chamber size of opening shall be as per the drawing or as directed by the Engineer-in-charge.

The masonry wall shall be plastered inside and outside with 15 mm thick 1:3 cement mortar. The off set for the concrete foundation shall be 100 mm on all sides beyond walls of chamber.

Whenever pipes enter or leave the masonry chamber bricks on edge must be so laid around the upper half of the pipes so as to form the arch to prevent the weight of the masonry chamber over it.

On the top of masonry walls RCC coping 1:1.5:3 150mm thick or as directed shall be laid and then 1:1 cement mortar shall be laid and then R.C.C. slab of grade 1:2:4 necessary and as directed by the Engineer with coarse aggregate of trap metal of 20 mm nominal shall be laid necessary from work and centering shall have to be provided by the contractor at his own cost as per relevant specification of cement concrete.

In the bottom of manhole the channel and benching shall be done in C.C. 1:2:4 (1 Cement : 2 Coarse sand : 4 graded stone aggregate of 20 mm nominal size) The channel at the bottom of the chamber shall be plastered 15 mm thick in c.m. 1:3 (1 Cement : 3 fine sand) and steel trowel smooth.

Channels shall be in semicircular in the bottom half and a diameter equal to the sewer. Above the horizontal diameter, the side shall be extended vertically to the same level as the crown of the outgoing pipe and the top edge shall be suitably rounded off. The branch channels shall also be similarly constructed with respect to the benching but at their junctions with the main channel an appropriate fall suitably rounded off in the direction of flow in the main channel shall be given.

For conical shaft of manhole necessary conical portion shall be treated from 750 mm below the bottom of concrete of slab for fixing of manhole cover and frame.

The item includes curing of all the cement work for 14 days.

If dewatering is required by installing pumping sets the same shall be paid separately Under respective item.

• **MODE OF MEASUREMENTS & PAYMENTS :**

Payment shall be made on the basis as per number of masonry manholes chambers constructed with all constructing materials labours, refilling curing, finishing providing and fixing C.I. steps, constructing laying half round gutter fixing R.C.C. manhole cover etc. complete in all respect for incomplete item. Payment will be made on part rate basis.

The item will be paid per No. of construction of complete RCC manhole chamber as shown in the drawing up to the depth specified and shown in the type design drawing. For every increase or decrease in the minimum specified depth of masonry manhole chamber increase or decrease in rate shown in schedule B will be paid taking in consideration every 10 CM increase or decrease depth of masonry chambers. For the purpose of payment of RCC chamber every increase or decrease of the 10 cm depth than the specified minimum depth of masonry manhole chambers as shown in drawing/ or in Schedule-B will paid more or less for every 10 cm depth.

The measurements shall be made for number of chamber constructed and for additional depth plus or minus the rate shall be paid for meter length correct up to 10 cm depth plus or minus. The surplus excavated stuff shall be disposed of within municipal limits. as directed by Engineer-in-charge without any extra claim.

The depth of manholes shall be the distance between the top manhole cover and the invert level of the main drain. The rate includes all labours, materials, tools and plant etc. required for satisfactory completion of this item as directed above.

The item include :-

- (i) Bed concrete slab concrete and copping with necessary reinforcement.

- (ii) Providing and fixing polypropylene steps.
- (iv) Carting, conveying and fixing of manhole frame cover with necessary concrete and finishing.
- (v) Refilling with necessary watering and consolidation.
- (vi) Excavation with shoring is required.
- (vii) Leveling coarse concrete
- (viii) Disposal of surplus soil
- (ix) Curing for 14 days.

**Item No. 5& 5.1**

**Vertical Drop Manhole.**

**Providing and constructing vertical drop arrangement of 0.6 m and more height as required including providing and jointing special such as double T. Bend required stoneware pipe fixed in m-100 C. C. at required level as type design cutting, jointing and filleting as per specification etc. complete.**

Sr.No	Description
<b>5.0</b>	<b>Vertical drop arrangement as above up to 0.6 m height.</b>
<b>5.1</b>	<b>Extra over item No.4 above for additional drop beyond 0.6 m</b>

**Workmanship:**

All the materials such as cement, sand, water aggregate, stone ware pipe fittings etc shall be as per general specification of materials of this document. The work of excavation, plain cement concrete shall be executed as detail furnished elsewhere in this document.

When a sewer connects a main sewer, and where the difference in level between sewer line (peak flow levels) of main line and the invert level of branch line is more than 600 mm or a drop of more than 600 mm is required to be given in the same sewer line and it is uneconomical or impractical to arrange the connection within 600 mm, a drop connection shall be provided for which a manhole shall be constructed as per relevant drawing, incorporating a vertical drop pipe from the higher sewer to the lower one. This pipe shall be provided outside the shaft and encased in concrete.

A continuation of the branch sewer should be built through the shaft wall to form a ridding and inspection eye, which should be provided with a half blank flange. The diameter of the backdrop should be at least as large as that of the incoming pipe. The drop pipe should terminate at its lower end with a plain or duck-foot bend turned so as to discharge its flow at 45 degrees or less to the direction of the flow in the mains sewer.

This shall be accomplished by providing a S.W. cross piece at junction joint and encasing the ground pipe with C.C. M-10. The pipe unless of cast iron should be surrounded with 150 mm thick concrete as per drawing. The Stoneware pipe & fitting shall be as per relevant IS specification. Detail specification of Stoneware pipe & fitting as given in general material specification shall be followed.

**Mode of Measurement & payment:**

The measurement of Drop will be taken on Number basis as per type design. Additional depth more than 0.60 m will be paid as an additional depth on R.mt. basis.

**Item No.6**

**Excavation for pipeline trenches for water supply, sewerage line, manhole etc. all with shoring and strutting if required as per required gradient and line including safety provisions using site rails and stacking excavated stuff including up to all required lead cleaning the site etc. complete for all lifts and strata as specified. Depth up to 0.00 m to 1.5 m depth.**

Sr. No.	Size
6.0	In all sorts of soil & soft murrum (Taking quantity of 45 % in 0.00 m to 1.5 m depth)
6.1	In hard murrum,boulders (Taking quantity of 45 % in 0.00 m to 1.5 m depth)
6.2	In soft rock and/or masonry in CM or L M or Lime Concrete.(Taking quantity of 5% in 0.00 m to 1.5 m depth)
6.3	In hard rock with blasting and chiseling or by chilling only for finishing. (Taking quantity of 10 % in 0.00 m to 1.5 m depth)

**1.0 GENERAL**

1.1 The excavation for trenches will generally, refer to open excavation for trenches in wet / dry conditions for pipe laying work.

**2.0 CLEARING OF SITES:**

2.1 The site on which the pipelines are to be laid and shown on plan and the area required for setting out and other operations shall be cleared and all obstruction loose stones and materials, rubbish of all kinds, stumps, brushwood as trees shall be removed as directed the roots shall be entirely grubbed up.

2.2 The products of the clearing to restocked in such a place and in such a manner, as directed by the engineer in charge.

2.3 In jungle clearings, all trees not specially marked for preservation, bamboo’s jungle wood and brushwood shall be cut down their roots grubbed up. All wood and materials from the clearing shall be the property of the local body shall be arranged as directed by the Engineer-in-charge or his authorized agent, the material pronounced as useful by the Engineer will be conveyed and properly stacked as directed within the specified limit. Unless materials will be burnt or otherwise disposed off as directed.

2.4 All holes or hollows whether originally existing or produced by digging up roots, shall be carefully filled up with earth, well earth, well rammed leveled off, as may be directed.

**3.0 SETTING OUT:**



The center lines of all pipe trenches etc. shall be given by the Engineer-in-charge and it will be the responsibility of the contractor to install substantial reference marks, bench marks, etc. and maintain them as long as required true to line, level curve and slopes. The contractor shall assure full responsibility for alignment, and dimension of trench.

The labor materials etc. required for setting out and establishing benchmarks and other reference marks shall be arranged by the contractor at his own cost.

#### **4 EXCAVATIONS**

**4.1** The excavation incl. Bailing out of water for the pipe trenches shall also incl. Removal of all materials of whatever nature and whether wet or dry condition necessary for laying of pipelines exactly in accordance with alignment, levels grades and curves shown on the plans or as directed by the Engineer-in-charge. Trenches shall be excavated to the exact width and depth according to the size of pipe and the sides shall be left vertical as far as possible or according to the angle of repose various soils. Unless there is a specific extra provision in the contract for shoring and strutting or for cutting side slopes the contractor shall at his own cost do the necessary shoring and strutting or cutting of slopes to a safe of repose or both approved by the Engineer-in-charge. The contractor shall notify the Engineer before starting excavation to enable him to take cross sectional levels for purpose of measurements before the ground is disturbed. The bottom of the trenches shall be leveled both longitudinally and transversely or slopped as directed by the Engineer. The contractor shall at his own cost to remove such portions of boulders or rocks, as are rectified to make the bottom of the trench level. No filling shall be allowed to bring the trench to level. If by contractor's mistake excavation is made deeper than shown on the plans and if ordered by the Engineer the extra depth shall have to be made with selected excavated stuff only with watering, remedying etc. as directed, by the Engineer and at the cost of the contractor. Other hard excavation shall be cleared of all sorts and loose materials and cut to firm surface, either level, stepped as directed by the Engineer. The Engineer may order such changes in the dimensions and alignment of pipe trench as may be deemed necessary to secure satisfactory cover over pipeline. The contractor shall, at his own expense, make provision for bailing out of draining water and the trenches shall be kept free of water, during laying work. After each excavation is completed, the contractor shall notify the Engineer to that effect and no laying of pipeline will be allowed to laid until Engineer has approved the depth and dimensions of trenches level and measurements.

#### **5.0 SHORING AND STRUTTING:**

**5.1** Shoring & strutting and dewatering if required shall have to be carried out by the contractor, for which any extra charge will not be paid

**5.2** During excavation if water connections, sewage connections, telephone lines khalkuva (soak pits) etc. are damaged by the contractor, the same shall have to be restored by the contractor without any extra payment.

#### **6.0 PROTECTION**

**6.1** The trenches shall be strongly fenced and red light signal shall be kept at night and arrangement of watchman to prevent accidents should be done, sufficient care protective measure shall be taken to see that the excavation shall not affect or damage the adjoining structure. The contractor shall be entirely responsible for any injury to life and damage to the properties etc. Necessary protection work such as guide ropes, crossing places, barricades, caution boards etc. shall be provided by the contractor.

**7.0** The excavation in all sorts of soil, hard murrum, soft rock or hard rock or any type of soil shall have to be carried out up to the required depth by the agency

#### **8 DISPOSALS OF EXCAVATED STUFF**

**8.1** No excavated stuff from trench are to be placed even temporarily nearer than 1.5 meter or greater distance up to 90 meter or as prescribed by the Engineer from the outer edge of trench. All excavated material will be the property of the board. The rate of excavated includes sorting out of useful materials and stacking them separately as directed within specified lead. The excavated stuff suitable and useful for



refilling or for other use shall be stacked at convenient places. The materials not useful in any wet shall be disposal off as directed by the Engineer from the outer edge of trench.

**8.2** The site should be cleared off on completion of work.

## **9.0 ADDITIONAL REQUIREMENTS**

### **9.1**

At the joints of pipes, the trench shall be excavated to an additional depth of 15 cm. and width of 30 cm. And length of 15 cm. beyond the edge of collar on both the sides or as directed. The rate includes for such extra excavation made at the joints. The trenches shall be excavated perfectly in straight line. The bottom of the trench shall be kept as per invert level or as directed. To maintain the proper slop the usual method of site rails and boning rods shall be adopted. The contractor shall have to provide and fix and maintain sight rails and boning rod without any extra cost.

If the contractor fails or makes delay to give hydraulic test of the pipe line laid in any of the section, without any genuine reason, he shall be responsible to get any part of the length trenches refill in such case i.e. before tasting for safety of pedestrian and/or vehicular traffic as found necessary by the engineer-in-charge without any extra cost. If found necessary any directed by the Engineer-in-charge. The contractor shall have to excavate the refilled trenches, during hydraulic test without any extra cost.

At all road crossings, trenches shall be excavated only for half width of the road and pipe shall be laid. The other half shall be excavated only after back filling over the laid pipeline is done so as to make it suitable for the traffic. The contractor shall provide direction when the pipeline is to be laid along the road as required and shall maintain the diversion or any part of it, without any extra cost. At all road crossings, the pipe shall be laid below the crest of read.

**9.2** The contractor shall break the road surface by excavation chiseling to the exact width and length as shown on the drawing or as directed by the Engineer-in-charge.

The excavated stuff shall be deposited in uniform layers to avoid mixing with other kind of materials at non-objectionable place or as directed by the Engineer-in-charge.

## **10.0 MEASUREMENT AND PAYMENT**

**10.1** The payment of excavation shall be made at the unit rate per cubic meter for the quantity actually excavated and accepted by the Engineer in charge limited to dimensions shown in the sanctioned plans or as directed by the Engineer. Excavation in excess of the sanctioned dimensions shall not be measured not paid for and if an ordered by the Engineer the contractor shall have to fill up the excess depth with excavated stuff with watering ramming etc. (Completed as specified) for trench without any extra payment to the contractor.

**10.2** Dimension shall be correct to two places of decimals of a meter and individual quantity shall of decimals of a meter and individual quantity shall be calculated to two places of decimals of a cubic meter.

**10.3** The rate for the item of excavation shall include unless and otherwise mentioned.

- (a) Clearing of site.
- (b) Setting out work including all materials and labour.
- (c) Providing and subsequently removing, shoring and strutting outing slopes etc.
- (d) Excavation and removal and staking of all excavated stuff as directed.
- (e) Necessary protection including labour materials equipment etc. to ensure safety and protection against risk or accident.
- (f) Providing facilities for inspection and damage to property if caused during **progress** of work.
- (g) Compensation for injury to life and damage to property if caused during progress of work.
- (h) Restoring of water supply connections, sewer connections, telephone lines, khalkuva soapiest etc. if damaged by contractor without extra payment.
- (i) Dewatering of excavated pit trench during the progress of work.
- (j) Clearing the site on completion of works directed by the Engineer.

## Item No.7

Excavation for pipeline trenches for water supply, sewerage line, manhole etc. all with shoring and strutting if required as per required gradient and line including safety provisions using site rails and stacking excavated stuff including up to all required lead cleaning the site etc. complete for all lifts and strata as specified.

(1.50 m to 3.0 m depth)

Sr. No.	Size
7.0	In all sorts of soil & soft murrum (Taking quantity of 10 % in 1.50 m to 3.0 m depth)
7.1	In hard murrum, boulders (Taking quantity of 40 % in 1.50 m to 3.0 m depth)
7.2	In soft rock and/or masonry in CM or L M or Lime Concrete.(Taking quantity of 25 % in 1.50 m to 3.0 m depth)
7.3	In hard rock with blasting and chiseling or by chieilling only for finishing. (Taking quantity of 20 % in 1.50 m to 3.0 m depth)

### 2.0 GENERAL

2.1 The excavation for trenches will generally, refer to open excavation for trenches in wet / dry conditions for pipe laying work.

### 2.0 CLEARING OF SITES:

2.1 The site on which the pipelines are to be laid and shown on plan and the area required for setting out and other operations shall be cleared and all obstruction loose stones and materials, rubbish of all kinds, stumps, brushwood as trees shall be removed as directed the roots shall be entirely grubbed up.

2.2 The products of the clearing to restocked in such a place and in such a manner, as directed by the engineer in charge.

2.3 In jungle clearings, all trees not specially marked for preservation, bamboo's jungle wood and brushwood shall be cut down their roots grubbed up. All wood and materials from the clearing shall be the property of the local body shall be arranged as directed by the Engineer-in-charge or his authorized agent, the material pronounced as useful by the Engineer will be conveyed and properly stacked as directed within the specified limit. Unless materials will be burnt or otherwise disposed off as directed.

2.4 All holes or hollows whether originally existing or produced by digging up roots, shall be carefully filled up with earth, well earth, well rammed leveled off, as may be directed.

### 3.0 SETTING OUT:

The center lines of all pipe trenches etc. shall be given by the Engineer-in-charge and it will be the responsibility of the contractor to install substantial reference marks, bench marks, etc. and maintain them as long as required true to line, level curve and slopes. The contractor shall assure full responsibility for alignment, and dimension of trench.

The labor materials etc. required for setting out and establishing benchmarks and other reference marks shall be arranged by the contractor at his own cost.

## 4 EXCAVATIONS

4.1 The excavation incl. Bailing out of water for the pipe trenches shall also incl. Removal of all materials of whatever nature and whether wet or dry condition necessary for laying of pipelines exactly in accordance with alignment, levels grades and curves shown on the plans or as directed by the Engineer-

in-charge. Trenches shall be excavated to the exact width and depth according to the size of pipe and the sides shall be left vertical as far as possible or according to the angle of repose various soils. Unless there is a specific extra provision in the contract for shoring and strutting or for cutting side slopes the contractor shall at his own cost do the necessary shoring and strutting or cutting of slopes to a safe of repose or both approved by the Engineer-in-charge. The contractor shall notify the Engineer before starting excavation to enable him to take cross sectional levels for purpose of measurements before the ground is disturbed. The bottom of the trenches shall be leveled both longitudinally and transversely or slopped as directed by the Engineer. The contractor shall at his own cost to remove such portions of boulders or rocks, as are rectified to make the bottom of the trench level. No filling shall be allowed to bring the trench to level. If by contractor's mistake excavation is made deeper than shown on the plans and if ordered by the Engineer the extra depth shall have to be made with selected excavated stuff only with watering, remedying etc. as directed, by the Engineer and at the cost of the contractor. Other hard excavation shall be cleared of all sorts and loose materials and cut to firm surface, either level, stepped as directed by the Engineer. The Engineer may order such charges in the dimensions and alignment of pipe trench as may be deemed necessary to secure satisfactory cover over pipeline. The contractor shall, at his own expense, make provision for bailing out of draining water and the trenches shall be kept free of water, during laying work. After each excavation is completed, the contractor shall notify the Engineer to that effect and no laying of pipeline will be allowed to laid until Engineer has approved the depth and dimensions of trenches level and measurements.

#### **5.0 SHORING AND STRUTTING:**

**5.3** Shoring & strutting and dewatering if required shall have to be carried out by the contractor, for which any extra charge will not be paid

**5.4** During excavation if water connections, sewage connections, telephone lines khalkuva (soak pits) etc. are damaged by the contractor, the same shall have to be restored by the contractor without any extra payment.

#### **6.0 PROTECTION**

**6.1** The trenches shall be strongly fenced and red light signal shall be kept at night and arrangement of watchman to prevent accidents should be done, sufficient care protective measure shall be taken to see that the excavation shall not affect or damage the adjoining structure. The contractor shall be entirely responsible for any injury to life and damage to the properties etc. Necessary protection work such as guide ropes, crossing places, barricades, caution boards etc. shall be provided by the contractor.

**7.0** The excavation in all sorts of soil, hard murram, soft rock or hard rock or any type of soil shall have to be carried out up to the required depth by the agency

#### **8 DISPOSALS OF EXCAVATED STUFF**

**8.1** No excavated stuff from trench are to be placed even temporarily nearer than 1.5 meter or greater distance up to 90 meter or as prescribed by the Engineer from the outer edge of trench. All excavated material will be the property of the board. The rate of excavated includes sorting out of useful materials and stacking then separately as directed within specified lead. The excavated stuff suitable and useful for refilling or for other use shall be stacked at convenient places. The materials not useful in any wet shall be disposal off as directed by the Engineer from the outer edge of trench.

**8.2** The site should be cleared off on completion of work.

#### **10.0 ADDITIONAL REQUIREMENTS**

##### **9.1**

At the joints of pipes, the trench shall be excavated to an additional depth of 15 cm. and width of 30 cm. And length of 15 cm. beyond the edge of collar on both the sides or as directed. The rate includes for such extra excavation made at the joints. The trenches shall be excavated perfectly in straight line. The bottom of the trench shall be kept as per invert level or as directed. To maintain the proper slop the

usual method of site rails and boning rods shall be adopted. The contractor shall have to provide and fix and maintain sight rails and boning rod without any extra cost.

If the contractor fails or makes delay to give hydraulic test of the pipe line laid in any of the section, without any genuine reason, he shall be responsible to get any part of the length trenches refill in such case i.e. before tasting for safety of pedestrian and/or vehicular traffic as found necessary by the engineer-in-charge without any extra cost. If found necessary any directed by the Engineer-in-charge. The contractor shall have to excavate the refilled trenches, during hydraulic test without any extra cost.

At all road crossings, trenches shall be excavated only for half width of the road and pipe shall be laid. The other half shall be excavated only after back filling over the laid pipeline is done so as to make it suitable for the traffic. The contractor shall provide direction when the pipeline is to be laid along the road as required and shall maintain the diversion or any part of it, without any extra cost. At all road crossings, the pipe shall be laid below the crest of read.

**9.2** The contractor shall break the road surface by excavation chiseling to the exact width and length as shown on the drawing or as directed by the Engineer-in-charge.

The excavated stuff shall be deposited in uniform layers to avoid mixing with other kind of materials at non-objectionable place or as directed by the Engineer-in-charge.

## **10.0 MEASUREMENT AND PAYMENT**

**10.1** The payment of excavation shall be made at the unit rate per cubic meter for the quantity actually excavated and accepted by the Engineer in charge limited to dimensions shown in the sanctioned plans or as directed by the Engineer. Excavation in excess of the sanctioned dimensions shall not be measured not paid for and if an ordered by the Engineer the contractor shall have to fill up the excess depth with excavated stuff with watering ramming etc. (Completed as specified) for trench without any extra payment to the contractor.

**10.2** Dimension shall be correct to two places of decimals of a meter and individual quantity shall of decimals of a meter and individual quantity shall be calculated to two places of decimals of a cubic meter.

**10.3** The rate for the item of excavation shall include unless and otherwise mentioned.

- (a)** Clearing of site.
- (b)** Setting out work including all materials and labour.
- (c)** Providing and subsequently removing, shoring and strutting outing slopes etc.
- (d)** Excavation and removal and staking of all excavated stuff as directed.
- (e)** Necessary protection including labour materials equipment etc. to ensure safety and protection against risk or accident.
- (f)** Providing facilities for inspection and damage to property if caused during **progress** of work.
- (g)** Compensation for injury to life and damage to property if caused during **progress** of work.
- (h)** Restoring of water supply connections, sewer connections, telephone lines, khalkuva soapiest etc. if damaged by contractor without extra payment.
- (i)** Dewatering of excavated pit trench during the **progress** of work.
- (j)** Clearing the site on completion of works directed by the Engineer.

## Item No.8

Excavation for pipeline trenches for water supply, sewerage line, manhole etc. all with shoring and strutting if required as per required gradient and line including safety provisions using site rails and stacking excavated stuff including up to all required lead cleaning the site etc. complete for all lifts and strata as specified.

(3.00 m to 4.50 m depth)

Sr. No.	Size
8.0	In all sorts of soil & soft murrum (Taking quantity of 10 % in 1.50 m to 3.0 m depth)
8.1	In hard murrum,boulders(Taking quantity of 25 % in 3.00 mt. to 4.50 mt depth)
8.2	In soft rock and/or masonry in CM or L M or Lime Concrete.(Taking quantity of 40 % in 3.00 mt. to 4.50 mt depth)
8.3	In hard rock and / or in C. C. 1:2:4 only..(Taking quantity of 25 % in 3.00 mt. to 4.50 mt depth)

### 3.0 GENERAL

3.1 The excavation for trenches will generally, refer to open excavation for trenches in wet / dry conditions for pipe laying work.

#### 2.0 CLEARING OF SITES:

2.1 The site on which the pipelines are to be laid and shown on plan and the area required for setting out and other operations shall be cleared and all obstruction loose stones and materials, rubbish of all kinds, stumps, brushwood as trees shall be removed as directed the roots shall be entirely grubbed up.

2.2 The products of the clearing to restocked in such a place and in such a manner, as directed by the engineer in charge.

2.3 In jungle clearings, all trees not specially marked for preservation, bamboo's jungle wood and brushwood shall be cut down their roots grubbed up. All wood and materials from the clearing shall be the property of the local body shall be arranged as directed by the Engineer-in-charge or his authorized agent, the material pronounced as useful by the Engineer will be conveyed and properly stacked as directed within the specified limit. Unless materials will be burnt or otherwise disposed off as directed.

2.4 All holes or hollows whether originally existing or produced by digging up roots, shall be carefully filled up with earth, well earth, well rammed leveled off, as may be directed.

#### 3.0 SETTING OUT:

The center lines of all pipe trenches etc. shall be given by the Engineer-in-charge and it will be the responsibility of the contractor to install substantial reference marks, bench marks, etc. and maintain them as long as required true to line, level curve and slopes. The contractor shall assure full responsibility for alignment, and dimension of trench.

The labor materials etc. required for setting out and establishing benchmarks and other reference marks shall be arranged by the contractor at his own cost.

## 4 EXCAVATIONS

4.1 The excavation incl. Bailing out of water for the pipe trenches shall also incl. Removal of all materials of whatever nature and whether wet or dry condition necessary for laying of pipelines exactly

in accordance with alignment, levels grades and curves shown on the plans or as directed by the Engineer-in-charge. Trenches shall be excavated to the exact width and depth according to the size of pipe and the sides shall be left vertical as far as possible or according to the angle of repose various soils. Unless there is a specific extra provision in the contract for shoring and strutting or for cutting side slopes the contractor shall at his own cost do the necessary shoring and strutting or cutting of slopes to a safe of repose or both approved by the Engineer-in-charge. The contractor shall notify the Engineer before starting excavation to enable him to take cross sectional levels for purpose of measurements before the ground is disturbed. The bottom of the trenches shall be leveled both longitudinally and transversely or slopped as directed by the Engineer. The contractor shall at his own cost to remove such portions of boulders or rocks, as are rectified to make the bottom of the trench level. No filling shall be allowed to bring the trench to level. If by contractor's mistake excavation is made deeper than shown on the plans and if ordered by the Engineer the extra depth shall have to be made with selected excavated stuff only with watering, remedying etc. as directed, by the Engineer and at the cost of the contractor. Other hard excavation shall be cleared of all sorts and loose materials and cut to firm surface, either level, stepped as directed by the Engineer. The Engineer may order such charges in the dimensions and alignment of pipe trench as may be deemed necessary to secure satisfactory cover over pipeline. The contractor shall, at his own expense, make provision for bailing out of draining water and the trenches shall be kept free of water, during laying work. After each excavation is completed, the contractor shall notify the Engineer to that effect and no laying of pipeline will be allowed to laid until Engineer has approved the depth and dimensions of trenches level and measurements.

#### **5.0 SHORING AND STRUTTING:**

**5.5** Shoring & strutting and dewatering if required shall have to be carried out by the contractor, for which any extra charge will not be paid

**5.6** During excavation if water connections, sewage connections, telephone lines khalkuva (soak pits) etc. are damaged by the contractor, the same shall have to be restored by the contractor without any extra payment.

#### **6.0 PROTECTION**

**6.1** The trenches shall be strongly fenced and red light signal shall be kept at night and arrangement of watchman to prevent accidents should be done, sufficient care protective measure shall be taken to see that the excavation shall not affect or damage the adjoining structure. The contractor shall be entirely responsible for any injury to life and damage to the properties etc. Necessary protection work such as guide ropes, crossing places, barricades, caution boards etc. shall be provided by the contractor.

**7.0** The excavation in all sorts of soil, hard murrum, soft rock or hard rock or any type of soil shall have to be carried out up to the required depth by the agency

#### **8 DISPOSALS OF EXCAVATED STUFF**

**8.1** No excavated stuff from trench are to be placed even temporarily nearer than 1.5 meter or greater distance up to 90 meter or as prescribed by the Engineer from the outer edge of trench. All excavated material will be the property of the board. The rate of excavated includes sorting out of useful materials and stacking then separately as directed within specified lead. The excavated stuff suitable and useful for refilling or for other use shall be stacked at convenient places. The materials not useful in any wet shall be disposal off as directed by the Engineer from the outer edge of trench.

**8.2** The site should be cleared off on completion of work.

#### **11.0 ADDITIONAL REQUIREMENTS**

##### **9.1**

At the joints of pipes, the trench shall be excavated to an additional depth of 15 cm. and width of 30 cm. And length of 15 cm. beyond the edge of collar on both the sides or as directed. The rate includes for such extra excavation made at the joints. The trenches shall be excavated perfectly in straight line. The bottom of the trench shall be kept as per invert level or as directed. To maintain the proper slop the



usual method of site rails and boning rods shall be adopted. The contractor shall have to provide and fix and maintain sight rails and boning rod without any extra cost.

If the contractor fails or makes delay to give hydraulic test of the pipe line laid in any of the section, without any genuine reason, he shall be responsible to get any part of the length trenches refill in such case i.e. before tasting for safety of pedestrian and/or vehicular traffic as found necessary by the engineer-in-charge without any extra cost. If found necessary any directed by the Engineer-in-charge. The contractor shall have to excavate the refilled trenches, during hydraulic test without any extra cost.

At all road crossings, trenches shall be excavated only for half width of the road and pipe shall be laid. The other half shall be excavated only after back filling over the laid pipeline is done so as to make it suitable for the traffic. The contractor shall provide direction when the pipeline is to be laid along the road as required and shall maintain the diversion or any part of it, without any extra cost. At all road crossings, the pipe shall be laid below the crest of read.

**9.2** The contractor shall break the road surface by excavation chiseling to the exact width and length as shown on the drawing or as directed by the Engineer-in-charge.

The excavated stuff shall be deposited in uniform layers to avoid mixing with other kind of materials at non-objectionable place or as directed by the Engineer-in-charge.

## **10.0 MEASUREMENT AND PAYMENT**

**10.1** The payment of excavation shall be made at the unit rate per cubic meter for the quantity actually excavated and accepted by the Engineer in charge limited to dimensions shown in the sanctioned plans or as directed by the Engineer. Excavation in excess of the sanctioned dimensions shall not be measured not paid for and if an ordered by the Engineer the contractor shall have to fill up the excess depth with excavated stuff with watering ramming etc. (Completed as specified) for trench without any extra payment to the contractor.

**10.2** Dimension shall be correct to two places of decimals of a meter and individual quantity shall of decimals of a meter and individual quantity shall be calculated to two places of decimals of a cubic meter.

**10.3** The rate for the item of excavation shall include unless and otherwise mentioned.

- (a)** Clearing of site.
- (b)** Setting out work including all materials and labour.
- (c)** Providing and subsequently removing, shoring and strutting outing slopes etc.
- (d)** Excavation and removal and staking of all excavated stuff as directed.
- (e)** Necessary protection including labour materials equipment etc. to ensure safety and protection against risk or accident.
- (f)** Providing facilities for inspection and damage to property if caused during **progress** of work.
- (g)** Compensation for injury to life and damage to property if caused during **progress** of work.
- (h)** Restoring of water supply connections, sewer connections, telephone lines, khalkuva soapiest etc. if damaged by contractor without extra payment.
- (i)** Dewatering of excavated pit trench during the **progress** of work.
- (j)** Clearing the site on completion of works directed by the Engineer.

**Item No.09**

**Add for restoration of infrastructures like Soak well, Electrical line, Water Supply line, Telephone cables all type, Gas line, Septic Tank etc.**

<b>Sr. No.</b>	<b>Description</b>
<b>9.0</b>	<b>Add for restoration of infrastructures like Soak well. 0.00 m to 1.5 m depth</b>
<b>9.1</b>	<b>Add for restoration of infrastructures like Soak well. 1.50 m to 3.0 m depth</b>

This item shall consist of excavation, removal and satisfactory disposal of all materials necessary for specification including all lead and lift and conformity with the lines all underground utilities, services and structures have been located and clearly marked on the ground surface in all areas involved in the construction process including access lanes. In many areas, a single number such as Miss Utilities may be called.

Items to be located are:

- Electrical line • Sanitary sewer • Gas • Septic tank • Water supply
- Telephone • Storm sewer • Cable TV • Drain field • Irrigation piping.

**• SITE ACCESS**

Before any demolition, delivery or construction equipment is allowed on site, make sure that there are no hazardous conditions such as overhead electric lines in the way. Plan all activities so that no damage will occur to existing pavements, structures, trees, shrubbery, gardens or other site amenities.

**Procedure:**

- Pull perpendicular string or snap chalk lines on all four sides of the opening.
- Lay pavers on one side, then the other.
- Count the courses needed to surround the openings on each side. They should be equal in number on both sides.
- Then fill around the remaining side of the opening.
- Cut pavers to fit and fill against the edge restraint around the opening.
- Plan your installation to begin along a straight line and preferably in a way which is easily accessible.
- At the joints of cable lines, shall be excavated to an additional depth of 15 cm. and width of 30 cm. And length of 15 cm. beyond the edge of collar on both the sides or as directed.
  - Snap a line from the point where the two tape measures cross to the center of the line.
  - Take a second tape measure and extend it from the other end of the line at an angle toward the center.
  - Overlap one tape on the other and match the length of both tapes. The same marked dimensions on each tape should be touching each other.

The products of the clearing to be restacked in such a place and in such a manner, as directed by the engineer in charge.

All holes or hollows whether originally existing or produced by digging up roots, shall be carefully filled up with earth, well-watered, well rammed leveled off, as may be directed.



The center lines of all trenches etc. shall be given by the Engineer-in-charge and it will be the responsibility of the contractor to install substantial reference marks, bench marks, etc. and maintain them as long as required true to line, level curve and slopes. The contractor shall assure full responsibility for alignment, and dimension of trench.

The labour materials etc. required for setting out and establishing benchmarks and other reference marks shall be arranged by the contractor at his own cost.

### **Mode of payments**

Restoring of water supply connections, sewer connections, telephone lines, Electrical line, Telephone line, Gas line, Cable TV line, Storm sewer line, khalkuva soak pits etc. if damaged by contractor without extra payment.

### **Item No. 10**

#### **Shoring or timbering for trench with 50 mm thick planks and suitable size truts etc. complete.1.1**

##### **GENERAL:**

This item is applicable only when the trench having more than 5.0 mt. depth and if the sides of trenches cannot be sloped or stepped due to any reason and the Engineer-in-charge feel the necessity for safety of trench and adjacent property and traffic. The Contractor should have to take previous approval from Engineer-in-charge before commencing this item.

##### **1.2 MATERIALS:**

**1.2.1** Sheathing, planks, wales, struts etc. required for shoring and strutting shall be of approved quality of wood or structural steel as per requirements of IS-3764-1966.

##### **1.3 WORKMANSHIP:**

**1.3.1** The Contractor before execution shall get approval of design of shoring from Engineer-in-charge. The shoring shall be of sufficient strength to resist side pressure and ensure safety from slips and below and to prevent damage to work and to prevent injury to persons. It shall be removed after getting permission of Engineer-in-charge, after all items for which it is required area completed. Shoring and strutting shall conform to IS - 3764 - 1966 or its latest version.

**1.3.2** The sheeting shall be placed against the side of trench so that length of each piece of sheeting is vertical. The sheeting shall be held securely in place against the Wales by ensuring that sheeting is kept firmly placed against the wall of the trench. Where the trench is excavated in loose, sandy or soft soil or soil which has been previously excavated or soil which is under hydrostatic pressure, each piece of sheeting shall be driven into the bottom of trench so has to be firmly held in place.

**1.3.3** Where two or more pieces of sheeting are used one above another, the sheeting shall be so arranged that the lower piece of sheeting overlap the lowest Wales supporting the pieces of sheeting next above next above it. These pieces of sheeting shall be firmly driven in to the soil and securely supported by Wales and struts as the trench is made deeper.

**1.3.4** The wales shall be supported parallel to the bottom or the proposed bottom of the trench. Each wale shall be supported on cleats spliced to the sheathing or by posts set on the wales next below it and in the case of lowest wale on the bottom of the trench itself. Where necessary, wedges may be provided between a wale and sheathing supports to that roughly uniform support is given to all individual pieces of sheathing.

**1.3.5** Struts shall be horizontal and at right angles to the wales of sheathing supported thereby. Struts shall be cut to the proper length required to fit in tightly between wales, where necessary, the struts shall be held securely in place by wedges, driven between struts and the wales. Struts shall be placed on cleats spliced or bolted to posts supporting wales.

**1.3.6** The sizes and spacing of sheathing, wales struts and wedges used for shoring and timbering for different depth shall conform the requirement of IS-3764-1966 or its latest version.

**1.3.7** The extra width of excavation that may be deemed necessary for the purpose of shoring and strutting will be understood to be covered in the rate for item of shoring and strutting for drain side.

**1.3.8** The contractor shall have to make all the necessary arrangements while removing shoring strutting. However, if contractor fails to remove the shoring strutting safely, the corporation shall not be responsible for any type of damages and contractor shall have to bear all the cost for the same and the corporation shall not pay any extra payment for the same.

**1.3.9** Shoring and strutting shall be close or open depending on the nature of soil and the depth of trench. The type of shoring and strutting shall be determined by the Engineer in charge. It shall be the responsibility of the contractor to take all necessary steps to prevent the sides of trenches from collapse. Engineer in charge should take guidance from IS: 3764-1966 for designing the shoring and strutting arrangements and specifying the profile of excavation.

**1.4 Measurement:**

**1.4.1** The item includes all labours, materials, equipments, tools etc. complete for whole the period for satisfactory completion of the item.

**1.4.2** No extra payment shall be given for extra excavation that required doing shoring or strutting.

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

**1.4.4** No payment shall be made to any wood which has been left out by the contractor while removing the shoring, strutting etc.

## Item No.11

**Lowering, Laying & Jointing R.C.C. pipes(Horizontal-Vertical) in C. M. 1:1 1/2 of following diameters in proper position, grade and alignment as directed by Engineer-in-charge including conveyance from stores to site of work, labour, giving hydraulic testing as per ISI code. Class NP3 Test Pressure, 0.7 Kg / Sq.m.**

<b>Sr. No.</b>	<b>Size</b>
<b>12.0</b>	<b>200 mm Dia Pipe</b>
<b>12.1</b>	<b>300 mm Dia Pipe</b>
<b>12.2</b>	<b>400 mm Dia Pipe</b>
<b>12.3</b>	<b>600 mm Dia Pipe</b>

### 1.0 SCOPE

The specification covers the requirements for laying of pipes and fittings/specials below ground. The two parts are complementary and are to be read together for a correct interpretation of the provisions of this specification.

### 2 APPLICABLE CODES

The laying of pipes and fittings/specials shall comply with all currently applicable statutes, regulations, standards and codes. In particular, the following standards, unless otherwise specified herein, shall be referred to. In all cases, the latest revision of the standards/codes shall be referred to. If requirements of this specification conflict with the requirements of the standards/codes, these specifications shall govern.

### 2.0 CODES OF PRACTICE

- a) IS: 783 -Code of practice for laying of concrete pipes
- b) IS: 3114 -Code of practice for laying of cast iron pipes
- c) IS: 3764 -Excavation work - Code of Safety
- d) IS: 4127 -Code of practice for laying of glazed stoneware pipes
- e) IS: 5822 -Code of practice for laying of electrically welded steel pipes for water supply
- f) IS: 6530 -Code of practice for laying of asbestos cement pressure pipes

### 3 CARTING AND HANDLING

Pipes and fittings/specials shall be transported from the factory to the work sites at places along the alignment of pipeline as directed by Owner/ Engineer. Contractor shall be responsible for the safety of pipes and fittings/specials in transit, loading/unloading. Every care shall be exercised in handling pipes and fittings/specials to avoid damage. While unloading, the pipes and fittings/specials shall not be thrown down from the truck on to hard surfaces. They should be unloaded on timber skids with steadying ropes or by any other approved means. Padding shall be provided any other approved means. Padding shall be

provided between coated pipes, fittings/ specials and timber skids to avoid damage to the coating. Suitable gaps between pipes should be left at intervals in order to permit access from one side to the other. In case of spigot socket pipes, care should be taken regarding orientation of pipes while unloading. As far as possible pipes shall be unloaded on one side of the trench only. The pipes shall be checked for any visible damage (such as broken edges, cracking or spalling of pipe) while unloading and shall be sorted out for reclamation. Any pipe, which shows sufficient damage to preclude it from being used, shall be discarded. Dragging of pipes and fittings/specials along concrete and similar pavement with hard surfaces shall be prohibited. Pipes can be brought to site only after the mandatory tests i.e. are completed and pipe lots accepted. I.e. Cube tests, T.E.B., Hydrostatic, water absorption test.

#### **4.0 STORAGE**

Each stack of pipes shall contain only pipes of same class and size, with consignment or batch number marked on it with particulars of suppliers wherever possible. Storage shall be done on firm level and clean ground and wedges shall be provided at the bottom layer to keep the stack stable. The stack shall be in pyramid shape or the pipes laid length-wise and crosswise in alternate layers. The pyramid stack shall be made for smaller diameter pipes for conserving space in storing them. The height of the stock shall not exceed 1.5m. Fittings/specials shall be stacked under cover and separated from pipes. Rubber rings shall be stored in a clean, cool store away from windows, boiler, electrical equipment and petrol, oils or other chemicals. Particularly in the field where the rubber rings are being used it is desirable that they are not left out on the ground in the sun or overnight under heavy frost or snow conditions.

#### **5.0 LAYING EXCAVATION**

Before excavating the trench, the alignment of pipeline shall be approved by Owner/Engineer. The excavation of trenches and pits for manholes/ chambers shall be carried out in accordance with the Technical Specification: Section D1 and shall be done such that it does not get far ahead of the laying operating as approved by Owner/Engineer.

To protect persons from injury and to avoid damage to property, adequate barricades, construction signs, red lanterns and guards as required shall be placed and maintained during the progress of the construction work and until it is safe for the traffic to use the roadways. The relevant Indian Standards and the rules and regulations of local authorities in regards to safety provisions shall be observed.

Suitable barricading shall be provided along the sides of trenches and pits. The posts of fencing shall be of timber securely fixed in the ground not more than 3 m apart and they shall not be less than 75 mm in diameter or less than 1.2m above surface of the ground. There shall be two rails, one near the top of the post and the other about 450mm above the ground and each shall be from 50 mm to 70mm in diameter and sufficiently long to run from post to post to which they shall be bound with strong rope. The method of projecting rails beyond the post and trying them together where they meet will not be allowed on any account. All along the edges of the excavation trenches a bank of earth about 1.2m high shall be formed where required by owner/ engineer for further protection.

The road metal and also the rubble packing shall first be stripped off for the whole width of the trench/pit and separately deposited in such place or places as may be determined by Owner/Engineer.

During excavation, large stones and rubble shall be separated and removed from the excavated soil and stacked separately. The material from excavation shall be deposited on either side of the trench leaving adequate clear distance from the edges of the trench and pit, or as may be necessary to prevent the sides of the trench pit to slip or fall, or at such a distance and in such a manner as to avoid covering fire hydrants, sluice valves, manholes covers etc. and so as to avoid abutting the wall or structure or causing inconvenience to the public and other service organizations or otherwise as Owner/engineer may direct.

Contractor shall take into account additional excavation if any as Owner/ Engineer may require in order locating the position of water pipes, drains, sewers etc. Or any other works which may be met with, in or about the excavation of trenches/pits while quoting the rates for excavation. Such service lines if met with during excavation shall be properly maintained by Contractor, by means of shoring, strutting, planking over, padding or otherwise as Owner/Engineer may direct, and shall be protected by the Contractor from damage during the progress of the work. All precautions shall be taken during excavation and lying operations to guard against possible damage to any existing structure/pipeline of water, gas, sewage etc.

If the work for which the excavation has been made is not completed by the expected date of the setting of monsoon as stipulated in "Data Sheet -A" or the setting in of rain whichever is earlier, or before the day fixed by Owner/ Engineer for filling in any excavation on account of any festival or special occasion. Contractor shall backfill such excavation and consolidates the filling.

Utmost care shall be taken to see that the width of the trench at the top of pipe is not more than that specified in drawing. In case additional width is required it shall be provided only in the top portion from the ground level up to 300mm above the top of pipe. If any extra width is provided in the area below this portion, Contractor shall have to provide remedial measures in the form of lime concrete or rubble masonry otherwise at the discretion and to the satisfaction of Owner/Engineer. If rock is met with, it shall be removed to 15 cm below the bottom of pipes and fittings/specials and the space resulting shall be refilled with granular materials and properly consolidated. Bottom of trenches/pits shall be saturated with water well rammed wherever Owner/ Engineer may consider it necessary to do so.

Wherever a socket or collar of pipe or fitting/special occurs, a grip is to be cut in the bottom of the trench or concrete bed to a depth of at least 75 mm below the bed of the pipe so that the pipe may have a fair bearing on its shaft and does not rest upon its socket. Such grip shall be of sufficient size in every respect to admit the hand all around the socket in order to make the joint and the grip shall be maintained clear until the joint has been approved by Owner/Engineer.

When welding is to be carried out with the pipes and specials in the trench, additional excavation of not more than 60 cm in depth and 90 cm in length shall be made at joints in order to facilitate welding.

The excess excavated material shall be carried away from site of works to a place up to a distance as directed by Owner/Engineer. This shall be done immediately so as not to cause any inconvenience to the public or traffic. If the instructions from Engineer are not implemented within seven days from the date of instructions to cart the materials and to clear the site, the same shall be carried out by Owner/Engineer and any claim or dispute shall not be entertained in this respect.

#### **6.0 DEWATERING**

During the excavation, if subsoil water is met with Contractor shall have to provide necessary equipment and laborers for dewatering the trenches/pits by bailing out water or water mixed with clay; if pumping out subsoil water is found to be necessary, Contractor shall provide sufficient number of pumps for the same. In both the above cases the excavation shall be done to the required level and the pipes shall be laid to proper alignment and gradient. Contractor shall also make necessary arrangement for the disposal of drained water to nearby storm water drain or in a pit if allowed by Owner/Engineer. In no case the water shall be allowed to spread over the adjoining area. Before discharging this water into public sewer/drain, Contractor shall take necessary permission from the local authorities.

#### **7.0 SPECIAL FOUNDATION IN POOR SOIL**

Where the bottom of the trench and sub-grade is found to consist of material which is unstable to such a degree that in the opinion of Owner/Engineer, it cannot be removed and replaced with an approved material thoroughly compacted in place to support the pipe properly, a suitable foundation for the pipes, consisting of piling, timbers or other materials, in accordance with relevant drawings and as instructed by Owner/Engineer shall be constructed.

#### **8.0 WOODEN SHORING**

Contractor shall suitably design polling bards, walling and struts to meet different soil conditions that might be encountered in excavating trenches/ pits. The horizontal and vertical spacing of struts shall be such that not only the sides of trenches shall be prevented from collapse but also easy lowering of pipe in trenches shall be ensured without creating undue obstructions for the excavation of the work. Any inconvenience and/or delay that might be caused in lowering pipes in trenches as a result of adopting improper spacing of struts by Contractor shall be his sole responsibility. No part of shoring shall be at any time be removed by Contractor without obtaining permission from Owner/Engineer. While taking out shoring planks the hollows of any form must simultaneously be filled in with soft earth well rammed with rammers and with water.

Owner/Engineer may order portions of shoring to be left in the trenches/pits at such places, where it is found absolutely necessary to do so to avoid any damage, which may be caused to buildings, cables, gas-mains, water mains, sewers etc. in close proximity of the excavation, by pulling out the shoring from the excavations. Contractor shall not claim, on any reason whatsoever, for the shoring which may have been left in by him at his own discretion.

## **9.0 STEEL PLATE SHORING**

Where the subsoil conditions are expected to be of a soft and unstable character in trench/pit excavation, the normal method of timbering may prove insufficient to avoid subsidence of the adjoining road surfaces and other services. In such circumstances Contractor will be required to use steel trench sheeting or sheet piling adequately supported by timber struts, walling etc., as per the instructions, manner and method directed by Owner/ Engineer. Contractor shall supply, pitch, drive and subsequently remove trench sheeting or piling in accordance with other items of the specification.

## **10.0 BONING STAVES AND SIGHT RAILS**

In laying the pipes and fittings/specials the center for each manhole/chamber or pipeline shall be marked by a peg. Contractor shall dig holes for and set up two posts (about 100 x 100 x 1800 mm) at each manhole/chamber or junction of pipelines at nearly equal distance from the peg and at sufficient distances there from to be well clear of all intended excavation, so arranged that a sight rail when fixed at a certain level against the post shall cross the center line of the manhole/chamber or pipelines. The sight rail shall not in any case be more than 30m apart. Intermediate rails shall be put up if directed by Owner/Engineer.

Boning staves of 75mm x 50 mm size shall be prepared by Contractor in various lengths, each length being of a certain whole number of meters and with a fixed tee head and fixed intermediate cross pieces, each about 300 mm long. The top-edge of the cross piece must be fixed below the top-edge of the cross piece must be fixed below the top-edge of the tee-head at a distance equal to the outside diameter of the pipe or the thickness of the concrete bed to be laid as the case may be. The top of cross pieces shall indicate different levels such as excavation for pipeline, top of concrete bed, top of pipe etc. as the case may be.

The sight rail of size 250-mm x 40 mm shall be screwed with the top edge resting against the level marks. The center line of the pipe shall be marked on the rail and this mark shall denote also the meeting point of the center lines of any converging pipes. A line drawn from the top edge of one rail to the top edge of the next rail shall be vertically parallel with the bed of the pipe, and the depth of the bed of pipe at any intermediate point may be determined by letting down the selected boning staff until the tee head comes in the line of sight from rail to rail.

The post and rails shall be perfectly square and planned smooth on all sides and edges. The rails shall be painted white on both sides and the tee-heads and crosspiece of the boning staves shall be painted black.

For the pipes converging to a manhole/chamber at various levels, there shall be a rail fixed for every different level. When a rail comes within 0.60 M of the surface of the ground, a higher sight-rail shall be fixed for use with the rail over the next point.

The posts and rails shall in no case be removed until the trench is excavated, the pipes are laid and



Owner/Engineer gives permission to proceed with the backfilling.

**11 BEDDING**

The type of bedding for pipes shall be as per Drawing and Schedule-B.

**12 LYING OF PIPES AND FITTINGS/SPECIALS**

All precautions shall be taken during excavation and laying operations to guard against possible damage to any existing structure/pipeline of water, gas, sewage etc. After excavation of trenches, pipes shall not be lowered unless the dimensions of trenches and bedding work for pipes at the bottom of the trenches are approved and measured by Owner/Engineer. Pipes and fittings/specials shall be carefully lowered in the trenches. Special arrangements such as cranes, tripods with chain pulley block for lowering the pipes and fitting/specials shall be made by Contractor. In no case pipes and fittings/specials shall be dropped. Slings of canvas or equally non-abrasive material of suitable width or special attachment to fit the ends of pipes and fittings/specials shall be used to lift and lower the coated pipes and fittings/specials. The pipes and fittings/specials shall be inspected for defects and is rung with slight hammer preferably while suspended to detect cracks. If doubt persists, further confirmation shall be done by pouring a little kerosene /dye on the inside of the pipe at the suspected spot. No sign of kerosene/dyke should appear on the outside surface. Pipes and fittings/specials damaged during lowering or aligning shall be rejected by Owner/Engineer.

All the pipes are to be laid perfectly true both in alignment and to gradient specified. In case of spigot and socket pipe the socket end of the pipe shall face upstream, except when the pipeline runs uphill in which case the socket ends should face the upgrade. The laying of pipes shall always precede upgrade of a slope. After placing a pipe in the trench, the spigot end shall be centered in the socket and the pipe forced home and aligned to required gradient. The pipes shall be secured in place with approved backfill material tamped under it except at the socket. Pipes and fittings/specials, which do not allow a sufficient and uniform space for joints, shall be removed and replaced with pipes and fittings/specials of proper dimensions to ensure such uniform space. Precautions shall be taken to prevent dirt from entering the jointing space. At times when pipe laying is not in progress, the open ends of pipe shall be closed by a watertight plug or other means approved by Owner/Engineer. During the period that the plug is on, the Contractor shall take proper precautions against floating of the pipe owing to entry of water into the trench. Wherever it is necessary to deflect pipe from a straight line, either in the vertical or horizontal plane, to avoid obstructions or where long radius curves are permitted the deflection allowed at joints shall not exceed 2½%. In case of pipes, with joints to be made with loose collars, the collars shall be slipped on before the next pipe is laid. The pipes shall be laid such that the marking on pipes appears at the top of the pipes. To the pipe so as to leave a smooth end at right angles to the axis of the pipe. For this purpose, the cutting of pipe for inserting valves, fittings or specials shall be done in a neat and workman like manner without damage, pipe-cutting machine shall be used.



### **13 JOINTING**

Jointing for pipes and fittings/specials shall be as per IS-783 (latest revision) done in accordance with the relevant specifications depending upon the type of pipes being used. Basic requirements for jointing the pipes are

Cleanliness of all parts, particularly joint surface.

- a) Correct location of components.
- b) Centralization of spigot within socket.
- c) Provision of the correct gap between the end of the spigot and the back of the socket to ensure flexibility at each joint.
- d) Any lubricant used shall be approved as to composition and method of application.

### **14 TESTING AND COMMISSIONING**

Testing and commissioning of pipes shall be as per IS-783 (latest Revision) clause 15.5 done in accordance with the relevant specifications.

#### **1.4 Mode of Measurement & payments;**

**1.4.1** The item includes all labours, materials, equipment, tools etc. complete for whole the period for satisfactory completion of the item.

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

#### **Item No.12**

#### **Refilling the pipeline trenches incl. ramming, watering, consolidating disposal of surplus stuff as directed within a radius of 3 km**

Refilling materials shall be from excavated stuff.

- Excavated stuff to be used shall be cleared off all rubbish, large size stone bricks bats etc. big clods shall 50 mm or less. The selected soil sand or any other materials shall be got approved before filling, Refilling shall be done in a systematic manner in layers by the contract. Before refilling the trenches the contractor shall got checked the trenches, ready for refilling.
- All space between pipe line and the sides of excavation shall be refilled to the original surface with earth or selected material in layers of 15 cms to 10 cms, well-watered and rammed. Each layers shall be watered and compacted with heavy manner, before the upper layer is laid till the final level is reached to the thoroughly compacted base.
- Refilling on top of pipe shall be carried out carefully with selected soft stuff out of the excavated stuff. The filling shall be raised about 15 cms. to take care of subsequent settlement.
- The contractor shall be responsible for any settlement. The contractor shall be responsible for any settlement during passage of time during monsoon and the same shall be refilled with stuff brought from the outside if necessary at his cost.

- The process of refilling trenches, watering, ramming shall be carried out in such a way that no damage is done to the pipe line already laid.
- Disposal of the Excavated Stuff:

The excavated stuff of the selected type shall be used for filling the trenches and plinth or leveling the ground in layers including ramming and watering etc. complete. The Contractor shall remove the balance of the excavated from the site of work to a place as directed within a lead up to 3 km.

### **Item no.13**

#### **Extra lead for transportation of Surplus stuff spreading or stacking as directed (removal of excavated stuff from site of U/G sump sewage pumping station, filter Plant etc.)**

The distance which constitutes lead shall be determined along the shortest practical route and note necessarily the route actually taken the decision of the Engineer-in-charge in this regard shall be taken as final. No materials shall be stored prior to, during and after execution of a structure in such a way as to cause or lead to damage or overloading of the various components of the structure.

The balance of the excavated quantity shall be removed by the contractor from the site of work to a place as directed with lead up to 50 M. and all lift. The materials available from soft excavation shall be properly stacked within 50 M. lead and 1 5 m. lift and shall be the property of department.

Useful materials obtained from clearing site and excavation shall be stacked within a lead of 50 M beyond the building areas is directed. Materials suitable for back-filling shall be stacked at convenient places within a lead of 50 M. from the structure for reuse. Useful stones from rock excavation shall be stacked neatly. within a lead of 50 M. and will be allowed to be used by the contractor on payment at rates laid down in the contract or if not so laid down, at scheduled rates of the Division or at a mutually agreed rates if there are no such rates in the schedule of rates.

#### **Mode of measurements & Payment**

The work shall be measured for the work limited to the dimensions shown on drawings or directed Excavation to dimension in excess of the above will not be measured or paid for and if so ordered by the Engineer the contractor shall have to fill up the excess depth with cement concrete specified for foundation without extra payment.

Removal of slips and blows in the foundation trenches will not be measured or paid for.

if it is necessary in the opinion of the Engineer-in-charge to carry foundation below the levels shown on the plans, the excavations for the 1.5 M of addition depth will be included in the quantity for the particular classification and will be paid for as extra at rate to be decided under the general conditions of contract unless, the contractor is willing to accept payment as tendered rates.

The payment Shall be for a unit of one cubic meter.

**Item no. 14**

**Providing bedding incl. ramming, watering, levelling, consolidating etc. Complete As above with required quality Sand brought from outside including all lead as per standard and instruction of engineer in-charge.**

**Workmanship**

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

As soon as the work in foundation has been completed and measured the site of foundation shall be cleared of all debris, brick bats, mortar dropping etc., and filled with earth in layers not exceeding 20 cms. Each layer shall be adequately watered, rammed and consolidated before the succeeding layer is laid. The earth shall be rammed with iron rammers where feasible and with the butt ends of crow-bars, where rammer cannot be used.

As soon as the work in foundation has been completed and measured, the site of foundation shall be cleared of all debris, brick bats, mortar dropping etc; and filled with earth in layers not exceeding 20 Cms. Each layer shall be adequately watered, rammed and consolidated before the succeeding layer is laid. The earth shall be rammed with iron rammers where feasible and with the butt ends of crow-bars, where rammer cannot be used.

The plinth shall be similarly filled with earth in layers not exceeding 20 cms. adequately watered and consolidated by ramming with iron or wooden rammers. When filling reaches finished level the surface shall be flooded with water for at least 24 hours and allowed to dry and then rammed and consolidated.

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

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

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

**2.0. Mode of Measurements & Payment**

The payment shall be made for filling in plinth and trenches. No deduction shall be made for shrinkage or voids, if consolidated as instructed above.

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

**Item No. 15**

**Providing C.C.M.:100 for encasing pipes using trap metal size 12 mm to 50 mm incl. form work curing consolidation etc. complete for various location on pipe line. using trap metal 20 mm nominal size.**

**Using trap metal 20 mm nominal size.**

The work shall be carried out with Ready Mix system in M-100 grade maintaining cement level @ 380.00 Kg./Cum. for Foundations, Footing, Base of Columns and the like and Mass Concrete as per detailed drawing 1.1 Ready Mix concrete.

1.1 Mixing Thorough mixing is essential for production of uniform concrete. Equipment and methods used shall be capable of effectively mixing concrete materials to produce in form mixes of the lowest slump practical for the work.

***Charging of mixer:-***

Mixers both stationary and truck mounted shall be so charged that there is a pre blending of the ingredients as the stream flows into the mixer.

Water shall enter the mixer first, but must continue to flow while other ingredients are entering the mixer. Water charging pipes shall be of proper design and of adequate size so that water enters at a point well inside the mixer. Water charging shall be complete within the first 25% of the mixing

Cement shall be charged along with other materials, but it shall be ensured that cement enters the stream after approximately 10% of the aggregate is in the mixer. When it is necessary to charge cement into truck mixers separately, additional mixing time shall be allowed to obtain desired uniformity to mix.

Admixtures shall be charged to the mixer at the same time in the mixing sequence for every batch. Liquid admixtures shall be charged with the water, powdered admixtures shall be sprinkled in to the mixer with other dry ingredients. When more than one admixture is used. They shall be batched separately and they shall not be premixed before entering the mixer. 1

***Mixer performance:-***

Mixer performance checks shall be made at regular intervals to ensure uniformity of the concrete. Visual examination of the concrete shall be one of the aids for maintaining and checking mixer performance.

Results of tests on air content, slump unit weight of air free mortar shall be guide lines on mixer performance.

***Mixing Time.***

Mixing time shall be measured from the time all ingredients are in the mixer.

Mixing time shall be established from mixer performance tests conducted at frequent intervals throughout the period of the work. However, as an initial guide, mixer manufacture's recommendation may be followed. Other guide line being 1.33 mins. For 1 cum capacity of mixer and 0.33 min for every additional 1 cum of mixer capacity.

Mixer shall be designed to have audible indicators and combination inter locks which prevent mixer discharge prior to completion of a preset mixing time. Mixer shall also be designed to start and stop operation with full load.

***Re-Tempering***

Provided that design water cement ratio is not exceeded, small increments of remembering water may be added to mixed batches to obtain the desired. Slump

Addition of water in excess of designed water cement ratio to compensate for slump loss resulting from delays in delivery or placing of concrete shall be permitted

***Mix Temperature***

Batch to batch uniformity of concrete regard to slump, water requirement and air content is dependent on temperature of concrete. It shall therefore, be ensured that the maximum and minimum temperatures of concrete throughout all seasons of the year do not vary beyond the limits given below.

Necessary measures shall be taken to lower or raise the temperature of water to maintain the mixed concrete between the specified temperature limits

***Discharging of mixer.***

Mixer shall be capable of and handled properly so that concrete of lowest desired slump can be effectively discharged without causing segregation.

***Ready-Mix concrete may be:***

Mixed in a central plant and transported to the job in agitating or no agitating truck bodies. Mixed entirely in transit. Mixed entirely after reaching the job site. Mixed partially in a central plant and completed in transit or after reaching the job site (Shrink mixing)

In ready mix concrete special attention shall be given to the addition of mixing water quantity, which if incorrect, shall result in reduction of concrete quality.

Concrete consistency (Slump) is also affected by : Amount and rate of mixing. Length of haul Time period for unloading Temperature conditions.

In cool weather or short haul and with prompt delivery concrete quality may not be significantly affected. But with reverse conditions, quality of concrete may be significantly affected. Addition of water to compensate for slump loss shall not exceed that quantity necessary to compensate for a maximum 25mm slump loss. However, by this additional quantity of water, the design water cement ratio shall not be exceeded.

Loss in workability in warm weather shall be minimized by expediting delivery and placement, and by controlling the concrete temperature

If it becomes necessary to use readers to prolong the time the concrete will respond to vibration

In hot weather conditions or delays in delivery or placement, use may be made of the procedure of withholding some of the mixing water till the mixer arrives at the job site, in such cases after addition of the balance ( Withheld) quantity. of water an additional 30 revolutions of mixer at mixing speed shall be given to adequately incorporate the additional water into the mix.

When loss of slump or workability cannot be controlled by measures stated above. complete mixing shall be done at the job site using centrally dry batched ingredients.

***Supply and placing of ready-mix concrete.***

Responsibility of in-place quality of ready-mix concrete shall be shared by the manufacturer or supplier of ready mix concrete and the placing contractor.

They shall work in close coordination. The placing crew shall be in direct radio or telecommunication contact with the batch plant to ensure. Avoidance of delay in dispatching concrete from batch plant. Inform batching plant delays in formwork, reinforcement work, handling or placing. The placement contractor shall give in writing his requirement of a particular batch of concrete to the supplier.

The ready - mix concrete manufacturer / supplier shall along with each batch of concrete delivered to the placement contractor give him a concrete delivery ticket. The supplier shall give copies of all such delivery tickets to the Engineer- in Charge for his record and also shall get duplicate Copies of all such delivery tickets duly received and signed from the placement contractor.

Ready mixed concrete as supplied by the manufacturer and as placed by the contractor shall in no way be different from the specifications of concrete as approved by the Engineer-in - Charge.

### ***Transportation.***

Fresh concrete can be transported to the placement area by a variety of methods common among them are: -Mixer trucks. -Stationary truck bodies with or without agitators. -Bucketshauled by trucks. - Conveyor belts. -House or pipe line by pumping. Each type of transportation has specific advantages and limitations depending on the condition of use, mix , accessibility and location of placing.

### ***Transportation by mixer trucks.***

These are essentially revolving drums mounted on truck chassis. Truck mixers used in the job shall be labeled permanently to indicate the manufacture specifications. for mixing like. .Capacity of drum. .Total number of drum revolutions required for complete mixing.c. Mixing speed. d. Maximum time limit before completion of discharge and after cement e. has entered the drum. f. Reduction in time period of discharge. g. Due to warm weather or other variables. All above information shall only form guidelines for the manufacture/ producer of concrete. Fulfillment of the stipulated number of revolutions or elapsed time shall not be acceptable criterion. As long as the mixing water limit not exceeded and the concrete has satisfactory plastic physical properties and is of satisfactory consistency and homogeneity for satisfactory placement and consolidation and is without initial se the concrete shall be acceptable.

When the concrete is totally mixed in transporting trucks or in case of shrink- mix concrete, cede 63% of the rated capacity of the drum. In case the concrete is totally mixed in the central batching plant, the transporting truck may be loaded up to 80% of the rated capacity of the drum. In this case the drum shall be rotated at charging speed during loading and reduced to agitating speed after loading is complete.

When transporting concrete by truck mixers, delivery time shall be restricted to 1.50 hours from the time cement has entered the mixer to completion of discharge.

### ***Transporting by Agitating.***

Transporting ready mix concrete by this method shall consist of truck chassis mounted with open top bodies. The metal body shall be smooth and streamlined for easy discharge. Discharge may be from the rear when the body is mechanically tilted. Body of the truck shall have a provision of discharge gate. Mechanical vibrators shall be installed at the discharge gate for control of discharge flow. Agitators, if mounted, also aid in the discharging of concrete from the truck in addition to keeping the concrete alive.

Water shall not be added to concrete in transport through this system. Bodies of trucks shall be provided with protective covers during period of inclement weather

Delivery period when adopting this system of transporting, concrete shall be restricted to 30 minutes from the moment all ingredients including cement and water enters in mixer to completion of discharge.

### ***Transporting by buckets.***

This method of transportation is very common for transportation of centrally mixed concrete. Buckets of suitable capacities may be fitted with concrete which is totally mixed in central plant and hauled to the job site. Buckets then may be conveyed to the actual point of placement either with the help of crane / hoist or they may be carted.

As in the case of open truck transportation water shall not be added to concrete transported in buckets. Concrete shall be protected from inclement weather by necessary covering arrangements. Also,

maximum delivery period for this system of transportation from the time cement is introduced into the mixer to completion of discharge shall not exceed 30 minutes.

### ***Cleaning***

Before loading concrete in either truck mixer open bodied trucks or buckets, the containers shall be thoroughly cleaned, washed and dried so that there is no water or moisture in the container which may affect the designed water content of the concrete.

Other methods of transportation.

Transportation of concrete either by belt conveyors or by pumping is envisaged in this work. If, however, producer or manufacturer or purchaser of ready mix concrete desires to use such methods of transportation, they may do so provided their

Scheme and complete specifications are submitted to the Engineer-in-Charge for his record and approval.

### ***Objective***

Method of transportation used shall ensure. -Efficient delivery of concrete -No significant alteration of properties. -with regard to water cement ratio. -slump, air content and homogeneity.

All variables in transportation considering type and accessibility of placement locations. Distance, time interval etc. shall be carefully studied before arriving at the method used.

### ***PLACING CONCRETE BY PUMPING METHODS.***

Concrete conveyed by pressure through either rigid pipes or flexible hoses and discharged directly into the desired area is termed as pumped concrete. The method of conveying the concrete through pipe lines is dealt with in these specifications.

Method of applying pressure to concrete is by pumps. Pumps to be used shall be either of the two types as mentioned below. a) Piston type pumps. b) Squeeze pressure type pumps. Compressed air pressure pumps shall not be used in the works.

### ***Pumping Equipment's***

Piston pumps Piston pump to be used in the works shall consist of a receiving hopper for mixed concrete an inlet valve, an outlet valve, and the pump shall be a twin piston pump. The two pistons shall be so arranged that one piston retracts when the other is moving forward and pushing concrete into the pipe line to maintain reasonably steady flow of concrete Single piston pumps shall not be acceptable. Inlet and outlet valves shall be any one of the following types

-Rotating plug type -Sliding plate type -Guided plunger type -Swing type -Flapper type -or any combination of the above. The pistons shall be mechanically driven using crank or chain or hydraulically driven using oil water. The receiving hopper shall have a minimum capacity of 1.0 cum and the hopper shall be fitted with mixing rotating blades capable of maintaining consistency and uniformity of concrete. The primary power for pumps may be supplied by gasoline, diesel, or electric motors. The primary power unit and the pump unit may be truck trailer or skid mounted.

Squeeze pressure pumps Squeeze pressure pumps shall consist of a receiving hopper fitted with re-mixing blade re-mixing blades shall be such that these can put the concrete into the flexible hose connected at the bottom of the hopper. The flexible hose shall pass through a metal drum around the inside periphery of the drum and come out through the top part of the drum. The drum shall be maintained under a very high degree of a vacuum during operation The drum shall be so fitted with hydraulically operated metal rollers, which when rotating, create a squeeze pressure on the flexible



hose carrying and forces the concrete out into the pipe line. **Effective Range and Discharge of pumps.**

Effective range of pumps to be used in the work shall be decided by the contractors after studying the site conditions. However, the minimum horizontal range shall not be less than 150 meters and minimum vertical range shall not be less than 50 meters.

Selection of pumps based on discharge capacity shall be decided by the contractors after studying the requirements for the project. Discharge capacity shall be worked out by the contractors and approval obtained from the Engineer-in-Charge. As a guide line figure the contractors may assume a discharge capacity of 15 cubic meter / hour / pump. Pipe Lines. All concrete carrying pipe lines shall generally be rigid pipe lines. flexible pipelines may only be used at bend curves in lines or at discharge ends if required. placements of flexible units shall be done judiciously and connected to the pipe lines only when it meets the approval of the Engineer-in Charge.

Rigid line / Hard Line/ slick line such lines shall be made either of steel or plastic Aluminum alloy pipes shall not be used. Minimum pipeline diameter shall be 100.

#### **Item no. 16**

**Supplying cutting, bending, binding and placing in position steel as per plan and design and as per ISS 2502 including cost of steel and binding wire for reservoirs/structures only including lift up to 6 meter height or depth below G.L. for all diameters Do – deformed (TMT) bars confirming to relevant IS Fe – 500 grade for all diameters**

#### ***Workmanship***

The work shall consist of furnishing and-placing reinforcement to the shape and dimensions shown as on the drawings or as directed by the engineering – charge.

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

Reinforcing steel shall conform accurate to the dimensions given in the bar bending schedules shown on relevant drawings. Bars shall be bent cold to specified shape and dimensions or as directed, using a proper bar bender, operated by hand or power to attain proper radius of bends. Bars shall not be bent or straightened in a manner that will injure the material. Bars bent during transport-or handling shall be straightened before being used on the work. They shall not be heated to facilitate bending Unless otherwise specified a "U" type hook at the end of each bar shall invariably be provided to main reinforcement. The radius of the bend shall not be less than twice the diameter of the round bar and the length of the straight part of the bar beyond the end of the curve shall be at least four times the diameter of the round bar. In case of bars which are not round and in case of deformed bars, the diameter shall be taken as the diameter of circle having an equivalent effective area. The hooks shall be suitably encased to prevent any splitting of the concrete.

All the reinforcement bars shall lie accurately placed in exact position shown on the drawings, and shall be securely held in position during placing of concrete by annealed binding wire not less than 1 mm in size, and confirming to IS : 280 and by using stay blocks or metal chair spacers, metal hangers supporting wires or other approved devices at sufficiently close intervals, Bars shall not be allowed to sag between supports nor displaced during concreting or any other operations of the work. All devices used for positioning shall be of non-corrodible material. Wooden and metal supports shall not extend to the surface of concrete, except where shown on drawings. Placing bars on layers of freshly laid concrete as the work progresses for adjusting bar spacing shall not be allowed. Pieces of broken stone or brick and wooden blocks shall not be used. Layers of bars shall be separated by spacer bars, precast mortar blocks or other



approved devices Reinforcement after being placed in position shall be maintained in a clean condition until completely embedded in concrete. Special care shall be exercised to prevent any displacement of reinforcement in concrete already placed. To prevent reinforcement form corrosion, concrete cover shall be provided as indicated on drawings. All the bars protruding from concrete and to which other bars are to be sliced and which are likely to be exposed for a period exceeding 10 days shall be protected by a thick coat of neat cement grout.

Bars crossing each other where required shall be secured by binding wire (annealed) of size not less than 1 mm. in such a manner that they do not slip over each other at the time of fixing and concreting.

As far possible, bars of full length shall be used. In case this is not possible. Over lapping of bars shall be done as directed When practicable, overlapping bars shall not touch each other, but be kept apart by 25 mm. Where not feasible, overlapping bars shall be bound with annealed wires not less than 1 mm. thick twisted tight. The overlaps shall be staggered for different bars and located at points, along the span where neither shear nor bending moment is maximum.

Whenever indicated on the drawings or desired by the Engineer-in-charge, bars shall be jointed by couplings which shall have a cross-section sufficient to transmit the full stresses of bars. The ends of the bars that are joined by coupling shall be upset for sufficient length so that the effective cross section at the base of threads is not less than the normal cross-section of the bar. Threads shall be standard threads Steel for coupling shall conform to I.S. 226.

When permitted or specified on the drawings, joints of reinforcement bars shall be bull-welded so as to transmit their full stresses. Welded joints shall preferably be located at points when steel will not be subject to more than 75 percent of the maximum permissible stresses and welds so staggered that at any one section not more than 20 percent of the rods are welded. Only electric arc welding using a piece which excludes air from the molten metal and conforms to any or all other special provisions for the work shall be accepted. Suitable means shall be provided for holding bars securely in position during welding. It shall be ensured that no voids are left in welding and when welding is done in two or three stages, previous surface shall be cleaned properly. Ends of the bars shall be cleaned of all loose scale, rust, stains, paint and other foreign matter before welding. Only competent welders shall be employed on the work. The M.S. electrodes used for welding shall conform to I.S. 814. Welded pieces of reinforcement shall be tested. Specimen shall be taken from the actual site and their number and frequency of test shall be as directed.

#### ***Mode of Measurement & Payment***

For the purpose of calculating consumption, wastage shall not be permitted beyond 5 percent Excess consumption over 5% will be charged at penal rate.

Reinforcement shall be measured in length including overlaps, separately for different diameters as actually used in the work. Where welding or coupling is resorted to in place lap joints, such joints shall be measured for payment as equivalent length of overlap as per design requirement. From the length so measured, the weight of reinforcement shall be calculated in tones on the same basis of as per M-18 even though steel is supplied to the contractor by the department on actual weight. Length shall include hooks at the ends Wastage and annealed steel wire for binding shall not be measured and the cost of these items shall be deemed to be included in the rate for reinforcement.

The rate for reinforcement includes cost of steel binding wires. its carting from Department store to work site, cutting, bending, placing, binding and fixing in position as shown on the drawings and as directed It shall also include all devices for keeping reinforcement in approved position, cost of joining as per approved method and all wastage and spacer bars The rate shall be for a unit of One kg.



## **SCHEDULE : B3 (House Connection)**

### **ITEM WISE SPECIFICATION**

#### **Item No. 1**

**Providing and constructing rectangular brick masonry chamber for house connection as per type design in brick masonry in C. M. 1:3 including M-100 in foundation M-150 in benching inside plastering in C. M. 1:3 and outside plastering in C. M. 1:3 coping in M200 and fixing RCC precast manhole frame and covers, but Excl. supply of manhole and cover etc. complete excl. excavation.**

Inside size of chamber shall be as above. Additional excavation required to be done shall be carried out as per instruction of Engineer-in-charge. For foundation chamber 15 cm. thick 1:4:8 PCC shall be provided and 23 cm. up to 1.5 m. depth and beyond 1.5 m. depth 35 cm thick BB masonry walls in CM 1:6 shall be constructed Second Class bricks of Standard size shall be brought by the Contractor & shall got approval before use in the work from the Engineer-in-charge.

12 mm thick cement plaster in CM 1:3 shall be provided on inside and outside of walls up to 20 cm below from G.L. Cement pointing in CM 1:3 shall be provided for outside below G.L. from 20 cm. 20 mm dia MS bar steps shall be provided and fixed in wall at 30 cm c/c for facilitating access into the chamber. First step should be at a depth of 0.5 m from top and last step should be 0.5 m above bottom.

Chamber shall be covered with cast in situ RCC slab in one single piece with providing and fixing of CI MH frame and cover with 20 cm. thick BM wall in C.M.1:6.

Reinforcement for the cover slab shall be provided considering heavy traffic load. Curing of concrete, BB masonry, RCC etc. shall be done using chemical or water for 14 days . 12 mm dia MS bar handles minimum two nos. shall be provided to each piece of slab during the time of casting of slab.

Sides of chamber shall be refilled properly with selected excavated earth. All the above items shall be carried out in workman like manner as per prevalent sound engineering practice and instruction of Engineer-in-charge.

#### **PAYMENT:**

Payment shall be made at the rate quoted in schedule '1' per number of chambers constructed as above and rate covers cost of supply of all materials and labours. The rates includes manhole frame and cover.

## Item No. 2

**Providing, Fixing of Steel Fiber Reinforced Concrete (SFRC) Frame & cover Manufacture Supply & Delivery of store or at Site of work Steel Fiber Reinforced Concrete (SFRC) Frame & cover which is suitable to Drainage MH. and as per type design & Drawing including flat. Curing mold work etc.**

**Capacity: 20 Ton, Size: 36"x36 Frame.**

## **Steel Fiber Reinforced Concrete (SFRC) Rectangular Frame & Cover - Detailed Specification**

### **1. Introduction:**

Steel Fiber Reinforced Concrete (SFRC) is a type of concrete that is reinforced with steel fibers, improving its mechanical properties, such as its flexural strength, toughness, and resistance to cracking. The SFRC is commonly used in various structural applications like beams, slabs, pavements, and frames.

This specification provides the detailed requirements for a SFRC rectangular frame and cover, which can be used in applications such as manhole covers, drainage structures, and other reinforced frame structures.

### **2. Material Specification:**

#### **2.1 Concrete Mix:**

The concrete mix should conform to the following specifications:

- **Grade of Concrete:** Minimum of **M25** (for moderate strength). Higher grades (e.g., M30, M35, M40) may be specified depending on the design requirements.
- **Cement:** Ordinary Portland Cement (OPC) of 43 or 53 grade or equivalent.
- **Aggregates:**
  - Coarse aggregates: Crushed stone or gravel with a maximum size of **20 mm**.
  - Fine aggregates: Clean, natural sand free from organic matter.
- **Water:** Clean, fresh, and free from harmful salts.
- **Admixtures:** Use of superplasticizers or other necessary chemical admixtures to improve workability, depending on the mix design.

#### **2.2 Steel Fiber Specification:**

- **Type of Steel Fiber:** Crimped or hooked-end steel fibers.
- **Fiber Length:** Typically between **30 mm to 60 mm**.
- **Fiber Diameter:** Typically **0.25 mm to 0.75 mm**.
- **Fiber Content:** Typically **0.5% to 2% by volume of concrete**. Higher percentages may be used for specialized applications.
- **Tensile Strength:** Fiber tensile strength of at least **1000 MPa**.
- **Aspect Ratio:** Ratio of fiber length to diameter typically between **50 and 80**.
- **Type of Steel:** Carbon steel or alloy steel, with adequate corrosion resistance.

## 2.3 Other Materials:

- **Reinforcement Steel:** Standard mild steel or high-tensile steel bars according to **IS 432** or equivalent standards.
- **Welding Electrodes:** For connection of the steel fibers if needed.
- **Formwork:** Steel or plywood, ensuring a smooth surface finish.

## 3. Structural Design Requirements:

### 3.1 Frame Dimensions:

- **Type of Frame:** Rectangular frame.
- **Frame Dimensions:**
  - **Length:** As per design requirements.
  - **Width:** As per design requirements.
  - **Height/Depth:** As per design requirements.
- **Cover Thickness:**
  - For manhole covers, the minimum concrete cover for reinforcement should be **25 mm**.
  - Ensure appropriate cover as per design for corrosion resistance.

### 3.2 Load Requirements:

- **Load Classification:** The SFRC frame should be capable of withstanding static and dynamic loads as per design, including vehicle load, pedestrian load, or any specific operational requirements.
  - **For manhole covers:** Class A to D as per **IS 12592** or **EN 124** (depending on the application).
  - **Traffic Load:** 20 kN to 50 kN for general applications.
  - **Impact Load:** Must resist impact forces based on expected traffic.

### 3.3 Reinforcement Detailing:

- **Steel Reinforcement:** Use of steel bars as per the structural design for tensile strength. Typical reinforcement could include:
  - **Bottom Reinforcement:** Longitudinal bars, spacing as per design.
  - **Top Reinforcement:** Transverse bars, spacing as per design.
  - **Stirrups:** For additional shear resistance.
- **Fiber Reinforcement:** Steel fibers should be uniformly distributed throughout the mix to ensure optimum performance in flexural and tensile strength.

### 3.4 Bonding and Interlock:

- Steel fibers should be sufficiently bonded with the concrete matrix to avoid slippage, providing enhanced toughness and crack resistance.

## 4. Fabrication and Construction:

### 4.1 Mixing of Concrete:

- **Mixer Type:** Use a mechanical concrete mixer (drum or pan type).
- **Mixing Time:** Minimum of 3 to 5 minutes, depending on the batch size and type of mixer.
- **Mixing Procedure:** Add steel fibers gradually to ensure even distribution within the mix.

### 4.2 Formwork:

- **Formwork Material:** Should be smooth to prevent any surface defects.
- **Formwork Design:** Should ensure proper shape and dimensions of the frame and cover. The form should also allow for easy release of the frame without damaging the concrete.

### 4.3 Casting and Curing:

- **Casting:** Pour the concrete mix into the prepared formwork and compact it to eliminate voids.
- **Vibration:** Use external or internal vibration to achieve adequate compaction and avoid air pockets.
- **Curing:** Cure the SFRC frame for at least 7 days using wet burlap, curing compound, or other methods to retain moisture and achieve proper hydration.

### 4.4 Finish:

- **Surface Finish:** Concrete surface should be smooth, free from cracks, honeycombs, and other defects.
- **Curing:** Continuous curing for 7 to 14 days depending on the ambient conditions.

## 5. Performance Testing:

The SFRC rectangular frame and cover must be tested for the following properties:

- **Compressive Strength:** Minimum 25 MPa (for M25 grade concrete) or as specified.
- **Flexural Strength:** Ensure a minimum of 7 MPa (based on design requirements).
- **Tensile Strength:** Measure post-crack behavior using suitable tests like the direct tension test or flexural tests.
- **Impact Resistance:** Frame should pass impact tests as per the design specifications (drop-weight or impact hammer tests).
- **Durability Tests:** Perform tests to check durability, including freeze-thaw resistance, chloride penetration, and abrasion resistance.

## 6. Quality Control:

- **Inspection:** Regular inspection of the batch mixing, formwork setup, and the casting process.
- **Testing:** Concrete cube tests at specified intervals for strength validation.
- **Certification:** SFRC frames should meet the quality control guidelines as per relevant national standards such as IS 456, IS 3370, and IS 12592.

## 7. Installation:

- **Handling:** Transport the SFRC frames and covers carefully, avoiding any impact or stress that could cause cracking.
- **Placement:** Ensure that the frames are placed on a stable, level surface. The concrete covers should sit securely within the frame with no movement.
- **Sealing:** Depending on the application, seals may be applied at the frame-cover interface to prevent leakage.

## 8. Safety Considerations:

- Use protective equipment (gloves, masks, and safety glasses) when handling steel fibers and concrete materials.
- Follow safe practices during the handling, mixing, and curing processes to avoid injury from heavy equipment and chemical exposure.

## 9. Maintenance and Inspection:

- Regular inspection should be carried out for signs of wear, cracking, or other structural issues.
- Clean the SFRC frames and covers to remove debris, dirt, and chemicals that may cause corrosion.

**Conclusion:** Steel Fiber Reinforced Concrete (SFRC) frames and covers provide superior durability, strength, and performance in demanding environments. The specifications provided here ensure that the concrete components will withstand the expected loads, environmental stresses, and operational requirements.

### Payment:

The rate shall be paid on number basis for set of Frame & Cover.

### Item No. 3

**Providing and supplying in standard length ISI mark rigid unplasticised PVC pipes suitable for potable water with ring til joint including cost of rings, as per IS specification no. 4985/1988 including all local and central taxes, transportation, freight charges, octroi, inspection charges, loading, unloading, conveyance to the departmental stores and including cost of jointing material etc. complete.**

Sr. No.	Particulars
3.0	110 mm Dia
3.1	90 mm Dia

### **UNPLASTICIZED PVC PIPES**

For Indian manufacturers a valid license issued by the Bureau of Indian Standards for marking the PVC pipes with ISI mark is a mandatory requirement both for PVC pipes & rings

#### **STANDARDS:**

- The UPVC Pipes to be manufactured, supplied and delivered under the scope of this contract shall be manufactured in accordance and confirming to IS:4985-2000 or its latest revision or amendments or other authoritative standard that ensure at least a substantially equal quality to the IS:4985-2000 or its latest revision or amendments
- Elastometric sealing ring shall be as per specification of IS – 5382-1985, and ISO: 4633-1996 or it shall be EPDM rubber ring.
- The dimensions, material compositions, tests etc. shall be as per IS:4985-2000 or with its latest revision or amendments.
- The minimum wall thickness weight shall be as per Appendix I of the tender.
- The colour of pipes shall be as per IS 4985-2000
- Bureau of Indian Specifications (BIS) / Indian Standard (IS) shall mean the Latest version issued by BIS.

The material from which the pipes are made shall consist substantially of unplasticized polyvinyl chloride conforming to IS: 10151, to which may be added only those additives that are absolutely needed to facilitate the manufacture of the polymer, and the production of sound, durable pipes of good surface, finish, mechanical strength and opacity.

The bulk density of the UPVC compound shall be 0.50 to 0.53 and the density of UPVC pipe shall be 1.40 to 1.46 g / cm<sup>3</sup>.

The additional of the manufactures own rework material shall comply to clause 4.2 of IS: 4985.

PVC resin of suspension grade K-66/K-67 shall be used for extrusion of UPVC pipe.

- In line with BIS 4985-2000 the tolerance on outside diameter of the pipe shall be as under:

Nominal outside Diameter	Min. outside diameter in mm		Outside diameter at any point in mm	
	Minimum	Maximum	Minimum	Maximum
90	90	90.3	88.9	91.1
110	110	110.4	108.6	111.4
140	140	140.5	138.3	141.7



- “The pipes shall be transported to the store by flat floored trucks in pre packed wooden crate. The height of crate should not be exceeding more than 2 meters. The both ends of packaging unit (crate) shall be covered with plastic sheet to ensure adequate protection during transport. At the time of packing and stacking of pipes, the sockets shall be alternated within the pipe of pipes and shall project sufficiently for the pipes to be correctly supported along their whole length. The pipes shall rest uniformly on the vehicle bed over their whole length during transport to avoid sagging or deformation.

The packing material like wooden crate, plastic sheet etc. shall be the property of tenderer and he is permitted to reuse the packing material for transporting next batch of pipes”.

- The pressure rating of pipes shall be in accordance with IS 4985 with a maximum continuous working pressure at 27<sup>o</sup> C. of 6 & 10 kg/cm<sup>2</sup>. This working pressure shall be down graded for ambient underground soil temperature of 45<sup>o</sup> C. as per the figure given in IS 4985 for design purposes.
- The pipes when subjected to internal hydrostatic pressure in accordance with IS: 12235-1986 (part – 8) shall not burst during the prescribed test duration. The temperature, duration and test and induced internal stress shall conform to the parameters given below:

Sr. No.	Test	Temp. (°C)	Min. duration (h)	Induced Stress (Mpa)	Requirements
1	Type test	60	1000	10	No failure
2	Acceptance Test	27	1	36	No failure

- The integral socket of the pipe shall be tested for internal hydrostatic pressure in accordance with ISO: 3603 and ISO 1167.
- The UPVC pipe shall not contain vinyl chloride monomer (VCM) exceeding 1 ppm when determined by means of gas phase chromatography using the “headspace” method according to IS: 10151.
- The wall of the socket and the wall of the plain pipe shall not transmit more than 0.2% of visible light falling on them when tested in accordance with IS:12235 (part -3).

The pipes shall be supplied in straight length of 6 mtrs with tolerance of +20mm and -0mm. The effective length of socket pipe shall be considered as shown in figure 2 of IS 4985.

All plastic and non plastic material for components of the UPVC piping system e.g. Elastomeric sealing ring, lubricants, when in permanent or in temporary contact with water which is intended for human consumption, shall not adversely affect the quality of the drinking water.

Concentrations of chemicals, biological agents or other substance leached from pipe materials in contact with drinking water and the values of the relevant physical parameters, shall not exceed the maximum values recommended by IS: 10500.

The pipe material shall be in accordance with IS 4985, clause 6.3.

Temperature variations:

All the pipes to be manufactured, supplied and delivered shall be subjected to weather conditions like sun, dust, rain, wind as available in State of Gujarat. They shall be also subjected to carry and convey drinking water under variable temperature conditions ranging from 4 C<sup>o</sup> to 45 C<sup>o</sup>.

These Sealing Ring Shall Be Sturine Butadin In Red Color As Specified In Is. The Lubricant Applied For Jointing Of Elastomatic Rubber Ring Shall Be Of Good Quality And Comply The Following Specifications:

- A) Must Have Paste Like Consistency And Be Ready For Use, Preferably Soap Jelly.
- B) Has To Adhere Wet And Dry Surfaces Of Upvc Pipes And Rubber Ring.
- C) Must Be Non-Toxic.
- D) Must Be Water-Soluble.
- E) Must Non-Affecting Physio-Chemical And Organoleptic Properties Of Drinking Water Carried On The Pipe.
- F) Must Not Have An Objectionable Odour.
- G) Must Not Harmful To The Skin.

Elastomeric sealing ring shall be in accordance with one of the types (Type - 1 to Type – 6) as per ISS 5382. These sealing rings shall be EPDM rubber ring. The sealing ring shall be with ISI mark.

In case of imported EPDM Ring, such rings shall conform to relevant International Standards or the Standards of country of origin, which are equivalent or higher than the Bureau of Indian Standard Specifications. In case of manufacturers who have applied for getting a BIS certification mark, it would be mandatory for such bidders to produce the BIS certification license on or before the date of opening of the price bids. An undertaking in this regard shall have to be provided along with the technical bid.

The rubber sealing rings shall be vulcanized from Ethylene Propylene (EPDM) with strengths as per table 2 of IS 5382-1985. type test:

- a) Type test capacity, test for effect on water, test for resistance to Sulfuric Acid, internal Hydrostatic pressure test for 1000 Hrs. shall be carried out at least once at any time during the contract. Or shall be taken at least once during every six months irrespective of the ordered quantity.
- b) The said type test shall be taken by the representative of authority or third-party inspection agency at the in-house laboratory of the manufacturer colour of pipes:
  - The color of the pipes shall be as per IS 4985-2000.
  - The pipes shall bear ISI mark confirming to IS:4985-2000 or its latest amendment/revision if any.

payment of pipes will be made as per schedule-B.

#### **Item No. 4**

##### **Horizontally cast**

**Providing and supplying ISI Standard R.C.C. pipes(of Sulphate Resisting Cement) in standard lengths of following class and diameter suitable for either collar joints or rubber ring joints including all taxes, insurance, transportation, freight charges, octroi, inspection charges, loading, unloading, conveyance to departmental stores, stacking etc. complete. (IS - 458/ 1989)**

**Note: One collar should be supplied with each full length plain ended RCC pipe, cost included in rates below. One rubber ring should be supplied with each full length socketed pipe, cost included in rates below.**

**150 mm Dia RCC NP 3 Pipe.**

Sr.No	Dia (in mm)
4.0	150 mm

- **Specification of RCC NP3 Pipe:**

### 1.1 Scope

This specification covers the requirements for manufacturing, testing, supplying, jointing and testing at work sites of Reinforced Cement Concrete (RCC) pipes, of non-pressure varieties, sewers and storm water drains. R.C.C. NP3 class pipes are to be used for sewer collecting system

### Applicable Codes

The manufacturing, testing, supplying, jointing and testing at work sites of RCC pipes shall comply with all currently applicable statutes, regulations, standards and codes. In particular, the following standards, unless otherwise specified herein, shall be referred. In all cases, the latest revision of the codes shall be referred to. If requirements of this specification conflict with the requirements of the codes and standards, this specification shall govern.

### 2.0 Materials

- (a) IS: 458 - Specification for precast concrete pipes (with and without reinf.)-2003
- (b) IS: 3597 - Method of tests for concrete pipes.
- (c) IS: 5382 - Specification for rubber sealing rings for gas mains, water mains and sewers
- (d) IS: 516 - Method of test for strength of concrete.

### 2.1 Codes of Practice

- (a) IS: 456 - Code of practice for plain and reinforced concrete.
- (b) IS: 783 - Code of practice for laying of concrete pipes.

### 3.0 Design

Design of RCC pipes including reinforcement details and the ends of pipes shall be in accordance with the relevant clauses of IS: 458-2003.

### 4.0 Manufacturing

#### 4.1 General

**Pipe can be manufactured by spinning process or by vibrated casting process**

- 4.1.1 The method of manufacture shall be such that the form and the dimensions of the finished pipes are accurate within the limits specified in relevant clause of IS: 458. The surfaces and edges of the pipes shall be well defined and true, and their ends shall be square with the longitudinal axis. The

ends of the pipes shall be further reinforced by an extra ring of reinforcement to avoid breakage during transportation.

- 4.1.2 The RCC pipes and rubber rings shall be systematically checked for any manufacturing defects by experienced supervisors so as to maintain a high standard of quality.
- 4.1.3 Owner/Engineer shall at all reasonable times have free access to the place where the pipes and collars/rubber rings are manufactured for the purpose of examining and testing the pipes and collars/rubber rings and of witnessing the test and manufacturing.
- 4.1.4 All tests specified either in this specification or in the relevant Indian Standards shall be performed by the supplier/contractor at his own cost and in presence of Owner/Engineer if desired. For this, sufficient notice before testing of the pipes and fittings shall be given to Owner/Engineer.
- 4.1.5 If the test is found unsatisfactory, Owner/Engineer may reject any or all pipes of that lot. The decision of Owner/Engineer in this matter shall be final and binding on Contractor and not subject to any arbitration or appeal

## 4.2 MATERIALS

### 4.2.1 Cement

Cement used for the manufacture of RCC pipes should be **Sulphate Resisting Cement (SRC)** only and shall conform to relevant IS codes.

### 4.2.2 Aggregates

Aggregates used for the manufacture of RCC pipes shall conform to IS: 383. The maximum size of aggregate should not exceed one-third the thickness of the pipe or 20 mm, whichever is smaller.

### 4.2.3 Mixing and Curing Water

Water shall be clean, colorless and free from objectionable quantities of organic matter, alkali, acid, salts or other impurities that might reduce the strength, durability or other desirable qualities of concrete and mortar

### 4.2.4 Reinforcement

Reinforcement used for the manufacture of the RCC pipes shall be mild steel Grade I or medium tensile steel bars conforming to IS: 432 (Part-I) or hard-drawn steel wire conforming to IS: 421 (Part-2). Reinforcement cages for pipes shall be as per relevant requirements of IS: 458

### 4.2.5 Concrete

Concrete used for the manufacture of RCC pipes shall conform to IS: 456. The minimum cement content and minimum compressive strength of concrete shall be as per relevant requirements of IS:458 (Latest Edition). Compressive strength tests shall be conducted on 15 cm cubes in accordance with the relevant requirements of IS: 456 and IS: 516.

#### 4.2.6 Rubber Ring

Rubber ring chords used in pipe joints shall be EPDM rubbering as per IS 5382: 1985.

#### 4.2.7 Curing

Pipes manufactured in compliance with IS:458 (Latest Edition) shall be either water cured or steam cured for minimum stipulated curing period in accordance with relevant requirements of the latest revised IS:458 (Latest Edition).

### 4.3 Dimensions

4.3.1 The internal diameter, wall thickness and length of barrel and collar of pipes, reinforcement (longitudinal and spiral), type of ends and minimum clear cover to reinforcement and strength test requirements shall be as per the relevant clauses/tables of IS: 458 for different classes of pipes.

**Table – 1**  
**Design and Strength Test Requirements of Concrete Pipes of Class NP3**  
**Reinforced Concrete, Medium Duty, Non-Pressure Pipes**

Internal Diameter of Pipes in mm	Barrel Wall Thickness	Reinforcements			Strength Test Requirements for Three Edge Bearing Test	
		Longitudinal, Mild Steel or Hard Drawn Steel		Spirals, Hard Draws Steel	Load to Produce 0.25 mm Crack kN/linear meter	Ultimate Load kN/linear meter
		Minimum number	Kg/linear meter	Kg/linear meter		
(1)	(2)	(3)	(4)	(5)	(6)	(7)
300	40	8	0.78	1.80	15.50	23.25
400	75	8	0.78	3.30	19.16	28.74
600	85	8 or 6+6	1.18	7.01	28.74	43.11
800	95	8 or 6+6	2.66	13.04	38.32	57.48
900	100	6 + 6	2.66	18.30	43.11	64.67
1000	115	6 + 6	2.66	21.52	47.90	71.85
1200	120	8 + 8	3.55	33.57	57.48	86.22
1400	135	8 + 8	3.55	46.21	67.06	100.60
1600	140	8 + 8	3.55	65.40	76.64	114.96
1800	150	12 + 12	9.36	87.10	86.22	129.33
2000	170	12 + 12	9.36	97.90	95.80	143.70
2200	185	12 + 12	9.36	133.30	105.38	158.07

**Note:**

1. If mild steel is used for spiral reinforcement, the weight specified under col.5 shall be increased to 140/125.
2. The longitudinal reinforcement given in this table is valid for pipes up to 2.5 m. effective length for internal diameter of pipe up to 250 mm and up to 3 m. effective length for higher diameter pipes.
3. Total mass of longitudinal reinforcement shall be calculated by multiplying the values given in col.4 by the length of the pipe and then deducting for the cover length provided at the two ends.
4. Concrete for pipes shall have a minimum compressive strength of 35 N/mm<sup>2</sup> at 28 days.

**Table – 2**  
**Design and Strength Test Requirements of Concrete Pipes of Class NP3**  
**Reinforced Concrete, Medium Duty, Non-Pressure Pipes Made by Vibrated Casting Process**

Internal Diameter of Pipes in mm	Minimum Barrel Wall Thickness	Reinforcements			Strength Test Requirements for Three Edge Bearing Test	
		Longitudinal, Mild Steel or Hard Drawn Steel		Spirals, Hard Draws Steel	Load to Produce 0.25 mm Crack kN/linear meter	Ultimate Load kN/linear meter
		Minimum number	Kg/linear meter	Kg/linear meter		
(1)	(2)	(3)	(4)	(5)	(6)	(7)
300	50	8	0.78	1.53	15.5	23.25
400	60	8	0.78	1.6	19.16	28.74
600	75	8 or 6 +6	1.18	2.2	28.74	43.11
800	95	8 or 6 +6	2.66	6.87	38.32	57.48
900	100	6 + 6	2.66	11.55	43.11	64.67
1000	115	6 + 6	2.66	15.7	47.9	71.85
1200	125	8 + 8	3.55	21.25	57.48	86.22
1400	140	8 + 8	3.55	30	67.06	100.6
1600	165	8 + 8	3.55	50.63	76.64	114.96
1800	180	12 + 12	9.36	64.19	86.22	129.33
2000	190	12 + 12	9.36	83.12	95.8	143.7
2200	210	12 + 12	9.36	105.53	105.4	158.07

**Note:** Concrete for pipes shall have a minimum compressive strength of 35 N/mm<sup>2</sup> at 28 days

#### **4.4 Workmanship and Finish**

**4.4.1** Pipes shall be straight and free from cracks except that craze cracks may be permitted. The ends of the pipes shall be square with their longitudinal axis so that when placed in a straight line in the trench no opening between ends in contact shall exceed 3 mm in pipes up to 600 mm diameter (inclusive), and 6 mm in pipes larger than 600 mm diameter

**4.4.2** The outside and inside surfaces of the pipes shall be smooth, dense and hard, and shall not be coated with cement wash or other preparation unless otherwise agreed to between Owner/Engineer and the manufacturer or supplier.

**4.4.3** The pipes shall be free from defects resulting from imperfect grading of the aggregate, mixing or molding.

**4.4.4** The pipes shall be free from local dents or bulges greater than 3 mm in depth and extending over a length in any direction greater than twice the thickness of barrel..

**4.4.5** The deviation from straight in any pipe throughout its effective length, tested by means of a rigid straight edge parallel to the longitudinal axis of the pipe shall not exceed, for all diameters 3 mm forever meter run

#### **4.5 Testing**

All pipes for testing purposes shall be selected at random from the stock of the manufacturer and shall be such as would not otherwise be rejected under the criteria of tolerances as mentioned in IS: 458.(Latest Edition)

During manufacture, tests on concrete shall be carried out as per IS: 456. The manufacturer shall supply, when required to do so by Owner/Engineer the results of compressive tests of concrete cubes and split tensile tests of concrete cylinders made from the concrete used for the pipes. The manufacturer shall supply cylinders or cubes for test purposes required by the Owner/Engineer and such cylinders or cubes shall withstand the tests prescribed by the manufacturer for the hydrostatic test pressure. For non-pressure pipes, 2 percent of the pipes shall be tested for hydrostatic test pressure.

The specimen of pipes for the following tests shall be selected in accordance with relevant Clause of IS: 458 (Latest Edition) and tests in accordance with the methods described in IS: 3597.

- i) Hydrostatic test

- ii) Three edge bearing test
- iii) Absorption test.

**Note:** Three edge bearing strength to produce 0.25 mm crack in case of special design of pipes shall be as per IS:458:2003.

For Inspection at manufacturing site 24 hrs. Access shall be provided to BMC Engineers as well as engineer appointed by PMC/TPI agency. Apart from this BMC will establish its own pipe testing facility where pipes will be randomly tested. The cost of transporting the pipe to the testing facility & testing charges shall be borne by the contractor

#### **4.6 Sampling and Inspection**

- 4.6.1** In any consignment, all the pipes of same class and size and manufactured under similar conditions of production shall be grouped together to constitute a lot. The conformity of a lot to the requirements of this specification shall be ascertained on the basis of tests on pipes selected from it
- 4.6.2** The number of pipes to be selected from the lot for testing shall be in accordance with Table 15 of IS: 458 (Latest Edition).
- 4.6.3** Pipes shall be selected at random. In order to ensure randomness, all the pipes in the lot may be arranged in a serial order and starting from any pipe, every 'n'th pipe be selected till the requisite number is obtained, n being the integral part of  $N/n$ , where N is the lot size and n is the sample size.
- 4.6.4** All pipes selected as per IS: 458 shall be inspected for dimensional requirements, finish and deviation from straight. A pipe failing to satisfy one or more of these requirements shall be considered as defective.
- 4.6.5** The number of pipes to be tested for tests under IS: 458 shall be in accordance with column 4 of Table 15 of IS: 458 (Latest Edition). These pipes shall be selected from pipes that have satisfied the requirements mentioned in Clause above.
- 4.6.6** A lot shall be considered as conforming to the requirements of IS:458 (Latest Edition) if the following conditions are satisfied.
  - (a)** The number of defective pipes shall not be more than the permissible number given in column 3 of Table 15 of IS: 458 (Latest Edition).



(b) All the pipes tested for various tests as per IS-458 shall satisfy corresponding requirements of the tests.

(c) In case the number of pipes not satisfying requirements of any one or more tests, one or two further samples of same size shall be selected and tested for the test or tests in which failure has occurred. All these pipes shall satisfy the corresponding requirements of the test

#### **4.7 Marking**

The following information shall be clearly marked on each pipe:

(a) Internal diameter of pipe.

(b) Class of pipe.

(c) Date of manufacture, and

(d) Name of manufacturer or his registered trademark or both.

### **LAYING OF PIPES**

The laying of RCC pipes shall conform to Technical Specifications: Item:-6

### **JOINTING**

#### **GENERAL**

Jointing of RCC pipes shall be done with SRC cement only and as per the requirements of following specifications and as per the relevant IS. The type of joints shall be as below. After jointing, extraneous material, if any, shall be removed from the inside of the pipe and the newly made joints shall be thoroughly cured. In case, rubber-sealing rings are used for jointing, these shall conform to IS 5382 and shall be of such type as mentioned in IS-458:2003.

#### **1. FLUSH JOINT (INTERNAL)**

This joint shall be generally used for culvert pipes of 900-mm diameter and over. The ends of the pipes are specially shaped to form a self-centering joint with an internal jointing space 13-mm wide. The finished joint is flush with both inside and outside with the pipe wall. The jointing space is filled with cement mortar in the proportion as specified in IS-458-2003, mixed sufficiently dry to remain in position when forced with a trowel or rammed.

#### **2. FLUSH JOINT (EXTERNAL)**

This joint is suitable for pipes which are too small for jointing from inside. This joint is composed of specially shaped pipe ends. Each end shall be butted against each other and adjusted in correct position. The jointing space shall then be filled with cement mortar as specified in IS-458-2003, sufficiently dry and finished off flush. Great care shall be taken to ensure that the projecting ends are not damaged as no repairs can be readily affected from inside the pipe

#### **3. Spigot and Socket Joint (Flexible)**

The RCC pipe with the rubber ring accurately positioned on the spigot shall be pushed well home into the socket of the previously laid pipe by means of uniformly applied pressure with the aid of a jack or similar appliance. The RCC pipes shall be of spigot and socket type and rubber rings as specified in IS-458-2003, shall be used, and the manufacturer's instructions shall be deemed to form a part of these specifications. The rubber rings shall be lubricated before making the joint and the lubricant shall be soft soap water or an approved lubricant supplied by the manufacturer. Socket & Spigot NP3 & NP4 pipe with rubber ring roll on joint for diameter up to 900 mm should be provided as per table 14 of IS 458 : 2003. Socket & spigot NP3 & NP4 pipe with rubber ring confined joint for diameter 1000 mm to 2200 mm should be provided as per Table -17 of IS 458:2003

#### **4. Cleaning Of Pipes**

As soon as a stretch of RCC pipes has been laid complete from manhole to manhole or for a stretch as directed by Owner/Engineer, contractor shall run through the pipes both backwards and forwards a double disc or solid or closed cylinder 75 mm less in diameter than the internal diameter of pipes. The open end of the incomplete stretch of pipeline shall be securely closed as may be directed by Owner/Engineer to prevent entry of mud or silt etc.

If as a result of the removal of any obstructions Owner/Engineer considers that damages may have been caused to the pipelines, he shall be entitled to order the stretch to be tested immediately. Should such test prove unsatisfactory, contractor shall amend the work and carry out such further tests as are required by Owner/Engineer.

It shall also be ascertained by contractor that each stretch from manhole to manhole or the stretch as directed by Engineer is absolutely clear and without any obstruction by means of visual examination of the interior of the pipeline suitably enlightened by projected sunlight or otherwise.

#### **5. Testing At Work Site**

After laying and jointing of RCC pipes is completed the pipe line shall be tested at work site as per the following specifications and as directed by Owner / Engineer In-Charge. All equipment for testing at work site shall be supplied and erected by contractor and shall be rectified by him to the full satisfaction of Owner / Engineer In-Charge.

After the joints have thoroughly set and have been checked by Owner/Engineer and before backfilling the trenches, the entire section of the sewer or storm water drain shall be proved by contractor to be water tight by filling in pipes with water to the level of 1.50 m above the top of the highest pipe in the stretch and heading the water up for the period of one hour. The apparatus used for the purpose of testing shall be approved by Owner/Engineer. Contractor if required by Owner/Engineer shall dewater the excavated pit and keep it dry during the period of testing. The loss of water over a period of 30 minutes should be

measured by adding water from a measuring vessel at regular 10 minutes intervals and noting the quantity required to maintain the original water level. For the approval of this test the average quantity added should not exceed 1 liter/hour/100 linear meters/10 mm of nominal internal diameter. Any leakage including excessive sweating which causes a drop in the test water level will be visible and the defective part of the work should be removed and made good.

In case of pressure pipeline, the completed stretch of pipeline shall be tested for site test pressure as specified in IS-458-2003. The site test pressure should not be less than the maximum operating pressure plus the calculated surge pressure, but in no case should it exceed the hydrostatic test pressure as specified in IS:458 (Latest Edition).

### **Measurement**

All RCC pipes shall be measured according to the work actually done and no allowance will be made for any waste in cutting to the exact length required. The measurement for pipes shall be in running meter nearest to a cm. of length along the center line of pipe as actually laid at work sites.

The rate for providing, laying and jointing of RCC pipes shall be deemed to include the cost of rubber rings, jointing material, testing and extra excavation required for ordinary bedding of pipes and also for pipe sockets, if any.

#### **Notes:**

1. If any damage is caused to the pipeline during the execution of work or while cleaning/testing the pipeline as specified. Contractor shall be held responsible for the same and shall replace the damaged pipeline and retest the same at his own cost to the full satisfaction of Engineer.
2. Water for testing of pipeline shall be arranged by Contractor at his own cost.
3. Pipes shall be brought on site proportionate to the required progress for Thirty days only.

### **Item No. 5**

**Manufacture, supply & delivery of PVC specials plain & Socket or flanged suitable to PVC pipe.**

Detailed Specification as per Schedule B3, Item No. 2

### **Item No. 6**

**Lowering, laying, fixing and jointing PVC/uPVC/cPVC pipes and specials of following class and diameter including cost of conveyance from stores to site of works including cost of labour, material, cement solvent, giving satisfactory hydraulic testing as per ISI code.**

Sr.No	Dia (in mm)
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<b>6.0</b>	<b>110 mm Dia</b>
<b>6.1</b>	<b>90 mm Dia</b>

### **Workmanship :**

- 1) The excavation for trenches shall be done before laying of the pipes as per required depth and width so that adequate space can be made available for joint.
- 2) The pipes & joints shall be procured, supplied by the Contractor at work site at his own cost. Every care shall be taken in carting them to site. During transportation any damage shall be occurring to pipes for fittings the replacement of pipes given by the contractor at his own cost.
- 3) Before laying the pipes it shall be brushed through out length so that the dust and soil can be removed.
- 4) Reducer bends tees, and adopter etc. to be supplied by the contractor as per requirement.
- 5) All the specials such as bends, tees, reducer, etc. shall be fixed as per instruction of engineer-in-charge in the pipeline.
- 6) The pipe shall be hydraulically tested during the testing no leakage shall be observed. If, leakage observed, it shall be set rightly by the contractor at his own cost as per the instruction of engineer-in-charge. The payment shall be as per payment schedule.

### **THE SCOPE FOR THE ITEM COVER**

Cost of additional excavation required for jointing clearing the site of all scrubs, bushes, and trees and dewatering where necessary.

Labour for laying pipes in trenches to correct alignment at required depth with tools, including cutting of pipes and specials if required for laying of pipes including connecting pipes to specials and appurtenances. Cost of the scaffolding, tools and plants, ropes etc.

Protection of existing works from damage and cost of repair to the damages carried out to the existing structure, sewer line telephone/electricity cables, electric cables, electric lines, gas pipe line, irrigation pipe line etc.

The pipe laying across the state highways, national highways etc. will have to be done either through open cut method or through push through method depending upon the requirement to be prescribed by the sanctioning authority. However, mostly it would be push through method.

Local body will not be able to provide water for testing of the pipelines & water containers of the project. This shall have to be managed by the contractor at his costs and risk.

Labor for making joints including jointing material for joints, tools as well as tests. Testing of pipes for leakage under water pressure and flushing the pipes after testing and construction work shall have to be arranged by the contractor at his own cost.

All required PVC and C.I. special where necessary.

A) Providing PVC molded 10 Kg/cm<sup>2</sup> specials (as per IS standards) such as Tees, bends, etc. complete suitable for PVC pipe, as approved by Engineer in charge.

B) Manufacture, supply and delivery of CID joints with Rubber Rings of Standard quality or any other specials suitable for use with M.S., A.C., D.I. and PVC pipes and delivery of specials is to be made to site of works any where in Gujarat including all taxes, loading, unloading, carting, stacking, insurance, inspection charges, Octroi etc. complete

The PVC specials shall be of the same material used for PVC pipes and should be best quality approved by Engineer-in-charge.

It shall be of best quality as per IS specification and rate shall be including loading, unloading, carting, insurance and labour charge etc. complete.

#### **Item No. 8**

**Excavation for pipe line trenches incl. all safety provisions using site rails and stacking excavated stuff up to a lead of 90 mts. cleaning the site etc. complete for lifts and strata as specified. Up to 1.50 mt depth.**

<b>Sr. No.</b>	<b>Particulars</b>
8.0	In all sorts of soil and soft murrum
8.1	In hard murrum, boulders, incl. Macadam road

#### 1.0 GENERAL

1.1 The excavation for trenches will generally, refer to open excavation for trenches in wet / dry conditions for pipe laying work.

#### 2.0 CLEARING OF SITES:

2.1 The site on which the pipelines are to be laid and shown on plan and the area required for setting out and other operations shall be cleared and all obstruction loose stones and materials, rubbish of all kinds, stumps, brushwood as trees shall be removed as directed the roots shall be entirely grubbed up.

2.2 The products of the clearing to restocked in such a place and in such a manner, as directed by the engineer in charge.

2.3 In jungle clearings, all trees not specially marked for preservation, bamboo's jungle wood and brushwood shall be cut down their roots grubbed up. All wood and materials from the clearing shall be the property of the local body shall be arranged as directed by the Engineer-in-charge or his authorized agent, the material pronounced as useful by the Engineer will be conveyed and properly stacked as directed within the specified limit. Unless materials will be burnt or otherwise disposed off as directed.

2.4 All holes or hollows whether originally existing or produced by digging up roots, shall be carefully filled up with earth, well earth, well rammed leveled off, as may be directed.

#### 3.0 SETTING OUT:

The center lines of all pipe trenches etc. shall be given by the Engineer-in-charge and it will be the responsibility of the contractor to install substantial reference marks, bench marks, etc. and maintain them as long as required true to line, level curve and slopes. The contractor shall assure full responsibility for alignment, and dimension of trench.

The labor materials etc. required for setting out and establishing benchmarks and other reference marks shall be arranged by the contractor at his own cost.

#### **4 EXCAVATIONS**

4.1 The excavation incl. Bailing out of water for the pipe trenches shall also incl. Removal of all materials of whatever nature and whether wet or dry condition necessary for laying of pipelines exactly in accordance with alignment, levels grades and curves shown on the plans or as directed by the Engineer-in-charge. Trenches shall be excavated to the exact width and depth according to the size of pipe and the sides shall be left vertical as far as possible or according to the angle of repose various soils. Unless there is a specific extra provision in the contract for shoring and strutting or for cutting side slopes the contractor shall at his own cost do the necessary shoring and strutting or cutting of slopes to a safe of repose or both approved by the Engineer-in-charge. The contractor shall notify the Engineer before starting excavation to enable him to take cross sectional levels for purpose of measurements before the ground is disturbed. The bottom of the trenches shall be leveled both longitudinally and transversely or sloped as directed by the Engineer. The contractor shall at his own cost to remove such portions of boulders or rocks, as are rectified to make the bottom of the trench level. No filling shall be allowed to bring the trench to level. If by contractor's mistake excavation is made deeper than shown on the plans and if ordered by the Engineer the extra depth shall have to be made with selected excavated stuff only with watering, remedying etc. as directed, by the Engineer and at the cost of the contractor. Other hard excavation shall be cleared of all sorts and loose materials and cut to firm surface, either level, stepped as directed by the Engineer. The Engineer may order such changes in the dimensions and alignment of pipe trench as may be deemed necessary to secure satisfactory cover over pipeline. The contractor shall, at his own expense, make provision for bailing out of draining water and the trenches shall be kept free of water, during laying work.

After each excavation is completed, the contractor shall notify the Engineer to that effect and no laying of pipeline will be allowed to laid until Engineer has approved the depth and dimensions of trenches level and measurements.

#### **5.0 SHORING AND STRUTTING:**

5.1 Shoring & strutting and dewatering if required shall have to be carried out by the contractor, for which any extra charge will not be paid

5.2 During excavation if water connections, sewage connections, telephone lines khalkuva (soak pits) etc. are damaged by the contractor, the same shall have to be restored by the contractor without any extra payment.

#### **6.0 PROTECTION**

6.1 The trenches shall be strongly fenced and red light signal shall be kept at night and arrangement of watchman to prevent accidents should be done, sufficient care protective measure shall be taken to see that the excavation shall not affect or damage the adjoining structure. The contractor shall be entirely responsible for any injury to life and damage to the properties etc. Necessary protection work such as guide ropes, crossing places, barricades, caution boards etc. shall be provided by the contractor.

**7.0** The excavation in all sorts of soil, hard murrum, soft rock or hard rock or any type of soil shall have to be carried out up to the required depth by the agency

## **8 DISPOSALS OF EXCAVATED STUFF**

**8.1** No excavated stuff from trench are to be placed even temporarily nearer than 1.5 meter or greater distance up to 90 meter or as prescribed by the Engineer from the outer edge of trench. All excavated material will be the property of the board. The rate of excavated includes sorting out of useful materials and stacking then separately as directed within specified lead. The excavated stuff suitable and useful for refilling or for other use shall be stacked at convenient places. The materials not useful in any wet shall be disposal off as directed by the Engineer from the outer edge of trench.

**8.2** The site should be cleared off on completion of work.

## **9.0 ADDITIONAL REQUIREMENTS**

### **9.1**

At the joints of pipes, the trench shall be excavated to an additional depth of 15 cm. and width of 30 cm. And length of 15 cm. beyond the edge of collar on both the sides or as directed. The rate includes for such extra excavation made at the joints. The trenches shall be excavated perfectly in straight line. The bottom of the trench shall be kept as per invert level or as directed. To maintain the proper slop the usual

method of site rails and boning rods shall be adopted. The contractor shall have to provide and fix and maintain sight rails and boning rod without any extra cost.

If the contractor fails or makes delay to give hydraulic test of the pipe line laid in any of the section, without any genuine reason, he shall be responsible to get any part of the length trenches refill in such case i.e. before tasting for safety of pedestrian and/or vehicular traffic as found necessary by the engineer-in-charge without any extra cost. If found necessary any directed by the Engineer-in-charge. The contractor shall have to excavate the refilled trenches, during hydraulic test without any extra cost.

At all road crossings, trenches shall be excavated only for half width of the road and pipe shall be laid. The other half shall be excavated only after back filling over the laid pipeline is done so as to make it suitable for the traffic. The contractor shall provide direction when the pipeline is to be laid along the road as required and shall maintain the diversion or any part of it, without any extra cost. At all road crossings, the pipe shall be laid below the crest of read.

**9.2** The contractor shall break the road surface by excavation chiseling to the exact width and length as shown on the drawing or as directed by the Engineer-in-charge.

The excavated stuff shall be deposited in uniform layers to avoid mixing with other kind of materials at non-objectionable place or as directed by the Engineer-in-charge.

## **10.0 MEASUREMENT AND PAYMENT**

**10.1** The payment of excavation shall be made at the unit rate per cubic meter for the quantity actually excavated and accepted by the Engineer in charge limited to dimensions shown in the sanctioned plans or as directed by the Engineer. Excavation in excess of the sanctioned dimensions shall not be measured not paid for and if an ordered by the Engineer the contractor shall have to fill up the excess depth with excavated stuff with watering ramming etc. (Completed as specified) for trench without any extra payment to the contractor.

**10.2** Dimension shall be correct to two places of decimals of a meter and individual quantity shall of decimals of a meter and individual quantity shall be calculated to two places of decimals of a cubic meter.

**10.3** The rate for the item of excavation shall include unless and otherwise mentioned.

(a) Clearing of site.

(b) Setting out work including all materials and labour.

(c) Providing and subsequently removing, shoring and strutting outing slopes etc.

(d) Excavation and removal and staking of all excavated stuff as directed.

(e) Necessary protection including labour materials equipment etc. to ensure safety and protection against risk or accident.

(f) Providing facilities for inspection and damage to property if caused during **progress** of work.

(g) Compensation for injury to life and damage to property if caused during progress of work.

(h) Restoring of water supply connections, sewer connections, telephone lines, khalkuva soapiest etc. if damaged by contractor without extra payment.

(i) Dewatering of excavated pit trench during the progress of work.

(j) Clearing the site on completion of works directed by the Engineer.

## **Item No. 8.2**

### **Refilling the pipeline trenches incl. ramming, watering, consolidating desposal of surplus stuff as directed within a radius of 3 km**

Refilling materials shall be from excavated stuff.

- Excavated stuff to be used shall be cleared off all rubbish, large size stone bricks bats etc. big clods shall 50 mm or less. The selected soil sand or any other materials shall be got approved before filling, Refilling shall be done in a systematic manner in layers by the contract. Before refilling the trenches the contractor shall got checked the trenches, ready for refilling.
- All space between pipe line and the sides of excavation shall be refilled to the original surface with earth or selected material in layers of 15 cms to 10 cms, well-watered and rammed. Each layers shall be watered and compacted with heavy manner, before the upper layer is laid till the final level is reached to the thoroughly compacted base.
- Refilling on top of pipe shall be carried out carefully with selected soft stuff out of the excavated stuff. The filling shall be raised about 15 cms. to take care of subsequent settlement.
- The contractor shall be responsible for any settlement. The contractor shall be responsible for any settlement during passage of time during monsoon and the same shall be refilled with stuff brought from the outside if necessary at his cost.
- The process of refilling trenches, watering, ramming shall be carried out in such a way that no damage is done to the pipe line already laid.



- Disposal of the Excavated Stuff:

The excavated stuff of the selected type shall be used for filling the trenches and plinth or leveling the ground in layers including ramming and watering etc. complete. The Contractor shall remove the balance of the excavated from the site of work to a place as directed within a lead up to 3 km.

### **Item No. 9**

#### **Demolition including stacking of serviceable materials and disposal of unserviceable materials with all lead and lift. (i) R.C.C. work**

##### Workmanship

The demolition shall consist of demolition of one or more parts of the building as specified or shown in the drawings. Demolition implies taking up or down or breaking up. This shall consist of demolishing whole or part of work including all relevant item as specified or shown in the drawings.

The demolition shall always be planned before hand and shall be done in reverse order of the one in which the structure was constructed. This scheme shall be got approved from the Engineer- in-charge before starting the work. This however will not absolve the Contractor from the responsibility of proper and safe demolition.

Necessary dropping, shoring and under pinning shall be provided for the safety of the adjoining work or property, which is to be left intact, before dismantling and demolishing is taken up and the work shall be carried out in such a way that no damages is caused to the adjoining property.

Wherever required, temporary enclosures or partitions shall also be provided. Necessary precautions shall be taken to keep the dust nuisance down as and where necessary.

Dismantling shall be commenced in a systematic manner. All materials which are likely to be damaged by dropping from a height or demolishing roof, masonry etc. shall be carefully dismantled first. The dismantled articles shall be properly stacked as directed.

materials obtained from demolition shall be the property of Government unless otherwise specified and shall be kept in safe custody until handed over to the Engineer-in-charge.

Any serviceable materials, obtained during dismantling or demolition shall be separated out and stacked properly as directed, with all lead and lift. All unserviceable materials, rubbish etc. shall be slacked as directed by the Engineer-in- charge.

On completion of work, the site shall be cleared of all debris rubbish and cleaned as directed.

##### Mode of measurements & payment:

Measurements of all work except hidden work shall be taken before demolition or dismantling and no allowance for increase in bulk shall be allowed.

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

All work shall be measured in decimal system as fixed in its place subject to the following limits, unless otherwise stated hereinafter: (a) Dimensions shall be measured to the nearest 0.01 mt. (b) Area shall be worked out to the nearest 0.01 sq. ml. (c) Cubical connection shall be worked out to the nearest 0.01 Cu. m.

The rate shall include cost of all labour involved and tools used in demolishing and dismantling including scaffolding.

The rate shall also include the charges for separating out and stacking the serviceable materials properly and disposing the unserviceable materials with all lead and lift.

The rate also includes for temporary storing for the safety of the portion not required to be pulled down or of adjoining property and providing temporary enclosures or partitions where considered necessary.

#### **Item No. 10**

#### **Providing and laying cement concrete 1:4:8 (1- Cement : 4- coarse sand : 8- hand broken stone aggregates 40 mm nominal size) and curing complete excluding cost of formwork in (A) Foundation and Plinth**

Providing and laying controlled cement concrete and curing complete excluding the cost of reinforcement for reinforced concrete work in :

**Materials & Workmanship:** The relevant specifications shall be followed except that the grading of concrete shall be controlled concrete M-0 grades for the works as specified in the item.

#### ***Charging of mixer: -***

Mixers both stationary and truck mounted shall be so charged that there is a pre blending of the ingredients as the stream flows into the mixer.

Water shall enter the mixer first, but must continue to flow while other ingredients are entering the mixer. Water charging pipes shall be of proper design and of adequate size so that water enters at a point well inside the mixer. Water charging shall be complete within the first 25% of the mixing time.

Cement shall be charged along with other materials, but it shall be ensured that cement enters the stream after approximately 10% of the aggregate is in the mixer. When it is necessary to charge cement into truck mixers separately, additional mixing time shall be allowed to obtain desired uniformity to mix.

Admixtures shall be charged to the mixer at the same time in the mixing sequence for every batch. Liquid admixtures shall be charged with the water, powdered admixtures shall be sprinkled in to the mixer with other dry ingredients. When more than one admixture is used. They shall be batched separately and they shall not be premixed before entering the mixer. 1

#### ***Mixer performance: -***

Mixer performance checks shall be made at regular intervals to ensure uniformity of the concrete. Visual examination of the concrete shall be one of the aids for maintaining and checking mixer performance.

Results of tests on air content, slump unit weight of air free mortar shall be guide lines on mixer performance.

#### ***Mixing Time.***

Mixing time shall be measured from the time all ingredients are in the mixer.

Mixing time shall be established from mixer performance tests conducted at frequent intervals throughout the period of the work. However, as an initial guide, mixer manufacture's recommendation may be followed. Other guide line being 1.33 mins. For 1 cum capacity of mixer and 0.33 min for every additional 1 cum of mixer capacity.

Mixer shall be designed to have audible indicators and combination inter locks which prevent mixer discharge prior to completion of a preset mixing time. Mixer shall also be designed to start and stop operation with full load.

### ***Re-Tempering***

Provided that design water cement ratio is not exceeded, small increments of remembering water may be added to mixed batches to obtain the desired. Slump

Addition of water in excess of designed water cement ratio to compensate for slump loss resulting from delays in delivery or placing of concrete shall be permitted

### ***Mix Temperature***

Batch to batch uniformity of concrete regard to slump, water requirement and air content is dependent on temperature of concrete. It shall therefore, be ensured that the maximum and minimum temperatures of concrete throughout all seasons of the year donot vary beyond the limits given below.

Minimum: 20 C

Necessary measures shall be taken to lower or raise the temperature of water to maintainthe mixed concrete between the specified temperature limits

### ***Discharging of mixer.***

Mixer shall be capable of and handled properly so that concrete of lowest desired slumpcan be effective) discharged without causing segregation.

### ***Ready- Mix concrete may be:***

Mixed in a central plant and transported to the job in agitating or no agitating truck bodies.Mixed entirely in transit. Mixed entirely after reaching the job site. Mixed partially in a central plant and completed in transit or after reaching the job site (Shrink mixing)

In ready mix concrete special at tension shall be given the addition of mixing waterquantity, which if incorrect, shall result in reduction of concrete quality.

Concrete consistency (Slump) is also affected by: Amount and rate of mixing. Length ofhaul Time period for unloading Temperature conditions.

In cool weather or short haul and with prompt delivery concrete quality may not be significantly affected. But with reverse conditions, quality of concrete may be significantly affected. Addition of water to compensate for slump loss shall not exceed that quantity necessary to compensate for a maximum 25mm slump loss However, by this additional quantity of water, the design water cement ratio shall not be exceeded.

Loss in workability in warm weather shall be minimized by expediting delivery andplacement, and by controlling the concrete temperature

If it becomes necessary to use readers to prolong the time the concrete will respond tovibration

In hot weather conditions or delays in deliveryl placement, use may be made of the procedure of withholding some of the mixing water till the mixer arrives at the job site, in such cases after addition of the balance (Withheld) quantity. of water an additional 30 revolutions of mixer at mixing speed shall be given to adequately incorporate the additionswater into the mix.

When loss of slump or workability cannot be controlled by measures stated above. complete mixing shall be done at the job site using centrally dry batched ingredients.

### ***Supply and placing of ready-mix concrete.***

Responsibility of in-place quality of ready-mix concrete shall be shared by the manufacturer / supplier of ready-mix concrete and the placing contractor.

They shall work in close coordination. The placing crew shall be in direct radio / telecommunication contact with the batch plant to ensure. Avoidance of delay in dispatching concrete from batch plant. Inform batching plant delays in formwork, reinforcement work, handling or placing

The placement contractor shall give in writing his requirement of a particular batch of concrete to the supplier.

The ready - mix concrete manufacturer / supplier shall along with each batch of concrete delivered to the placement contractor give him a concrete delivery ticket. The supplier shall give copies of all such delivery tickets to the Engineer- in Charge for his record and also shall get duplicate Copies of all such delivery tickets duly received and signed from the placement contractor.

Ready mixed concrete as supplied by the manufacturer and as placed by the contractor shall in no way be different from the specifications of concrete as approved by the Engineer-in - Charge.

### **Transportation.**

Fresh concrete can be transported to the placement area by a variety of methods common among them are: -Mixer trucks. -Stationary truck bodies with or without agitators. -Buckets hauled by trucks. -Conveyor belts. -House or pipe line by pumping. Each type of transportation has specific advantages and limitations depending on the condition of use, mix, accessibility and location of placing.

### **Transportation by mixer trucks.**

These are essentially revolving drums mounted on truck chassis. Truck mixers used in the job shall be labelled permanently to indicate the manufacture specifications. for mixing like.

- a. Capacity of drum.
- b. Total number of drum revolutions required for complete mixing.
- c. Mixing speed.
- d. Maximum time limit before completion of discharge and after cement. has entered the drum.
- e. Reduction in time period of discharge.
- f. Due to warm weather or other variables.

All above information shall only form guidelines for the manufacture/ producer of concrete. Fulfilment of the stipulated number of revolutions or elapsed time shall not be acceptable criterion. As long as the mixing water limit not exceeded and the concrete has satisfactory plastic physical properties and is of satisfactory consistency and homogeneity for satisfactory placement and consolidation and is without initial se the concrete shall be acceptable.

When the concrete is totally mixed in transporting trucks or in case of shrink- mix concrete, ~~and~~ 63% of the rated capacity of the drum. In case the concrete is totally mixed in the central batching plant, the transporting truck may be loaded up to 80% of the rated capacity of the drum. In this case the drum shall be rotated at charging speed during loading and reduced to agitating speed after loading is complete.

When transporting concrete by truck mixers, delivery time shall be restricted to 1.50 hours from the time cement has entered the mixer to completion of discharge.

### **Transporting by Agitating.**

Transporting ready mix concrete by this method shall consist of truck chassis mounted with open top bodies. The metal body shall be smooth and streamlined for easy discharge. Discharge may be from the rear when the body is mechanically tilted. Body of the truck shall have a provision of discharge

gate. Mechanical vibrators shall be installed at the discharge gate for control of discharge flow. Agitators, if mounted, also aid in the discharging of concrete from the truck in addition to keeping the concrete alive.

Water shall not be added to concrete in transport through this system.

Bodies of trucks shall be provided with protective covers during period of inclement weather

Delivery period when adopting this system of transporting, concrete shall be restricted to 30 minutes from the moment all ingredients including cement and water enters in mixer to completion of discharge.

### **Transporting by buckets.**

This method of transportation is very common for transportation of centrally mixed concrete. Buckets of suitable capacities may be fitted with concrete which is totally mixed in central plant and hauled to the job site. Buckets then may be conveyed to the actual point of placement either with the help of crane / hoist or they may be carted.

As in the case of open truck transportation, water shall not be added to concrete transported in buckets. Concrete shall be protected from inclement weather by necessary covering arrangements. Also, maximum delivery period for this system of transportation from the time cement is introduced into the mixer to completion of discharge shall not exceed 30 minutes.

### **Cleaning**

Before loading concrete in either truck mixer open bodied trucks or buckets, the containers shall be thoroughly cleaned, washed and dried so that there is no water or moisture in the container, which may affect the designed water content of the concrete.

Other methods of transportation.

Transportation of concrete either by belt conveyors or by pumping is envisaged in this work. If, however, producer / manufacturer / purchaser or ready-mix concrete desires to use such methods of transportation, they may do so provided their Scheme and complete specifications are submitted to the Engineer-in-Charge for his record and approval.

### **Mode of measurement and payment:**

The rate shall be for a unit of one cubic metre.

### **Item No. 11**

**Providing and erecting C. I. and MS ventilating columns 15 cms. dia. with C.I. ornamental cap and Min 6.00 Mtr. Height (Height may be varying as per site) base fixed firmly with necessary foundation with one coat of red lead oxide paint and one coat of any approved colour with 15 cms, dia. 10 Mt. in length with 0.35mt\*0.35mt\* M100 Encasing, stoneware or R.C.C. pipe connection with M.H. including excavation and jointing as required etc. complete.**

**6m High**

GWSSB, relevant drawings and as per the instructions of Engineer in Charge. The work shall be carried out as per item description.

In a modern, well designed sewerage system, there is no need to provide ventilation on such elaborate scale considered necessary in the past, especially with the present day policy to omit intercepting traps in house connections.

The ventilating columns/shafts are not necessary where intercepting traps are not provided. It is necessary however, to make provision for the escape of air to take care of the exigencies of full flow and also to keep the sewage as fresh as possible especially in outfall sewers. In case of storm sewers providing ventilating manhole covers can do these.

Provision -Ventilating columns/ shafts shall be provided at an interval of 180m in all mains intercepting and outfall sewers, near the manholes.

The connections of house drains to the sewer shall be allowed without the use of any intercepting trap and thus permitting ventilation of laterals and branch sewers via. house drains and their ventilating pipes.

Construction-The ventilating shaft shall consist of vertical columns of R.C.C. or cast iron about 6 to 8 meter in height and about 100 to 150mm in diameter Page 159 (opening) at the top, the diameter increasing uniformly towards the bottom for stability.

The shaft shall be provided with a Crowell or fitted with a wire ground at the top