

# RAJKOT MUNICIPAL CORPORATION

e-TENDER No.: RMC/PWD/CZ/21-22/01



**CONSTRUCTION OF MINOR BRIDGE NEAR SHANTINAGAR-3 ON  
AIIMS hospital connecting 30.0 mt. D.P. Road in WARD NO.3**

**VOLUME – I: CONDITION OF CONTRACT AND TECHNICAL SPECIFICATION**



<b>Milestone Dates for e-tendering is as under</b>	
1. Downloading of e-Tender documents	01-06-2021 To 07-06-2021 upto 17.00 Hrs.
2. Online submission of e - Tender	07-06-2021 upto 18.00 Hrs.
3. Pre-Bid meeting	04-06-2021 at 17:00 Hours onwards
4. Submission of EMD, Tender fee and other required documents as per Financial, Experience etc. through Regd.A.D. / Speed Post.	08-06-2021 & 09-06-2021 upto 18.00 Hrs.
6. Agency to remain present in person along with original documents for verification	10-06-2021 between 16.00 to 17.00 Hours
7. Opening of online technical Bid	10-06-2021 at 17.00 Hours
8. Opening of online Price Bid	11-06-2021 at 17.00 Hours onwards (If Possible)
9. Bid Validity	120 Days

**JUNE -2021**

ADDI. CITY ENGINEER  
RAJKOT MUNICIPAL CORPORATION  
DR.AMBEKDAR BHAVAN, CENTRAL ZONE,  
DHEBARBHAI ROAD,  
RAJKOT - 360 001

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**RAJKOT MUNICIPAL CORPORATION****E-Tender Notice**

Rajkot Municipal Corporation, Bandhkam Branch, Dr. Ambedkar Bhavan, Dhebarbhai Road, Rajkot-360001 invites e-Tender with two bid system by e-tendering from the contractors registered in appropriate class for the following works:

Sr No	Name of work	a) Estimated cost b) Earnest Money c) e-Tender fee d) Time limit for completion of work
1	Construction of minor bridge near Shantinagar-3 on AIIMS hospital Connecting 30.0 mt. D.P. Road in ward 3. (Re-Tender)	a) Rs.4,65,00,000/- b) Rs.4,65,000/- c) Rs.7,500/- d) 6 Months

**Milestone Dates for e-tendering is as under**

1. Downloading of e-Tender documents	01-06-2021 To 07-06-2021 upto 17.00 Hrs.
2. Online submission of e - Tender	07-06-2021 upto 18.00 Hrs.
3. Pre-Bid meeting	04-06-2021 at 17:00 Hours onwards
4. Submission of EMD, Tender fee and other required documents as per Financial, Experience etc. through Regd.A.D. / Speed Post.	08-06-2021 & 09-06-2021 upto 18.00 Hrs.
6. Agency to remain present in person along with original documents for verification	10-06-2021 between 16.00 to 17.00 Hours
7. Opening of online technical Bid	10-06-2021 at 17.00 Hours
8. Opening of online Price Bid	11-06-2021 at 17.00 Hours onwards (If Possible)
9. Bid Validity	120 Days

- All bidders must submit Bid security (EMD) as above either directly deposited in ICICI Bank Account No.015305010638 (Rajkot Municipal Corporation) IFSC Code IC-IC0000153 or submit at the below mentioned address in form of Demand Draft in favour of "Rajkot Municipal Corporation", Rajkot, from any Nationalized Bank or Scheduled Bank (except Co-operative Bank) in India. The receipt of professional tax paid for current year, address proof, tender appendix details and ID proof shall have to be submitted along with physical submission of required documents shall have to be done at the below mentioned address:

Addi. City Engineer  
Rajkot Municipal Corporation  
Bandhkam Branch, Central zone,  
Dr. Ambedkar Bhavan,  
Dhebarbhai Road,

Rajkot-360001

2. The e-tender fee will be accepted in form of Demand Draft only in favor of "Rajkot Municipal Corporation" Rajkot, from any Nationalized Bank or Scheduled Bank (except Co-operative Bank) in India and must be delivered to above address.
3. The prequalification requirement is as under:
- i) Financial Criteria:
1. An average annual turnover of last seven years should not be less than 50% of the tender amount.
  2. Working capital should not be less than 25% of the estimated amount.
  3. Solvency should not be less than Rs75.00 lacs
  4. Class of Registration : A & Above. Special Category-II(bridge)  
Note: Enhancement factor at 10% per year for last seven years will be applicable to arrive average annual turnover and finalize the magnitude of work done in last seven years.

Sr. No.	Year	Enhance Factor
1	Year of inviting tender (e.g. 2021-22)	1.00
2	-1 (2020-21)	1.10
3	-2 (2019-20)	1.21
4	-3 (2018-19)	1.33
5	-4 (2017-18)	1.46
6	-5 (2016-17)	1.61
7	-6 (2015-16)	1.77
8	-7 (2014-15)	1.95

Available bid capacity – ABC must be more than the estimated tender amount ABC is to be calculated as: -  $ABC = 2 * A * N - B$

A = Maximum Value of works executed in any one year during the last seven years (updated to present price level by applying enhancement factor) taking into account the completed as well as works in progress.

N = no. of Years prescribed for completion of the works for which tender is invited

B = Value (\*Price level) of existing commitments and ongoing works to be completed during the next N Years (Period of completion of the works for which tender is invited)

ii) Experience Criteria:

The bidder should possess following minimum experience:

1. Bidder should have completed at least one work of similar nature 60% or two works of 40% or three works of 30% each of tender amount of either Government or Semi-Government as a main contractor in period of last seven years.

2. Since this bridge work is pile based construction activity .therefore those bidders who participate in bidding should have carried out pile based bridges
3. Bidder should have enough machinery and experienced personnel to supervise the work.
4. The contractor shall have to quote their rates including GST and other taxes and the Invoice with break-up of GST is to be submitted accordingly, failing which, such amount will be deducted from the bill of the agency and deposited accordingly. The contractor shall have to purchase the material required for this tender work, only from the supplier having registered GST Number. RMC will not be responsible to pay any amount towards GST if the material is purchased from the unregistered supplier / not having GST Number.
5. The tenders of those bidders who fail to submit the required documents physically within the prescribed date and time, will be treated as non-responsive and their Price Bid will not be opened.
6. Commissioner, Rajkot Municipal Corporation, Rajkot, reserves the right to accept / reject any or all e-tender(s) without assigning any reasons thereof.

**Commissioner  
Rajkot Municipal Corporation**

**RAJKOT MUNICIPAL CORPORATION****BID INFORMATION**

Municipal Commissioner, Rajkot Municipal Corporation, invites sealed tenders on Percentage rate basis from the experienced contractors for **CONSTRUCTION OF MINOR BRIDGE NEAR SHANTINAGAR-3 ON AIIMS HOSPITAL CONNECTING 30.0 MT. D.P. ROAD IN WARD NO.3**

1. Name of Work: **CONSTRUCTION OF MINOR BRIDGE NEAR . SHANTINAGAR-3 ON AIIMS HOSPITAL CON. NECTING 30.0 MT. D.P. ROAD IN WARD NO.3**
2. Estimated Amount put to tender **Rs.4,65,00,000.00**
3. Time Limit: 6 Months excluding monsoon period.
4. Eligibility Criteria: Registered in Class-"A" with special category-II in bridge works contractors registered in Other State Government/ Central Government in appropriate class and meeting the qualifying criteria as specified.
5. Tender Fee:  
(Non refundable) Rs. 7,500/- (only Demand Draft in favor of Rajkot Municipal Corporation, Rajkot) OR directly deposited in Account No. 015305010638 (Rajkot Municipal Corporation) IFSC Code ICIC0000153.
6. Bid Security: **1% of estimated cost** Rs. 4,65,000/- in form of DD in favor of Rajkot Municipal Corporation, Rajkot To be submitted of any Nationalized OR Scheduled Bank (Except Cooperative Bank) valid for 180 days OR directly deposited in Account No. 015305010638 (Rajkot Municipal Corporation) IFSC Code ICICI 0000153.

7. Downloading of e-tender documents:

Date From: 01/05/2021 To 10/05/2021 up to 17:00 Hrs

8. Submission of Bid Security and Tender Fees to be submitted in separate sealed cover on 11/05/2021 up to 18:00 Hrs. at Office of the City Engineer, Room No.6, Second floor, Dr.Ambedkar Bhavan, Central Zone, Rajkot Municipal Corporation, Dhebarbhai Road, Rajkot – 360001.Gujarat.

9. Pre bid meeting: Date 05/05/2021 Time: 16:00AM

**Venue:** Addi. City Engineer Office, Room No.06, Central Zone,  
Rajkot Municipal Corporation, Dr.Ambedkar Bhavan,  
Dhebarbhai Road, Rajkot.

10. Last date of Submissiononline submission of e-tender  
10/05/2021 upto 18:00 Hours only.

11. Time and Date of Opening of technical bid  
13/05/2021at 17:00 Hours onwards.

12. Time and Date of Opening Financial Bid-Opening of Qualified bidder's financial bid –  
To be intimated to technically qualified Bidders

13. Place of opening of technical bid &financial bid  
Address: The Addi. City Engineer Rajkot Municipal Corporation,  
Central Zone, Dr.Ambedkar Bhavan, Dhebarbhai Road,  
Rajkot – 360001. Gujarat.

14. Bid Validity Period: 120 days from date of submission of the bid.

15. Officer Inviting Bid: Municipal Commissioner,  
Rajkot Municipal Corporation

16. Web site: [www.nprocure.com](http://www.nprocure.com) and [www.rmc.gov.in](http://www.rmc.gov.in)

Conditional tenders will not be accepted. Rights to reject any or all the tenders without as-  
signing any reasons are hereby reserved.

**Municipal Commissioner**  
**Rajkot Municipal Corporation**  
**Rajkot**



**RAJKOT MUNICIPAL CORPORATION**  
**INFORMATION TO TENDERERS**

**Name of Work: CONSTRUCTION OF MINOR BRIDGE NEAR SHANTINAGAR-3 ON AIIMS HOSPITAL CONNECTING 30.0 MT. D.P. ROAD IN WARD NO.3**

Estimated Amount put to Tender: **Rs.4,65,00,000.00**

1. Bid Security: Rs.4,65,000/- to be submitted in form of DD in favor of Municipal Commissioner, Rajkot valid for (120 days) of any Nationalized OR Scheduled Bank (Except Co-operative Bank) OR directly deposited in Account No. 015305010638 (Rajkot Municipal Corporation) IFSC Code ICICI 0000153.
2. Defect Liability Period: 3 years after issue of completion certificate or otherwise stated in particular item.
3. Liquidated Damages : Delay : (0.10%) zero point one zero percentage of contract price for uncompleted work per day subject to a maximum up to ten percentage of contract price or as decided by Municipal Commissioner.
4. Workers Welfare cess: 1% workers welfare cess as per Act. 1996 (non-refundable) shall be deducted from each running bill.
5. The contractor shall have to quote their rates including GST and other taxes and the Invoice has to be submitted accordingly, failing which, such amount will be deducted from the bill of the agency and deposited accordingly.
6. Water, Electricity: Contractor shall have to make his own arrangements for water and electricity for the purpose of construction work at site at his own expense. During construction period temporary lighting arrangement for public facility shall be arranged by contractor at his own cost. RMC may give NOC where ever required for the same.
7. Tender which do not fulfill all or any of condition or are submitted incomplete in any respect or are conditional tenders, will be rejected. Municipal Commissioner reserves the rights to reduce / increase the scope of work and contract without assigning any reason thereof.

8. Maintenance will be valid for period as specified. The maintenance period will commence from the date of total completion of the work under this tender. For completion of works, contractor will be required to request in writing, to get completion certificate from Rajkot Municipal Corporation. Date of completion will be considered as the date mentioned in the completion certificate.
9. No price escalation and price variations will be paid/recovered for the works mentioned in the tender as the time limit is short.
10. No advance such as machinery advance or materials advance will be given.
11. Mobilization advance will not be given.
12. The bidder is advised to note that the levels & details of the bridge shown in tender drawings are correct but are subject to modification, to match the road profile and ground conditions. The changes resulting in to addition or reduction of quantity due to any reason and to any extent shall be binding and shall be executed by contractor without any contractual and financial implications. This shall be applicable over & above any other stipulation given in tender or specification of MORT&H and R & B or any other.
13. The bridge and related solid approaches are included in this tender. This work will be carried out by bridge contractor along with top road crust on structure and approaches. Necessary profile to be match by the road contractor under the guidance of competent authority. Suitable co-ordination of work shall be extended by both the parties as directed by engineer – in –charge of RMC.
14. Conditional tenders will not be accepted.
15. The sequence of operation shall be decided in consultation with the Engineer-in-charge. The contractor shall prepare the detail program of work in Bar Chart format and get approved from The Addi. City Engineer, RMC, Rajkot before actual commencement of work and strictly follow the same.

**Signature of Contractor:**

**Addi. City Engineer  
Rajkot Municipal Corporation  
Rajkot**

**Date:**

## **Rajkot Municipal Corporation**

### **CONSTRUCTION OF MINOR BRIDGE NEAR .SHANTINAGAR-3 ON AIIMS HOSPITAL CONNECT- ING 30.0 MT. D.P. ROAD IN WARD NO.3**

#### **DISCLAIMER**

1. The information contained in this bid document or subsequently provided to the bidders whether verbally or email or text message or any other electronic media or in documentary form by or on behalf of the Rajkot Municipal Corporation (here in after called as RMC) or any of their employees/ advisers/ consulting engineers is provided to the bidder (s) on the terms and conditions set out in this bid document and any other terms and conditions subject to which such information is provided.
2. This bid document and subsequent submissions of the bidders are not an agreement. These will subsequently form a part of agreement between the successful bidder and the Rajkot Municipal Corporation after modifications/ additions/ alterations as mutually agreed to.
3. This document does not purport to contain all the information the bidder may find necessary for the completion of works in a professional manner in accordance with good engineering practice. The bidder is required to check the accuracy, reliability and completeness of the information in this bidding document regarding the site, the movement of traffic, the accessibility, the working conditions, the climatic conditions, the availability of working and storage spaces etc. RMC, its employees/ advisers/ consulting engineers do not incur any liability under any law, rules or regulation as to the accuracy, reliability and completeness of the information in this bidding document.

**SECTION - I**

**INSTRUCTIONS TO BIDDERS**

## INSTRUCTIONS TO BIDDERS

### Table of Clauses

#### **A. General**

- 1.0 Scope of Bid
- 2.0 Source of Funds
- 3.0 Eligible Bidders
- 4.0 Technical Information of the Bidder
- 5.0 Bidding and Site Visit

#### **B. Bidding Documents**

- 6.0 Content of Bidding Documents
- 7.0 Clarification of Bidding Documents
- 8.0 Amendment of Bidding Documents

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- 9.0 Language of the Bid
- 10.0 Documents comprising the Bid
- 11.0 Bid Prices
- 12.0 Currencies of Bid and Payment
- 13.0 Bid Validity
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- 16.0 E-Tender
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- 21.0 Bid Opening
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- 23.0 Clarification of Financial Bids
- 24.0 Examination of Bids and Determination of Responsiveness
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- 27.0 Award Criteria
- 28.0 Employer's Right to accept any Bid and to reject any or all Bids
- 29.0 Notification of Award and Signing of Agreement
- 30.0 Performance Security
- 31.0 Dispute Review Expert /Arbitration
- 32.0 Corrupt or Fraudulent Practices

**A. GENERAL****1.0 Scope of Bid**

- 1.1** The Municipal Commissioner, Rajkot Municipal Corporation invites sealed bids for the construction of works (as defined in these documents and referred to as "the work") detailed in the table given in the Invitation for Bid (hereinafter called as IFB.) from competent bidders. The bidders may submit bids for the works detailed in the table given in IFB.
- 1.2** The successful bidder will be expected to complete the works by the intended completion period specified in the Contract data.
- 1.3** Throughout these bidding documents, the terms; 'bid' and 'tender' and their derivatives (bidder/ tenderer, bidding/tendering etc.) are synonymous.
- 1.4** Blank bidding documents consisting of all the data for e-tender are available from RMC **websites** : [www.rmc.nprocure.com](http://www.rmc.nprocure.com)
- 1.5** Bidders shall not have any dispute or claim for any kind of compensation,
- i) If the quantity stipulated in the tender items varies or the scope of work changes and thereby total amount of work increases / decreases up to any extent.
  - ii) If the works gets delayed / postponed for some administrative / technical decision whatsoever.
  - iii) If the items stipulated in the tender shall not be executed as per site condition/ requirements. No claim shall be entertained for the same.
  - iv) No idle charges shall be paid to contractor for machinery and man power if remains idle and no claim shall be entertained for the same.

**2. Source of Funds**

The expenditure on this project will be met with from the budget of RMC – SJMMSVY.

**3. Eligible Bidders**

For eligibility the bidder shall fulfill following criteria

- I. Single bidder/ Joint venture of two firms permitted for bidding.
- II. Contractor registered with Government of Gujarat in class 'A' category and special Category-II for bridges, contractors registered in Other State Government/ Central Government in appropriate class and meeting the qualifying criteria as specified.

III. In Joint Ventures both contractors must fulfill above criteria of class & Registration only.

**A. Financial Criteria:**

- (1) An average annual turnover of last seven financial years should not be less than 50% of estimated tender amount.
- (2) Working capital should not be less than 25% of the estimated tender amount.
- (3) Solvency must not be less than Rs. 75 Lacs
- (4) Available bid capacity- ABC must be more than the estimated tender amount

ABC is to be calculated as: -  $ABC = 2 * A * N - B$

A = Maximum Value of works executed in any one year during the last seven years (updated to present price level by applying enhancement factor) taking into account the completed as well as works in progress.

N = No. of Years prescribed for completion of the work for which tender is invited

B = Value (\*Price level) of existing commitments and ongoing works to be completed during the next N Years (Period of completion of the work for which the tender is invited).

**B. Experience Criteria:**

The bidder should possess following minimum experience.

- (1) Bidder should have completed at least one work of similar nature of 60% or two works of 40% or three works of 30% each of tender amount is completed in last seven years.

Similar nature work shall mean construction of River Bridge or Fly over bridge (FOB) or Railway over bridge (ROB) in city area only.

Additionally the agency should have carried out the followings:

- i. Pile foundation in rocky strata for any bridge work

- (1) Bidder should have enough machinery and experienced personnel to su-

perverse the work.

#### 4. Technical Information of the Bidder

- 4.1 The Bidder is required to demonstrate his capability to execute the job within the specified time frame and up to the required acceptable quality standards. The bidder is, hence requested to go through volume – II Qualification Document and furnish necessary data regarding plant and machinery, manpower experience and financial resources to demonstrate his suitability for successful implementation of the project. The bidders should, however, undertake their own studies and furnish with their Bid, a detailed construction planning and methodology supported with necessary drawings and calculations to allow the employer to review their proposals. The numbers, types and capacities of each plant/equipment shall be mentioned in the proposals along with the optimum cycle time for each operation for the given production capacity to match the requirements. The bidder shall ensure the availability of required key personnel for this project. Detailed bio data of Project Manager and Materials & Quality Control engineer shall be submitted as part of Technical Bid. The bidder, however, can make its own assessment and is free to propose his/her own site organization.
- 4.2 Even though the bidders meeting the qualifying criteria, they are subject to be disqualified if they have:- mentioned misleading or false representations in the forms, statements and attachments submitted in proof of the qualification requirements; and/or- record of poor performance such as abandoning the works, not properly completing the contract, substantial delays in completion, litigation history, or financial failures etc.; and/or
- Participated in previous bidding for the same work and have quoted unreasonably high Bid prices and could not furnish rational justification to the employer.
  - Colluded with other prospective bidders for this work to arrive at quoted prices for the purpose of restricting competition.
  - Indulged in inducement of any official of RMC and/or their consulting engineer and other advisors in any manner whatsoever.



- Not submitted a safety manual
- Not submitted a proposed site organization chart

**5. Bidding & Site Visit**

**5.1 Cost of Bidding**

The bidder shall bear all costs associated with the preparation and submission of this Bid, and the Employer will in no case be responsible and liable to bear costs.

**5.2 Site Visit:**

The Bidder, at the Bidder's own responsibility and risk is deemed to have inspected and examined the site and its surroundings thoroughly and obtain all information that may be necessary for preparing the Bid and entering into a contract for construction of the Works. The costs of visiting the Site shall be at the Bidder's own expense. If any person will be found misbehaving with RMC officials, then RMC can take necessary action.

Particular attention of bidders is invited to:

- The form and nature of work and subsurface conditions
- The climatic conditions
- The extent and nature of work and materials necessary for the execution and completion of the Works
- The means of access to the site
- All other information as to risks, contingencies and circumstances which may influence or affect bid. Bidders have to work out their own construction methods based on standard practice and codal stipulations and other relevant information about the site. Bidders shall not have any right to claim compensation against any dispute arising
  - (i) if the quantity stipulated in the tender items varies or the scope of work changes and thereby total amount of work increases / decreases up to any extent.
  - ii) If the works gets delayed / postponed for some administrative / technical decision whatsoever taken by RMC same shall be strictly follow by contractor.

**B. BIDDING DOCUMENTS****6 Content of Bidding Documents**

- 6.1 The set of bidding documents comprises the documents listed below and added issued in accordance with Clause 10:

**Volume No. I****Particulars Section I**

Invitation for Bids

Instructions to Bidders & Form of Bid I

General Conditions of Contract II

Contract Data III

Work Plan and Technical Specifications IV

Drawings V

II Documents to be furnished by bidder for Qualification

III Financial Bid (to be submitted online)

- 6.2 The bidder is expected to examine carefully all instructions, conditions of contract, contract data, forms, terms, technical specifications, Schedule B, forms, Annexures and drawings in the Bid Document. Failure to comply with the requirements of Bid Documents shall be at the bidder's own risk. Bids which are not substantially responsive to the requirements of the Bid Documents will be liable for rejection.

**7 Clarification of Bidding Documents**

- 7.1 A prospective bidder requiring any clarification of the bidding documents may notify the Employer in writing or by cable (hereinafter "cable" includes telex, facsimile) at the Employer's address indicated in the invitation to bid.
- 7.2 Pre-bid meeting
- 7.2.1 The bidder or his official representative is invited to attend a pre-bid meeting which will take place at the address, venue, time and date as indicated in this document face sheet.
- 7.2.2 The purpose of the meeting will be to clarify issues and to answer queries on any matter which may need clarifications.

- 7.2.3 The bidder is requested to submit his questions/queries in writing or by cable to reach the Employer not later than 24 hours before the meeting.
- 7.2.4 Minutes of the meeting, including the text of the questions that are raised during the meeting (without identifying the source of enquiry) will be issued to all bidders. Any modification of the bidding documents which may become necessary as a result of the pre-bid meeting shall be published by the employer exclusively either by issuance of an Addendum or through the minutes of the pre-bid meeting. The minutes of the Pre-bid meeting will be considered as a part of bid document.
- 7.2.5 Non-attendance at the pre-bid meeting will not be treated as a cause for disqualification of a bidder.

## **8 Amendment of Bidding Documents**

- 8.1 Before the deadline of submission of bids, the Employer may modify the bidding documents by issuing addenda.
- 8.2 Any addendum thus issued shall be part of the bidding documents and shall be placed on n-procure website [www.rmc.nprocure.com](http://www.rmc.nprocure.com) and intimated accordingly. The prospective bidder is requested to refer to website [www.rmc.nprocure.com](http://www.rmc.nprocure.com) to check any addendum. RMC will not publish any advertisement for the same.
- 8.3 To give prospective bidders reasonable time, to incorporate an addendum into account in preparing their bids, the Employer may extend, at his discretion, and as necessary the deadline for submission of bids, in accordance with Sub-Clause 19.1.

**C. PREPARATION OF BIDS****9 Language of the Bid**

All documents relating to the bid shall be in the English language.

**10 Documents comprising the Bid**

10.1 The bid to be submitted by the Bidder through e-tender as bid document (refer clause 8.2) shall be in three separate parts.

**Part I** Shall be named "**Technical Bid**" and shall comprise as below:

- (i) Tender fee as submitted with specified scanned copy of DD/Pay order shall be tender while original copy shall be submitted as mentioned in bid Information.
- (ii) Bid Security in the form specified in Clause 14.0
- (iii) Technical Information of the Bidder for Qualification (pursuant to Clause 4.0 and Volume – II)
- (iv) Undertaking that the bid shall remain valid for the period specified in Clause 13.1
- (v) Acceptance / non-acceptance of dispute review expert in clause 31.1
- (vi) Affidavit as per format provided in Annexure – I
- (vii) Forms of bid as specified in volume II
- (viii) Undertaking in form given in Annexure II of volume I

**Part II** shall be named **tender fee and bid security** and shall comprise as below and shall be submitted original to Office of the City Engineer, Room No.6, Second floor, Dr.Ambedkar Bhavan, Central Zone, Rajkot Municipal Corporation, Dhebarbhai Road, Rajkot – 360001.Gujarat.

- (i) Tender fee as specified in Bid Information
- (ii) Bid security in the form as specified in clause 14.0. Each part will be separately submitted as specified.
- (iii) Copy of documents to be attached must be self-attested or attested by gazet-teer officer.

**Part III** Shall be named "**Financial Bid**" and shall comprise as below:

Percentage rate tender specified in Volume - III

- 10.2 The successful bidder will be required to sign each page of these documents and submit them to the Employer. These signed documents along with the documents of accepted bid, shall form a part of the contract agreement between the Employer and the bidder.

## **11 Bid Prices**

- 11.1 The contract shall be for the whole works as described in various documents as listed in Sub-Clause 10.1 including the schedule B.
- 11.2 Percentage rate tender – The bidder has to quote only % (percentage) above or below the estimated cost Rs.4,65,00,000/- and payment will be made as per actual quantity executed and the rate mentioned in price bid with the % (percentage) above or below as the case may be.
- 11.3 All duties, taxes, and other levies payable by the contractor under the contract, or for any other cause shall be included in the rates, prices and total Bid Price submitted by the Bidder,
- 11.4 The rates and prices quoted by the bidder shall be fixed for the duration of the Contract or up to completion of the project and shall not be subject to adjustment on any account, except where expressly specified, otherwise, in the contract.

## **12 Currencies of Bid and Payment**

- 12.1 The unit rates and the prices shall be quoted by the bidder entirely in Indian rupees. All payments shall be made in Indian rupees.

## **13 Bid Validity**

- 13.1 Bids shall remain valid for a period not less than 120 days after the deadline date for tender specified. A bid valid for a shorter period shall be rejected by the Employer considering the bid as non-responsive.

13.2 In exceptional circumstances, prior to expiry of the original time limit, the Employer may request that the bidders may extend the period of validity for a specified additional period. The request and the bidders' responses shall be made in writing or by cable. A bidder may refuse the request without forfeiting his bid security. A bidder agreeing to the request will not be required or permitted to modify his bid, but will be required to extend the validity of his bid security for a period of the extension, and in compliance with Clause 14.0 in all respects.

#### **14 Bid Security**

14.1 The Bidder shall furnish, as part of his Bid, a Bid Security of the amount as shown in column 4 of the table of IFB for this particular work. This bid security in the form of DD payable at Rajkot of any nationalized bank (except cooperative bank) in favor of "Rajkot Municipal Corporation" OR directly deposited in Account No. 015305010638 (Rajkot Municipal Corporation) IFSC Code ICIC0000153.

14.2 Any bid not accompanied by an acceptable Bid Security and not secured as indicated in Sub-Clauses 13.1 and 13.2 above shall be rejected by the Employer as non-responsive.

14.3 The Bid security of unsuccessful bidders will be returned within 30 days of the award of the contract. The Bid security of successful bidder shall be returned after submitting Performance Security and entering into the agreement.

14.4 The Bid Security of the successful bidder will be reimbursed when the bidder assigned the Agreement and furnished the required Performance Security.

14.4.1 The Bid Security shall be forfeited

- a) If the Bidder withdraws the Bid after Bid opening during the period of Bid validity;
- b) If the Bidder does not accept the correction of the Bid Price, pursuant to Clause 25; or
- c) In the case of a successful Bidder, if the Bidder fails within the specified time limit to
  - (i) Sign the Agreement; or
  - (ii) Furnish the required Performance Security.

In such case, the bidder will be debar for any work in RMC for three years.

No interest shall be paid by the owner on any e-Tender guarantee/bid security.

**15 Format and Signing of Bid**

- 15.1 The Bidder shall prepare one original and one copy of the documents comprising the bid as described in Clause 10 of these Instructions to Bidders, bound with the volume-containing the 'Technical Bid; and 'Financial Bid' in separate parts and clearly marked "ORIGINAL" and "COPIES" as appropriate. In the event of discrepancy between them, the original shall prevail.
- 15.2 The original and copies of the Bid shall be typed or written in indelible ink and shall be signed by a person or persons duly authorized to sign on behalf of the Bidder. All pages of the Bid where entries or amendments have been made shall be initiated by the person or persons signing the bid.
- 15.3 The Bid shall contain no alterations or additions, except those to comply within instructions issued by the Employer, or as necessary to correct errors made by the bidder, in which case such corrections shall be initiated by the person or person assigning the bid.
- 15.4 Sufficiency of bid: The bidder shall be deemed to have satisfied himself as to the correctness and sufficiency of the bid and of the rates and prices stated in the schedule B, all of which shall, cover all his obligations under the contract and all matters and things necessary for the proper execution and completion of Works and the remedying of the defects therein.

**D. SUBMISSION OF BID.****16 E-Tender**

This e-tender shall be submitted in three parts as described in clause 10.0 as below:

**Part I** shall be named "**Technical Bid**" and shall be submitted online and same shall be submitted in 2 hard copies through RPAD or speed post only.

**Part II** shall be named **Tender Fee** and **Bid Security** and shall be submitted through RPAD or speed post only

**Part III** shall be named "**Financial Bid**" and shall be submitted through e-tender

**17 Sealing & Marking of Bids**

17.1 The bid shall be submitted online as describe in bid information.

Hard copies of documents (except financial bid which shall be submitted online only) like (1) Bid security & tender fee and (2) Volume-I, qualification documents, etc. shall be submitted in separate sealed envelopes duly marked as "**ORIGINAL**" and "**DUPLICATE**". These envelopes (called as inner envelopes) shall then be put inside one outer sealed envelope and will be submitted under formal forwarding letter address to the Employer inter alia containing an undertaking that the bid documents does not contain any amendment, modification or change of any type whatsoever in the bid documents and to any amendment issued.

17.2 The each envelope shall be addressed to Employer as mentioned in Bid Information bearing the following Identification.

- Bid for \_\_\_\_\_ (name of work)
- DO NOT OPEN BEFORE \_\_\_\_\_ ( time & date for bid opening)
- ORIGINAL / Duplicate
- Name and address of the Bidder.

17.3 If the outer envelopes are not sealed and marked as above, the Employer will assume no responsibility for the misplacement or premature opening of the Bid.



**18 Deadline for Submission of the Bids**

- 18.1 Completed Bids (including Technical and Financial) shall be submitted through e-tenderprocess as specified not later than the date indicated on the face sheet of the document. In the event of the specified date for the submission of bids falls on a holiday, the Bids will be accepted on the next working day by the specified time-schedule.
- 18.2 The Employer may extend the deadline for submission of bids by issuing an amendment in accordance with Clause 8, in which case all rights and obligations of the Employer and the bidders previously subject to the original deadline will then be incorporated with the new deadline.
- 18.3 All bidders are requested to see the website [www.rmc.nprocure.com](http://www.rmc.nprocure.com) for corrigendum & addendums, if any.

**19 Late Bids**

- 19.1 Any Bid received after the deadline prescribed in Clause 19 will be rejected.

**20 Modification and Withdrawal of Bids**

- 20.1 No modification or withdrawal is allowed.
- 20.2 No bid may be modified after the deadline for submission of Bids, except in pursuant to clause 8.
- 20.3 Withdrawal or modification of a Bid between the deadline for submission of bids and the expiration of the original period of bid validity specified in Clause 13.1 above or as extended pursuant to Clause 13.2 shall result in the forfeiture of the Bid security pursuant to Clause 14.

**E. BID OPENING AND EVALUATION****21 Bid Opening**

- 21.1 The Employer will open all the Bids received (except those received late), including modifications made pursuant to Clause 20, in the presence of the Bidders or their representative. In the event of the specified date of Bid opening being falls on a holiday, the Bids will be opened by the specified time and location on the next-working day.
- 21.2 The file Part-I containing "Technical Bid" shall be opened. The amount, form and validity of the bid security furnished with each bid will be announced. If the bid security furnished does not conform to the amount and validity period as specified in the Invitation for Bid (ref. Column 4 and paragraph 2), and has not been furnished in the specified form in Clause 14, the bid may be considered as non-responsive.
- (i) After receipt of confirmation of the bid security, the bidder will be asked for submission in writing (usually within 10 days of opening of the Technical Bid) to clarify technical bid, if necessary, with respect to any rectifiable mistakes which will also indicate the date, time and venue of opening of the Financial Bid.
  - (ii) The bidders will respond in not more than 7 days of issue of the clarification letter.
  - (iii) After receipt of these clarifications the list of responsive bidders whose financial bids are eligible for consideration will be finalized.
- 21.3 In no case the modification in financial bid will be allowed.
- 21.4 At the time of opening of "Financial Bid", the names of the bidders who were qualified to open financial bid & found responsive in accordance with Clause 20.3 will be announced (if withdrawal is not done). The financial bids of these bidders will be opened online. The responsive Bidders' names, the Bid prices, the total amount of each bid, any discounts, bid modifications and Withdrawals, and such other details as the Employer may consider appropriate, will be announced by the Employer at the opening. Any bid price or discount, which is not read out and recorded, will not be taken into account in Bid Evaluation.
- 21.5 The Employer shall prepare minutes of the Bid opening, including the information disclosed to those present in accordance with Sub-Clause 21.3.

**22 Process to be Confidential**

22.1 Information relating to the examination, clarification, evaluation, qualification 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 proces-suntil the award to the successful Bidder has been announced. Any effort by a Bid-der to influence the Employer's processing of Bids or award decisions may result in the solerejection of his Bid.

**23 Clarification of Financial Bids**

23.1 To assist in the examination, evaluation, and comparison of Bids, the Employer may, at this discretion, ask any Bidder for clarification of his Bid, including breakdowns of unitrates. The request for clarification and the response shall be in writing or fax or e-mail,but no change in the price or substance of the Bid shall be sought, offered, or-permitted except as required to confirm the correction of arithmetic errors discove-redby the Employer in the evaluation of the Bids in accordance with Clause 25.

23.2 Subject to sub-clause 23.1, no Bidder shall contact the Employer on any matterrelat-ing to his bid from the time of the bid opening to the time the contract isawarded. If the Bidder wishes to bring additional information to the notice of theEmployer, he should do so in writing.

23.3 Any effort by the Bidder to influence the Employer in the Employer's bid evaluation, bid comparison or contract award decisions may result in the sole rejection of the-Bidders' bid.

**24 Examination of Bids and Determination of Responsiveness**

24.1 During the detailed evaluation of 'Technical Bids', the Employer will determinew-hether each bid (a) meets the eligibility criteria defined in Clauses 3 and 4; (b) has-been properly signed; (c) is accompanied by required securities and; (d) issue sub-stantially responsive to the requirements of the 'Bidding Documents'. During thede-tailed evaluation of the "Financial Bid", the responsiveness of the bids will be further-determined with respect to the remaining bid conditions, i.e., priced schedule B,technical specifications, and drawings.

24.2 A substantially responsive "Financial Bid" is one which conforms to all the terms,conditions, and specifications of the Bidding documents, without material dev-

iation or reservation. A material deviation or reservation is one (a) which affects in any substantial way the scope, quality, or performance of the Works; (b) which limits in any substantial way, inconsistent with the Bidding documents, the Employer's rights or the Bidder's obligations under the Contract; or (c) whose rectification would affect unfairly the competitive position of other Bidders presenting substantially responsive Bids.

- 24.3 If a "Financial Bid" is not substantially responsive, it will be rejected by the Employer, and may not subsequently be made responsive by correction or withdrawal of the non-conforming deviation or reservation.

## 25 Correction of Errors

- 25.1 "Financial Bids" determined to be substantially responsive will be checked by the Employer for any arithmetic errors. Errors will be corrected by the Employer as follows:
- a. Where there is a discrepancy between the rates in figures and in words, the rate in words shall govern;
- 25.2 The amount stated in the "Financial Bid" will be corrected by the Employer in accordance with the above procedure and the bid amount adjusted with the concurrence of the Bidder in the following manner:
- a. If the Bid price increases as a result of these corrections, the amount as stated in the bid, before applying corrections, will be the 'bid price' and the increase will be treated as rebate;
  - b. If the bid price decreases as a result of the corrections, the decreased amount will be treated as the 'bid price'

## 26 Evaluation and Comparison of Bids

- 26.1 The Employer will evaluate and compare only the Bids determined to be substantially responsive in accordance with Sub-Clause 24.2.
- 26.2 In evaluating the Bids, the Employer will determine for each Bid the evaluated Bid-Price by adjusting the Bid Price as follows:
- a) Making any correction for errors pursuant to Clause 25; or

- b) Making an appropriate adjustments for any other acceptable variations, deviations; and
  - c) Making appropriate adjustments to reflect discounts or other price modifications offered in accordance with Clause 23.1.
- 26.3 The Employer reserves the right to accept or reject any variation or deviation and other factors, which are in excess of the requirements of the Bidding documents or otherwise result in unsolicited benefits for the Employer. However the same shall not be taken into account in Bid evaluation
- 26.4 If the Bid of the successful Bidder is substantially unbalanced in relation to the Consulting Engineers estimate of the cost of work to be performed under the contract, the Employer may require the Bidder to produce detailed price analysis for any or all items of the schedule B, to demonstrate the internal consistency of those prices with the construction methods and schedule proposed. After evaluation of the price analysis, the Employer may require that the amount of the performance security set forth in Clause 30 be increased at the expense of the successful Bidder to a level sufficient to protect the Employer against financial loss in the event of default of the successful Bidder under the Contract.
- 26.5 A bid which contains several items in the schedule B which are unrealistically priced on and which cannot be substantiated satisfactorily by the bidder may be rejected as 'non-responsive'.

**F. AWARD OF CONTRACT****27 Award Criteria**

27.1 Subject to Clause 29, the Employer will award the Contract to the Bidder whose Bid has been determined

- (i) To be substantially responsive to the Bidding documents and who has offered the lowest evaluated Bid Price; and
- (ii) To be within the available bid capacity (In case of multiple similar works) adjusted to account for his bid price which is evaluated the lowest in any of the packages opened earlier than the one under consideration.

In no case, the contract shall be awarded to any bidder whose available bid capacity (In case of multiple similar works) is less than the evaluated bid price, even if the said bid is the lowest evaluated bid. The contract will in such cases be awarded to the next lowest bidder at his evaluated bid price.

The same process will be continued in case the second lowest bidder fails to meet with the bid capacity criteria described above.

**28 Employer's Right to Accept any Bid and to Reject any or all Bids**

28.1 Notwithstanding Clause 27, the Employer reserves the right to accept or reject any Bid, and to cancel the Bidding process and reject all Bids, at any time prior to the award of Contract, without thereby incurring any liability to the affected Bidder or Bidders or any obligation to inform the affected Bidder or Bidders of the grounds for the Employer's action.

**29 Notification of Award and Signing of Agreement**

29.1 The Bidder whose Bid has been accepted will be notified for the award by the Employer prior to expiration of the Bid validity period by writing, facsimile or e-mail confirmed by registered letter. This letter (hereinafter and in the Conditions of Contract called the "Letter of Acceptance" as per format given in Annexure - II) will state the sum that 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 Contract called the "Contract Price").

- 29.2 The notification of award will constitute the formation of the Contract, subject only to the furnishing of a performance security in accordance with the provisions of Clause 30
- 29.3 The successful bidder is required to enter into the agreement and submit the Performance Security within 10 days from the issuance of Letter of Acceptance.
- 29.4 Upon entering into the agreement and furnishing by the successful Bidder of the Performance Security, the Employer will promptly notify the other Bidders that their Bids have been unsuccessful.

### **30 Performance Security**

- 30.1 Within 10 days of issuance of the Letter of Acceptance, the successful Bidder shall deposit to the Employer a Performance Security in of the forms given below for an amount equivalent to 5% of the Contract price (plus additional security for unbalanced Bids in accordance with Clause 26.4 of Information to Bidders as decided by the Employer if necessary). Bank Guarantee as indicated in Appendix.
- 30.2 The performance security provided by the successful Bidder, in the form of a Bank Guarantee, should be issued by a nationalized / scheduled bank (Except Co-Operative Bank) only.
- 30.3 Failure of the successful Bidder to comply with the requirements of Sub-Clause 30.0 shall constitute sufficient grounds for cancellation of the award and forfeiture of Security.
- 30.4 The Performance Security shall remain in force until the issuance of the Defects Liability Certificate and the security shall be returned to the Contractor within 28 days of the issuance of the completion of Defects Liability Certificate and after engineer has certified that all defects notified by engineer to the contractor before the end of this period have been corrected.
- 30.5 Prior to making a claim under the performance security the Employer shall, in every case, notify the Contractor stating the nature of default in respect of which the claim is to be made.

**31 Dispute**

31.1 In case of all the disputes, decision of the Municipal Commissioner shall be final and-binding to the bidder.

**32 Corrupt or Fraudulent Practices**

32.1 The Employer will reject a proposal for award if it determines that the Bidderrecommended for award has engaged in corrupt or fraudulent practices incompeting for the contract in question and will declare the firm ineligible, either indefinitely or for a stated period of time.

32.2 Furthermore, Bidders shall be aware of the provision stated in Sub-Clause 23.3



Annexure - I

**AFFIDAVIT (to be checked)**

- a. I, the undersigned, do hereby certify that all the statements made in the required attachments are true and correct.
- b. The undersigned also hereby certifies that neither our firm M/s \_\_\_\_\_ have abandoned any work \_\_\_\_\_ in India nor any contract awarded to us for such works have been rescinded, during last seven years prior to the date of this bid.
- c. The undersigned hereby authorize(s) and request(s) any bank, person, firm or corporation to furnish pertinent information deemed necessary and requested by the Department to verify this statement or regarding my (our) competence and general reputation.
- d. The undersigned understand and agrees that further qualifying information may be requested, and agrees to furnish any such information at the request of the Department / Project implementing agency.

\_\_\_\_\_  
(Signed by an Authorized Officer of the Firm)

\_\_\_\_\_  
Title of Officer

\_\_\_\_\_  
Name of Firm

\_\_\_\_\_  
Date

**Letter of Acceptance**

(Letterhead paper of the Employer)

\_\_\_\_\_ [date]

To: \_\_\_\_\_

[Name and address of the Contractor]

Dear Sirs,

This is to notify you that your Bid dated \_\_\_\_\_ for execution of the \_\_\_\_\_ [name of the

contract and identification number, as given in the Instructions to Bidders] for the Contract

Price of Rupees \_\_\_\_\_

(\_\_\_\_\_) [Amount in words and figures], as corrected and modified in accordance with the Instructions to Bidders/ as negotiated is hereby accepted by the Authority's

We note that as per bid, you do not intend to subcontract any component of work.

You are hereby requested to furnish Performance Security, plus additional security for unbalanced Bids in terms of ITB Clause 26.4, in the form detailed in Para 30.1 of ITB for amount of Rs. \_\_\_\_\_ within 10 days of the receipt of Notice of Award valid up to 28 days from the date of expiry of Defects Liability Period i.e. up to \_\_\_\_\_ and sign the contract, failing which action as stated in Para 30.3 of ITB will be taken.

We have reviewed the construction methodology submitted by you along with the bid in response to ITB Clause 5.2 and our comments are given in the attachment. You are requested to submit a revised Program including environmental management within 14 days of receipt of this letter.

Yours faithfully,

Authorized Signatory

Name and Title of Signatory

Name of Age

**Agreement Form****Agreement**

This agreement, made the \_\_\_\_\_ day of \_\_\_\_\_ 2021, between \_\_\_\_\_ [name and address of Employer] (hereinafter called "the Employer") of the one part and

\_\_\_\_\_ [name and address of Contractor] (hereinafter called "the Contractor" of the other part).

Whereas the Employer is desirous that the Contractor execute \_\_\_\_\_ [name and identification number of Contract] (hereinafter called "the Works") and the Employer has accepted the Bid by the Contractor for the execution and completion of such Works and the remedying of any defects therein, at a contract price of Rs. \_\_\_\_\_.

NOW THIS AGREEMENT WITNESSED as follows:

- 1) In this Agreement, words and expression shall have the same meanings as are respectively assigned to them in the Conditions of Contract hereinafter referred to, and they shall be deemed to form and be read and construed as part of this Agreement.
- 2) In consideration of the payments to be made by the Employer to the Contractor as hereinafter mentioned, the Contractor hereby covenants with the Employer to execute and complete the Works and remedy any defects therein in conformity in all aspects with the provisions of the Contract.
- 3) The Employer hereby covenants to pay the Contractor in consideration of the execution and completion of the Works and the remedying the defects wherein the Contract Price or such other sum as may become payable under the provisions of the Contract at the times and in the manner prescribed by the Contract.

- 4) The following documents shall be deemed to form and be read and construed as part of this Agreement, viz.:
- I. Letter of Acceptance;
  - II. Notice to proceed with the works;
  - III. Contractor's Bid after amendments, addenda and corrections as mutually agreed with the Employer;
  - IV. The notice inviting bids,
  - V. The information to bidders,
  - VI. Minutes of Pre-bid meeting
  - VII. Contract Data;
  - VIII. General Conditions of contract;
  - IX. Technical Specifications;
  - X. Drawings;
  - XI. Schedule B;
  - XII. Any other document listed in the Contract Data as forming part of the contract;

In witness whereof the parties thereto have caused this Agreement to be executed the day and year first before written.

The Common Seal of (CONTRACTOR) \_\_\_\_\_ was hereunto affixed in the presence of:

Signed, Sealed and Delivered by the said EMPLOYER \_\_\_\_\_  
\_\_\_\_\_ in the presence of:

Binding Signature of Contractor \_\_\_\_\_

Dy. Executive Engineer  
Rajkot Municipal Corporation

Addi. City Engineer  
Rajkot Municipal Corporation

Signed and sealed In the presence

Corporator  
Rajkot Municipal Corporation

Corporator  
Rajkot Municipal Corporation

**Annexure - IV**

**Issue of Notice to Proceed with the Work**

(Letterhead of the Employer)

\_\_\_\_\_ [date]

To:

\_\_\_\_\_ [name and address of the Contractor]

\_\_\_\_\_

\_\_\_\_\_

Dear Sirs,

Pursuant to your furnishing the performance security as stipulated in Information to bidders (ITB) clause 30.1 and signing of the contract agreement for the construction of \_\_\_\_\_ at the accepted Bid Price of Rs. \_\_\_\_\_ ( In words ), you are hereby instructed to proceed with the execution of the said works in accordance with the contract documents.

Yours faithfully,

(Signature, name and title of signatory  
Authorized to sign on behalf of Employer)

## Annexure - V

**BANK GUARANTEE FOR PERFORMANCE SECURITY**

To: \_\_\_\_\_ [name of Employer]  
 \_\_\_\_\_ [address of Employer]

WHEREAS \_\_\_\_\_ [name and address of Contractor] (here-in after called "the Contractor") has undertaken, in pursuance of Contract No. \_\_\_\_\_ dated \_\_\_\_\_ to execute \_\_\_\_\_ [name of Contract and brief description of Works] (hereinafter called "the Contract");

AND WHEREAS it has been stipulated by you in the said Contract that the Contractor shall furnish you with a Bank Guarantee by a recognized bank for the sum specified therein as security for compliance with his obligations in accordance with the Contract; AND WHEREAS we have agreed to give the Contractor such a Bank Guarantee; NOW THEREFORE we hereby affirm that we are the Guarantor and responsible to you, on behalf of the Contractor, up to a total of \_\_\_\_\_ [Amount of Guarantee] \_\_\_\_\_ [in words], such sum being payable in the types and proportions of currencies in which the Contract Price is payable, and we undertake to pay you, upon your first written demand and without cavil or argument, any sum or sums within the limits of \_\_\_\_\_ [amount of Guarantee] as afore-said without your needing to prove or to show grounds or reasons for your demand for the sum specified therein.

We hereby waive the necessity of your demanding the said debt from the Contractor before presenting us with the demand. We further agree that no change or addition to or other modification of the terms of the Contract or of the Works to be performed thereunder or of any of the Contract documents which may be made between you and the Contractor

shall in any way release us from any liability under this guarantee, and we hereby waive notice of any such change, addition or modification

This guarantee shall be valid until the date of issue of the Defects Liability Certificate.

SIGNATURE AND SEAL OF THE GUARANTOR \_\_\_\_\_

Name of Bank \_\_\_\_\_

Address \_\_\_\_\_

Date \_\_\_\_\_

**SECTION-II**

**GENERAL CONDITIONS OF CON-  
TRACT**



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## A. GENERAL

### 1.0 Definitions

1.1 In the contract (as here in after defined) the following words and expressions shall have the meaning hereby assigned to them, except where the context otherwise requires.

1.2 Terms which are defined in the Contract Data are not also defined in the Conditions of Contract but keep their defined meanings. Capital initials are used to identify defined terms.

**"Commencement Date"** means the date on which the Contractor receives from the Engineer the notice to commence works.

**"Time for completion"** means the time for completing the execution of the works and passing the tests on completion of the works calculated from the commencement date.

**"Taking over certificate"** means a certificate issued pursuant to clause 54 of these Conditions of Contract.

**"Contract"** means the contract agreement between the Employer and the Contractor to execute, complete and maintain the Works as described.

**"Specifications"** means the specification of the works included in Contract and/or modifications/alterations made thereto by Contractor and approved by the Engineer. **"Drawings"** means all drawings, calculations and technical information of a like nature provided by the Engineer to the Contractor.

**"Contract Data"** means the documents and other information which comprise the Contract.

**"Contractor"** means a person / corporate body / registered company / consortium of companies whose Bid to carry out the Works has been accepted by the Employer and the legal successors in title to such person / corporate body / registered company / consortium of companies.

**"Subcontractor"** means any person/corporate body/ registered company/ a consortium of companies to whom a part of the works have been subcontracted with the consent of the Engineer.

**"Contractor's Bid"** means the priced offer to the Employer for the execution of the works and remedying defects there in accordance with various terms and conditions set out in the Contract as accepted by " Letter of Acceptance."

**Contract Price** means the price stated in the Letter of Acceptance and thereafter as adjusted in accordance with the provisions of the Contract.

**Retention money** means the aggregate of all monies retained by Employer pursuant to clause 51 of these Conditions of Contract.

**Interim payment certificate** means any payment certificate issued by the Engineer other than the final payment certificate.

**Final payment certificate** means the certificate of payment issued by the Engineer pursuant to clause 46.1 g of these Conditions of Contract. **Days** mean calendar days; **months** mean calendar months.

**Defect** means any part of the Works not completed in accordance with the Contract.

**Owner** means the Rajkot Municipal Corporation and is the party who has ownership of the project.

**Employer / Client** means The Rajkot Municipal Corporation (RMC) / Municipal Commissioner and is the party who will employ the Contractor to carry out the Works.

**Engineer** means the person appointed by the Employer as named in the Contract Data or as informed to the contractor in writing for the purposes of the contract. The Contractor is obliged to accept the Engineer appointed by the Employer.

**Engineer's representative/ Consultant / Consulting Engineer** means the person / organization appointed by the Employer for carrying out such duties and exercising such authority as delegated to him from time to time by the Engineer with written intimation to the Employer and the Contractor.

**Third Party Inspection Agency (TPI)** means the Agency, having represented to the client that they have the required professional skills and personal and technical resources, have agreed to provide for services on the terms and conditions set forth in RMC's Standing Committee resolution no. 370 date 21-10-2011.

**Equipment** means the Contractor's machinery and vehicles brought temporarily to the Site to construct the Works.

**Completion date** means the date arrived at by counting the Contract period (inclusive of any time extensions granted by the Engineer from time to time) after the commencement date.

**“Plant”** means any integral part of the Works, which is to have civil, mechanical, electrical, electronic or chemical or biological function.

**“Site”** means the places provided by the Employer where the works are to be executed and any other places as may be specifically designated in the contract as forming part of the site.

**“Specification”** means the Specification of the Works included in the Contract and any modification or addition made or approved by the Engineer.

**“Works”** means permanent works and/or temporary works.

**“Permanent works”** means the permanent works to be executed in accordance with the Contract.

**“Temporary Works”** are works of every kind in or about the permanent works designed, constructed, installed, and removed by the Contractor, which are needed for construction or installation of the Works.

**“Cost”** means all expenditure on or off site properly accounted and incurred or to be incurred including all overheads.

**“Writing”** means all handwritten or typewritten or printed communication including cable, facsimile or email communication.

- 1.3 Wherever in the contract provision is made for the giving of notice, consent, approval, certificate or determination by any person such notice consent, approval, certificate or determination by any person shall be given in writing unless otherwise specified in the contract. Any such consent, approval, certificate or determination shall not be unreasonably delayed or withheld.

## **2.0 Interpretation**

- 2.1 In interpreting these Conditions of Contract, singular also means plural, male also means female or neuter, and the other way around. Headings and marginal notes have no significance. Words have their normal meaning under the language of the Contract unless specifically defined. All the notices, consents, approvals, certificates, decisions, determinations to be given under this contract by all the concerned parties (Employer, Consulting Engineer and Contractor) shall be given in writing only.
- 2.2 If sectional completion is specified in the Contract Data, The completion date for each section of work is arrived at by counting the period of completion assigned

for that section of work from the date of commencement assigned to that section of the work.

2.3 The several documents forming the Contract are to be taken as mutually explanatory to one another, but in case of ambiguities and/or discrepancies the same shall be explained and adjusted by the Engineer who shall there upon issue to the contractor instructions thereon and in such event unless otherwise provided in the contract, the priority of the documents forming the Contract shall be as follows:

- (1) The notice inviting bids,
- (2) The Contract Agreement,
- (3) The instructions to Bidders
- (4) The Letter of Acceptance and notice to proceed with the works
- (5) The accepted Contractor's Bid
- (6) The Contract Data
- (7) The General Conditions of Contract
- (8) The Technical Specifications
- (9) The Drawings
- (10) Any other document listed in the Contract Data as forming part of the Contract.

### **3.0 Language and Law**

The language of the Contract shall be English and the law governing the Contract shall be the Law as prevailing in India.

### **4.0 Engineer's Decisions**

4.1 Except where otherwise specifically stated, the Engineer will decide contractual matters between the Employer and the Contractor as specified in the contract.

4.2 Except as expressly stated in the contract, the Engineer shall have no authority to relieve the contractor of any of his obligations under the contract.

4.3 Engineer shall act impartially while dealing with the contractual matters arising between the Contractor and the Employer while

- Giving decisions, opinion or consent,
- Expressing his satisfaction or approval,
- Determining value, or
- Otherwise taking decisions which may affect the rights and obligations of the Employer or the Contractor

4.4 The Engineer shall obtain specific approval from the Employer before carrying out his duties in accordance with following clauses and any other sub clauses that will have cost or time implications on the Contract:

5.0	Delegation,
7.0	Subcontracting
17.5, 17.6	Suspension of work
21.0	Possession of site
32.0	Extension of completion date
44.0	Valuation of variations
50.0	price variation
52.0	Liquidated damages
56.0	Taking over
57.0	Claims
59.0	Termination
61.0	Default of Contractor

#### **5.0 Delegation**

- 5.1 **Engineers Representative** (Team Leader in this case) shall be appointed by the Employer and shall carry out such duties and exercise such authority as may be delegated to him by the Employer under sub clause 5.2 from time to time.
- 5.2 The Engineer may delegate in writing any of his duties and responsibilities to other persons appointed by the Engineer to carry out the duties assigned to him under the contract (except to the Dispute Review Expert ) after notifying the Contractor in writing ) and may cancel any delegation in writing after notifying the Contractor.

#### **6.0 Communications**

- 6.1 A notice shall be effective only when it is delivered (in terms of Indian Contract Act).
- 6.2 All communications from Engineers Representative shall have the same effect although given by the Engineer. The Engineer shall however retain the authority to disapprove any work, materials or Plant in the event of the Engineers Repre-

sentative failing to do so or revoke the decisions/instructions issued by the Engineers Representative.

- 6.3 All certificates, notices or instructions to be given to the Contractor by the Employer or the Engineer under the terms of Contract shall be sent by post, cable, fax, e-mail to or placed at the Contractors principal place of business or such other address as the Contractor shall nominate for that purpose.
- 6.4 Any notice to be given to Employer or to the Engineer under the terms of the Contract shall be sent by post, cable, fax or e mail to or left at the respective addresses nominated for that purpose given in contract data.
- 6.5 Change of address shall be informed to respective parties well in advance.

### **7.0 Subcontracting**

- 7.1 The Contractor shall not, without the prior consent of the Employer assign the contractor any part thereof. The contractor shall not subcontract the whole of the works. Part of the works may be subcontracted after obtaining Engineers prior consent. Any such consent shall not relieve the Contractor from any liability or obligation under the contract. The contractor shall remain responsible for all the acts, defaults and/or neglect of the contractual requirements and obligations by any Subcontractor.

### **8.0 Other Contractors**

- 8.1 The Contractor shall cooperate and share the Site with other contractors, public authorities, utilities, and the Employer as and when required without prejudice to any of his contractual obligations. The Contractor shall as referred to in the Contract Data, also provide facilities and services for them as described in the Schedule. The employer may modify the schedule of other contractors and shall notify the contractor of any such modification.

### **9.0 Personnel**

- 9.1 The Contractor shall employ the key personnel named in the Schedule of Key Personnel as referred to in the Bid document to carry out the functions stated in the Schedule or other personnel approved by the Engineer. The Engineer will approve any proposed replacement of key personnel only if their qualifications, ab-



ilities, and relevant experience are substantially equal to or better than those of the personnel listed in the Schedule.

- 9.2 If the Engineer asks the Contractor to remove a person, for his misconduct or inadequacy of technical skills and experience, who is a member of the Contractor's staff or his work force, the Contractor shall ensure that the person leaves the Site within seven days and has no further connection with the work in the Contract.
- 9.3 No residential accommodation is allowed at the site of work. The labour huts shall not be erected on the site of work and contractor shall make his own arrangements to provide such accommodations as per the rules of the local bodies. He shall make his own arrangements for housing, stores, field office etc. He shall submit a site layout plan indicating the location of various site facilities to be created by him at his cost for the execution of work. The Owner shall in no way be responsible for any delay on this account and no claim on this account whatsoever shall be entertained.
- 9.4 A Project Manager who is a graduate civil engineer having a minimum twenty years of experience in similar nature work i.e. construction of RCC girder bridge, Steel girder with RCC deck slab type superstructure, pile foundation in rocky strata etc. shall be the responsible authorized representative of contractor at site. The Project Manager shall always be available at the site during the actual execution of the work. This is in addition to the number of graduate engineers (of civil and other disciplines as required) who shall be appointed by contractor to execute all items of work.

## **10.0 Employer's and Contractor's Risks**

- 10.1 The Employer carries the risks which this Contract states are Employer's risks, and the Contractor carries the risks which this Contract states are Contractor's risks.

## **11.0 Employer's Risks**

- 11.1 The Employer is responsible for the excepted risks which are (a) in so far as they directly affect the execution of the Works, the risks of war, hostilities, invasion, act of foreign enemies, rebellion, revolution, insurrection or military or usurped power, civil war, or riot, commotion, disorder (unless restricted to the Contractor's em-

ployees), natural disaster and contamination from any nuclear fuel or nuclear waste or radioactive toxic explosive. Contractor will execute rectification of damaged portions of work due to such risks and Employer shall suitably compensate for works in accordance with the terms and conditions of the contract.

## **12.0 Contractor's Risks**

- 12.1 All risks of loss or damage to physical property and of personal injury, death which arise during and in consequence of the performance of the Contract, are the responsibility of the Contractor. Contractor shall rectify damages to works, loss of materials, property, plant and machinery, life etc. at his own costs
- 12.2 The contractor shall assume all liability, financial or otherwise in connection with his contract and shall protect and indemnify the Employer from any and all damages and claims that may arise on any account. The contractor shall indemnify the owner against all claims in respect of patent rights, royalties, damages to adjacent buildings, roads or members of public in course of execution of work or any other reason whatsoever and shall himself defend all actions arising from such claims and shall keep the Owner saved harmless and indemnified in all respect from such actions, costs and expenses. The contractor shall be liable for any loss or damage to the Works occasioned by him in the course of operations carried out by him. All such damage (except that arising out of excepted risks defined in clause 11.1 above) to works will be rectified by contractor at his own cost.

## **13.0 Insurance**

- 13.1 The Contractor shall provide, in the joint names of the Employer and the Contractor, insurance cover from the Commencement Date to the end of the Defects Liability Period, in the amounts and deductibles as stated below and the contract data, for the following.
- (a) Loss of or damage to the Works, Plant and Materials. (Minimum full replacement costs and additional 15% costs);
  - (b) Loss of or damage to Contractors Equipment and other things at site (minimum full replacement costs);

- (c) Loss of or damage of property and personnel (other than the Works, Plant, Materials and Equipment in connection with the Contract); i.e. Third Party Insurance; and
- (d) Personal injury or death. (i.e. Workmen compensation policy)
- 13.2 Policies and certificates for insurance shall be delivered by the Contractor to the Engineer for the Engineer's approval before the Commencement Date. All such insurance policies shall provide for compensation to be payable in the types and proportions of currencies required to rectify the loss or damage incurred.
- 13.3 No work (Temporary or Permanent) shall be permitted at site in absence of proper insurance policies and up to date payment of premium.
- 13.4 The responsibility of any amounts not insured or not recovered from the insurer shall be borne by the Employer or the Contractor in accordance with their responsibilities as defined in these clauses.
- 13.5 The Employer shall indemnify the Contractor against all proceedings, claims, damages, costs, charges, expenses in respect of the matters for which the Employer is responsible.
- 13.6 The insurance policy shall include a cross liability clause such that the insurance shall apply to the Contractor and the Employer as separate insured.
- 13.7 The minimum amount of insurance shall be as specified in these clauses and the Contract data. In the event of mismatch insurance shall be for higher amount.
- 13.8 The Contractor shall keep notified the insurer of changes in the nature, extent or
- 13.9 Programme for the execution of the works and ensure the adequacy of the insurances at all the times in accordance with the terms of the contract.

#### **14. Site Investigation Reports**

- 14.1 The bidder is advised to inspect and examine the site and its surroundings and satisfy himself with the nature and extent of site and work, the hydrological and climatic conditions the means of access to the site, the constraints of space for stacking material/machinery, labour etc. he requires, if any, weather conditions at site, general ground/subsoil conditions etc. or any other circumstances which may affect or influence their bid. No claim, whatsoever, shall be entertained from the bidder, on the plea that the information supplied by the Owner is insufficient or is at variance to the actual site conditions.

**15. Queries about the Contract Data and Contract agreement**

- 15.1 The Employer / Engineer will clarify queries on the Contract Data. These clarifications shall form a part of the Contract and shall be binding on both the Employer and the Contractor.
- 15.2 The Contractor shall enter into and execute the contract agreement to be prepared at the cost of the Employer in the form given in the instructions to bidders.

**16. Contractor to Construct the Works**

- 16.1 The Contractor shall with due care and diligence design (to the extent as provided for in the contract), execute and complete the works and remedy the defects if any in accordance with the provisions of the contract.
- 16.2 Contractor shall provide all superintendence, labour, materials, plant, contractor's equipment and all other things as may be required to design, execute, complete and maintain during defects liability period the works. (Refer clause 16.1 above).
- 16.3 Any defect, error, omission, fault shall be immediately brought to the notice of the Engineer before or during the execution of the works.
- 16.4 The Contractor shall take full responsibility for the adequacy, stability, safety of all site operations and methods of construction. Contractor shall not be responsible for the design and specifications of the Permanent works not designed by him.
- 16.5 The Contractor shall be responsible for:
- The accurate setting out of the Works in relation to original lines, levels and points of reference given by the Engineer in writing.
  - The correctness of all positions, levels, dimensions and alignment of all parts of the Works, and
  - The provision of all necessary instruments, appliances and labour in connection with the foregoing responsibilities.
  - Contractor shall rectify all errors during execution of works at his cost except for the errors that occur due to supply of incorrect drawings or instructions by the Engineer.
- 16.6 The checking and approval by the Engineer of any alignments, levels and setting out shall not relieve the Contractor of his responsibility for accuracy thereof.

16.7 The Contractor shall provide a well equipped site office for the Engineer and his staff for the complete duration of the contract including defects liability period. Following facilities are to be provided.

- Office area of 100 sq.m.
- Well ventilated sitting area with fans and with 1 A. C. Cabins of 10 sq. m. each and conference cum meeting room with conference table, revolving chairs of Godrej or equivalent make and appropriate size of display board.
- Tables, chairs and cupboards of Godrej or equivalent make of appropriate size suitable for offices.
- Two latest computer of H.P. make with 17" monitor, 80 GB HDD, DVD combo drive, and latest necessary software, H.P. Laser jet Printer and internet facility.
- Drinking water facility
- Toilets

**17. The Works to Be Completed by the Completion Date**

17.1 The Contractor may commence execution of the Works on the Commencement Date and shall carry out the Works in accordance with the programme submitted by the Contractor, as updated with the approval of the engineer, and complete them by the completion date.

17.2 The Employer shall in no way be responsible for either any delay in getting electric and/or water and/or telephone connections for carrying out the work or not getting connection at all and no claim whatsoever on this account shall be entertained from the contractor. Also contingency arrangement of standby water & electric supply shall be made by the contractor for smooth progress of the work on account of power failure or disconnection for any reason whatsoever it may be. No claim of any kind whatsoever shall be entertained on this account from the contractor. Nothing extra shall be payable on this account.

17.3 The Contractor shall provide necessary superintendence matching with working hours.

17.4 The Contractor shall afford every facility for and every assistance in obtaining the right to access for the Engineer or any of his representative at all reasonable times to the site and to all workshops, places where materials or plant are being manufactured, fabricated or prepared. If materials, plant or parts of works are

manufactured, fabricated or prepared in places not belonging to the contractor, the contractor shall organize necessary permissions from the owners of such facilities for the engineer to inspect such materials or plant.

17.5 **Suspension of work:** The Contractor shall, on the instructions of the Engineer, suspend the progress of the works or part thereof for such time and in such manner as the Engineer may consider necessary and shall, during such suspension, properly protect and secure the works or any part thereof so far as is necessary in the opinion of the Engineer. Unless such suspension is:

- i. otherwise provided in the contract,
- ii. Necessary by reason of some default or breach of contract by the contractor or for which he is responsible,
- iii. Necessary by reason of climatic conditions on site or
- iv. Necessary for the proper execution of the work or for safety of the works or any part thereof, following sub clause shall apply.

17.6 Effect of suspension.

With reference to clause 17.5 the Engineer shall after due consultations with the Employer and the Contractor determine

- a. The time effect of such suspension on the contract period and
- b. The cost effect of such suspension on the contract price and shall notify the Contractor with a copy to the Employer.

## 18. Approval by the Engineer

18.1 The Contractor shall submit specifications and drawings showing the proposed temporary work to the engineer, who shall approve them if they comply with the Specifications and Drawings.

18.2 The Contractor shall be responsible for design of temporary Works.

18.3 The Engineer's approval shall not alter the Contractor's responsibility for design of the temporary Works.

18.4 All Drawings prepared by the contractor for the execution of the temporary or permanent Works, are subject to prior approval by the Engineer before their use.

## 19. Safety

- 19.1 The Contractor shall have full regard throughout execution, completion and defects liability period to following safety aspects and shall take all necessary steps to ensure that danger to safety is avoided all the time in respect of
- a. Safety of the works
  - b. Safety of the Contractors employees and all the persons directly or indirectly engaged by him for the works
  - c. Safety of all the employees including persons working on other contracts of Employer at the same site of the Employer and Engineers employees engaged at work site.
  - d. Any authorized third party persons on the site.
  - e. Contractors plant and equipment
- 19.2 Contractor shall provide and maintain at his costs all lights, guards, fencing, warning signs, watching when and where necessary or required by Engineer or by any duly constituted authority for the protection of the works or for the safety and convenience of the public or others.
- 19.3 Contractor shall take all reasonable steps to protect the environment on and off the site and avoid damage or nuisance to persons or property of the public and others arising as a consequence of his method of operation.
- 19.4 The contractor shall maintain in good condition all work throughout execution, completion and defects liability period. The contractor shall be responsible for and to make good all injuries, damages and repairs, rendered necessary by fire, rain, traffic, floods or other causes.
- 19.5 All the scaffolding work, wherever required for the execution of work, shall be provided by the contractor. Nothing extra shall be payable on this account. It shall be provided strictly with double scaffolding system with all the accessories etc. with adjustable suitable working platforms to access the areas, with ease for working and inspection. It shall be designed to take all incidental loads. It should cater to the safety features for workmen. It shall be ensured that no damage is caused to any structure due to scaffolding.
- 19.6 All temporary warning/ caution boards display such as "Construction Work in progress", "keep away", "No parking" etc. shall be provided and displayed board showing all information in the plate during day as well as night time by the contractor, wherever required and as directed by the Engineer.

19.7 Arrangement of temporary water and electricity and telephone connection required, by him, shall be made by the contractor at his own cost and also necessary permissions directly from relevant Owners shall be obtained by him under intimation to the Owner. Also all initial and running charges and security deposit, if any in this regard shall be borne by him. The contractor shall abide by all the rules/ bye laws applicable in this regard and he shall be solely responsible for any penalty on account of violation of any of the rules and byelaws in this regard.

19.7.1 The contractor shall be responsible for maintenance and watch and ward of the complete installation and shall also be responsible for any pilferage, theft, damage, penalty etc. in this regard. The contractor shall indemnify the owner against any claim arising out of pilferage / theft, damage, penalty etc. whatsoever on this account. Security deposit for the work shall be released only after the clearance is obtained from the local authorities from whom temporary electric/ water / telephone connection have been obtained by the contractor.

19.8 The contractor shall depute Site Engineer & skilled workers as required for the work. Necessary protective and safety equipment shall be provided to them by the contractor at his own cost and used at site.

19.9 Security & Traffic Arrangements

In event of any restriction being imposed by the Security Staff of Owner, Rajkot Municipal Corporation traffic or any other local governing body having control over the project, on the working or movement of labour, materials, the contractor shall strictly follow all such restrictions or instructions issued regarding the same and nothing extra shall be payable to the contractor on account of such restrictions or instructions. In case of loss of time on this account if any, shall have to be made up by generating additional resources etc.

General security restrictions are given as under:

- i. The movement of trucks and vehicles shall be regulated in accordance with rules and regulations as approved by competent authorities.
- ii. The contractor shall inform in advance, if required, the truck registration numbers ownership of the trucks, names and addresses of the drivers for necessary action by the security agency.



- iii. As and when there will be security requirements, certain additional restrictions can be imposed as per the requirement of the situation.
  - iv. No claim whatsoever will be entertained by the Owner on account of restriction that can be imposed as per the requirement of the situation.
- 19.10 No inflammable materials including P.O.L shall be allowed to be stored in huge quantity at site. However, reasonable quantity may be permitted for storage, subject to the compliance of all rules & instructions issued by the relevant authorities and as per the direction of Engineer -in- Charge in this regard.
- 19.11 The contractor shall save harmless and indemnify the Employer in respect of all claims, proceedings, damages, costs, charges and expenses whatsoever arising out of, or in relation to, any such matters in so far as the Contractor is responsible thereof.
- 19.12 Movement and diversion of traffic during construction.
- 19.13 Contractor shall provide barricades during construction period and dismantled and taking away the same after completion of work as directed by employer and as per site requirement.

## **20. Discoveries**

- 20.1 Anything of geological or archaeological or other interest or articles of value or antiquity discovered on the Site shall be the absolute property of the Employer. The Contractor is to notify the Engineer of such discoveries and carry out the Engineer's instructions for dealing with them without damages, thefts etc. In carrying out the Engineers instructions to dealing with such articles if the contractor incurs extra costs or suffers delays, the Engineer shall determine after due consultation with the Employer and the Contractor amounts of such costs and extension of time in accordance with the corresponding clauses of the contract.

## **21. Possession of the Site**

- 21.1 The Contractor shall commence the work as soon as is reasonably possible on receipt of the "commencement of work notice" from the Engineer.
- 21.2 The Employer shall give possession of parts of the Site to the Contractor from time to time as agreed in the contract in the order in which such portions will be

made available to the Contractor. This shall be based on the contractor's construction program and method of construction.

- 21.3 Access to site shall also be provided by the Employer to the Contractor in order and manner as set out in the contract to enable the Contractor to commence and proceed with the works in accordance with his construction program and method of construction.
- 21.4 The site of work shall be always kept clean. The excavated material shall be disposed off as directed by the Engineer, from the premises and all necessary permissions in this regard from the local bodies shall be obtained by the contractor. The water / slush / bentonite slurry etc. shall not be allowed to be collected at site or to be discharged into public drainage system. The work shall be carried out in such a way that the area is kept clean and tidy without causing any nuisance due to overflowing or spilling of bentonite slurry or any other material all over the place. Nothing extra shall be payable on this account.
- 21.5 If the Contractor suffers delays and /or incurs costs on account of delays in giving possession of site from the Employer in accordance with sub clause 21.2 and 21.3, the Engineer shall then decide if any extension of time and/ or amount of such costs in accordance with the terms and conditions of the contract and notify the Contractor and Employer accordingly.

## **22. Access to the Site**

- 22.1 The Contractor shall allow the Engineer and any person authorized by the engineer access to the Site, to any place where work in connection with the Contract is being carried out or is intended to be carried out and to any place where materials or plant are being manufactured / fabricated / assembled for the works.

## **23. Instructions**

- 23.1 The Contractor shall, unless it is legally or physically impossible, execute and complete the works and remedy defects therein in strict accordance with the contract to the satisfaction of the Engineer. The contractor shall comply and adhere to the Engineer's instructions on any matter, whether mentioned in the con-

tract or not, concerning the works. The Contractor shall take instructions only from the Engineer (or his delegates).

**24. Disputes:**

24.1 If the Contractor believes that a decision taken by the Engineer was either outside the authority given to the Engineer by the Contract or that the decision was wrongly taken, the decision shall be referred to the municipal commissioner within 15 days of the notification of the Engineer's decision.

**25. Settlement of Disputes:**

In case of all the disputes, only Rajkot jurisdiction.

**26. Avoidance to damage of roads. :**

26.1 The Contractor shall ensure that no damage to roads and bridges on the route to the sites occurs due to his or his subcontractor's traffic. He shall ensure minimum possible hindrance to the traffic movements on public roads and bridges due to his materials, plant, temporary works etc. No materials shall be stacked on public roads and thoroughfares.

**27. Transport of Contractor's equipment:**

27.1 The Contractor shall specifically notify the Employer in case he plans to transport materials, equipment, plant etc. which might induce such loads on roads and bridges enroute to site for which the roads and bridges are not designed. In every such case the Contractor shall carry out all such strengthening works as may be necessary to ensure the safety of the roads/ bridges. All such works should be approved by the Engineer in writing. The Contractor, despite the strengthening measures and written approval by the concerned authority, shall be responsible for the safety of the roads and bridges as well as his own plant, materials and equipment's.

**28. Opportunities and Facilities for other Contractors:**

**Opportunities:**

The Contractor shall afford all reasonable opportunities to

- a. any other contractor and his workmen engaged by the Employer
- b. the Workmen of the Employer
- c. Workmen of any other agency permitted by the Employer to work in or around the site of works.

**Facilities:**

- a. Make available any roads or ways for the maintenance of which the Contractor irresponsible.
- b. Permit the use of any temporary works or Contractors Equipment on site. (To be charged wherever applicable).
- c. Provide any other services of whatsoever nature (to be chargeable wherever applicable.)

**29. Contractor to keep site clean:**

- 29.1 During the execution of the work, the Contractor shall keep the site clean. All wreckage rubbish, excess materials, temporary works no longer required will be removed from site.

**30. Clearance of site on completion:**

The Contractor shall clear away and remove all Contractor's equipment's, surplus materials, rubbish, temporary works of every kind, except those Contractor's equipment's, surplus materials, rubbish, temporary works that may be required by him during the Defects Liability period and leave the site clean and in a workmanlike condition to the satisfaction of the Engineer on issue of the Taking Over Certificate.

## **B. TIME CONTROL**

### **31. Programme**

- 31.1 The contractor should plan the work to be executed round the clock without violating labour and environmental control norms specified by the governing bodies (National, State and local).
- 31.2 Within the time stated in the Contract Data the Contractor shall submit to the for his consent programme showing the general methods of construction, arrangements, order, and timing and sequence for all the activities including traffic diversion, resource schedules including material, manpower and machinery and equipment scheduling monthly cash flow forecast and any other details the Engineer may require.
- 31.3 If at any time it should appear to the Engineer that the actual progress of works does not confirm to the programme to which consent has been given as per clause 31.2 above, the Contractor shall produce, at the request of the Engineer, a revised programme showing modifications to the programme consented to under clause 31.2 above necessary to ensure completion of works within the Time for Completion.
- 31.4 If the Contractor fails to submit such a revised programme, the Engineer may withhold the amount stated in the Contract Data from the next payment certificate and continue to withhold this amount in all future payments until the date on which the revised Program is submitted.
- 31.5 The Engineer's consent to the program shall not relieve the contractor from his duties and responsibilities under the contract.
- 31.6 The Engineer shall monitor the rate of progress of work. In case the Engineer finds that the rate of progress of work is too slow to comply with the Time for completion, he shall notify the Contractor who shall thereupon take necessary steps to expedite progress. No extra payments on account of such actions shall be due to the Contractor.

### **32. Time for completion and Extension/s of Time for completion**

- 32.1 The whole of the works, and if applicable any section of the works required to be completed within a particular time as stated in the Contract data, shall be completed within the stipulated time for the whole of the works or the Section (as the

case may be) calculated from the Commencement Date, or such extended time as may be allowed under following sub clauses.

- 32.2 The Engineer shall, after due consultation with the Employer and Contractor, determine the amount of extension of time for completion to which the Contractor becomes fairly entitled in the event of
- a) Amount and nature of extra work
  - b) Any cause of delay referred to in these conditions
  - c) Exceptionally adverse climatic conditions
  - d) Any delay, impediment or prevention by the Employer
  - e) Other special circumstances which may occur, other than through a default or breach of contract by the contractor

The Engineer shall notify the Contractor about all such extension of time with a copy to the Employer.

- 32.3 The Engineer shall however not be bound to make any determination unless the Contractor has notified the Engineer within 28 days of occurrence of even that furnished detailed particulars of the extension of time arising out of such an event within 28 days of the issue of notice of occurrence of the event.

### **33. Delays Ordered by the Engineer**

- 33.1 The Engineer may instruct the Contractor to delay the start or progress of any activity within the Works. These delays shall be suitably compensated for time in accordance with the provisions of the Contract.

### **34. Management Meetings**

- 34.1 Either the Engineer or the Contractor may require the other to attend a management meeting. The business of a management meeting shall be to review the plans for remaining work and to deal with matters raised in accordance with the early warning procedure.
- 34.2 The Engineer shall record the business of management meetings and is to provide copies of his record to those attending the meeting and to the Employer. The responsibility of the parties for actions to be taken is to be decided by the Engineer either at the management meeting or after the management meeting and stated in writing to all who attended the meeting.

### **35. Early Warning**

- 35.1 The Contractor is to warn the Engineer at the earliest opportunity of specific likely future events or circumstances that may adversely affect the quality of the work, increase the Contract Price, or delay the execution of works. The Engineer may require the Contractor to provide an estimate of the expected effect of the future event or circumstance on the Contract Price and Completion Date. The estimate is to be provided by the Contractor as soon as reasonably possible.
- 35.2 The Contractor shall cooperate with the Engineer in making and considering proposals for how the effect of such an event or circumstance can be avoided or reduced by anyone involved in the work and in carrying out any resulting instruction of the Engineer.

### **36. Drawings and contract documents:**

- 36.1 The drawings shall remain in the sole custody of the Engineer, but two copies thereof shall be provided to the Contractor free of cost. The Contractor can avail a soft copy in PDF format from the Consulting Engineer for making further copies at his cost.
- 36.2 All the contractual documents and drawings shall not be given to a third party or used for any other purpose than contractual work. On receipt of the Defects Liability Certificate, the Contractor shall return all the drawings and the Contract documents including the drawings to the Engineer.
- 36.3 Four hard copies and two soft copies of the drawings, specifications and other documents (submitted by the Contractor and approved by the Engineer for all temporary and permanent works in accordance with the contract requirements) shall be submitted by the Contractor to the Engineer, free of cost.
- a) **Disruption of progress:** The Contractor shall give notice to the Engineer with a copy to the Employer, whenever planning or execution of the Works is likely to be delayed or disrupted unless any further drawing or instruction is issued by the Consulting Engineer within a reasonable time. The notice shall include details of the drawing or instruction required and of why and by when it is required and of any delay or disruption likely to be suffered if it is late.

- b) If by reason of any failure or inability of the Consulting Engineer to issue, within a time reasonable in all circumstances, any drawing or instruction for which the Contractor has given a notice in accordance with clause 33 and 35, the Contractor suffers delay then the Consulting Engineer shall, after due consultation with the Employer and the Contractor, determine:
    - c) Any extension of time to which the Contractor is entitled.
    - d) Negative time and cost effects shall be calculated by the Engineer and deducted from the Contract Sum in the event of delays in issue of drawings arise out of Contractor's failures or delays in submission of drawings of temporary works.
- 36.4 Supplementary drawings and instructions: The Engineer shall have authority to issue supplementary drawings and instructions to the Contractor. The Contractor shall carry out and be bound by the same.



## C. QUALITY CONTROL

### 37. Quality of Materials, Plant and Workmanship

- 37.1 All materials, plant and workmanship shall be:
- i. I. Of the respective kinds and quality as described in the contract and in accordance with the Engineers instructions and subject to tests as the Engineer may require at any or all places, such as manufacturers facility, site, during fabrication, preparation etc, as specified in the contract.
  - ii. The Contractor shall provide all assistance required by Engineer for carrying out the tests. Costs of tests are covered by the contractor's quoted rates for the works.
  - iii. All samples shall be provided by the Contractor free of costs.
- 37.2 The Engineer and his personnel shall have access to all locations of work all the time for inspection of work. Contractor shall provide all necessary assistance to the Engineer and his personnel for this at no extra costs.
- 37.3 On inspection, if the Engineer finds that certain works, materials and/or plant are defective and/or not in accordance with the contract, he shall notify the contractor thereof immediately with his objections and reasons. The Contractor shall then promptly make good the defect or remove defective materials, plant from site.
- 37.4 All work or any part of shall be covered up only after approval of the Engineer in respect of the quality of materials used and workmanship.
- 37.5 The Contractor shall uncover any part of the work or make openings in or through as required by Engineer from time to time for inspection and shall make good such part only after approval of the Engineer to such covered up work.
- 37.6 In case of default on the part of the contractor in removal and making good of any defective materials, workmanship and/or plant, the Employer shall engage another agency to carry out the same at the contractors' risks and costs.

### 38. Specifications of Contract

- 38.1 This tender is for a firm and fixed price contract and therefore no price escalation clause is provided under the conditions of contract. Any increase or de-

crease in quantity of work or material will be paid as per the price quoted in price schedule.

- 38.2 The tenders are invited under Local Competitive Bid procedure and therefore the bidders will not be eligible to avail the facility of deemed export. At present there is no GST exemption for these kinds of works.
- 38.3 However, if such exemptions are made available during the performance of the contract, the contractor shall be liable to pass on the benefit to OWNER appropriately.
- 38.4 Employer will appoint a third party inspection agency for inspection and quality control of the materials procured by the contractor. The contractor shall provide necessary access and necessary facilities for the purpose. The costs of the remuneration to be paid to such agencies shall be borne by the contractor.
- 38.5 The rates shall be inclusive of all the taxes, duties; local tax etc. prevailing at the time of quoting and statutory variation if any will also be borne by the contractor.
- 38.6 The Planning and Design of this project has been carried out by Consultant is DELF Consulting Engineers (I) Pvt. Ltd. Ahmedabad, therefore Agency has to bear consulting fee as 1.35% of awarded cost (including all taxes)
- 38.7 Agency has also to bear the expense for bore test and site survey to be carried out during execution and also bear the charge of bore test already carried out during planning safe of the project

### **39. Tests**

- 39.1 If the Engineer instructs the Contractor to carry out a test not specified in the Specification to check whether any work has any Defect or not, Contractor shall perform the same and submit the results to the Engineer at contractor's cost.

### **40. Correction of Defects during Defects liability period**

- 40.1 The Engineer shall give notice to the Contractor of any Defects before the end of the Defects Liability Period, which begins at Completion and is defined in the Contract Data. The Defects Liability Period shall be extended for as long as Defects remain to be corrected.
- 40.2 Every time notice of a Defect is given, the Contractor shall correct the notified Defect within the length of time specified by the Engineer's notice.

**41. Uncorrected Defects during Defects liability period**

- 41.1 If the Contractor does not rectify or correct a defect within the time specified in the Engineer's notice, the Engineer will assess the cost of having the Defect corrected, and the Contractor will bear the costs of such defective work as well as all works carried out over such defective work until the defect is removed to the satisfaction of the Engineer.
- 41.2 Only the Defects Liability Certificate referred to in following clause shall be deemed to constitute the approval of the works.
- 41.3 **Defects Liability Certificate:** The Defects liability certificate shall be given by the Employer to the Contractor, within 28 days of the expiry of the Defects Liability Period. The Contract shall remain incomplete until issue of the Defects Liability Certificate.
- 41.4 The defects Liability Certificate shall mention clearly that the Contractor has completed his obligations to execute and complete the works and remedy defects therein to the satisfaction of the Engineer.
- 41.5 **Unfulfilled obligations:** Despite issuance of the Defects Liability Certificate, the contract between the Employer and the Contractor shall remain in force in respect of unperformed obligations incurred under the provisions of the Contract prior to the issue of the Defects Liability Certificate.

## **D. COST CONTROL**

### **42. Schedule – B**

- 42.1 The schedule-B shall contain Memorandum showing items for the construction, installation, testing, and commissioning work to be done by the Contractor.
- 42.2 The quantities stated in the schedule B are estimated quantities. The Contractor shall be paid only quantities calculated after taking measurements of executed work. The rate stated in the schedule B for each item of work shall apply. The works shall be measured by the contractor jointly with the authorized representative of the Engineer and all particulars required by the representative of the Engineer shall be supplied by the contractor.
- 42.3 The work shall be measured net. No allowance for general or local custom, working space etc. is to be made.
- 42.4 Deleted

### **43. Variations**

- 43.1 The Engineer shall make any variation of form, quality or quantity of the Works or any part thereof that may, in his opinion, be necessary and for that purpose, or if for any other reason it shall, in his opinion, be appropriate, he shall have the authority to instruct the Contractor to do and the Contractor shall do any of the following:
- Increase or decrease the quantity of any work included in the contract,
  - Omit any such work,
  - Change the character or quality or kind of any such work,
  - Execute additional work of any kind necessary for the completion of the Works or
  - Change any specified sequence or timing of construction of any part of work.
  - No such variation shall in any way vitiate or invalidate the contract, but the effects, if any, of all such variations shall be valued in accordance with the following sub clauses. Provided that where the issue of an instruction to vary the Works is necessitated by some default or breach of contract by contractor or for which he is responsible, any additional cost attributable to such default shall be borne by the Contractor.

43.2 The Contractor shall not make any such variation without an instruction of the Engineer. No instruction is required for quantities varying from those provided for the items in the contract schedule B. Price escalation due to Inflation rate shall not be given.

#### **44. Valuation of Variations**

44.1 The basis for the valuation of variations for addition to the contract price shall be as follows in the same order of priority.

44.2 Contract unit rates for individual items shall apply to varied quantities where there is a quantity variation.

44.3 In case of other types of variations following procedure shall apply.

- If the Contract does not contain any rates or prices applicable to the varied work, the rates and prices in the Contract shall be used as per the prevailing SOR of RMC if item is not available in RMC then R & B SOR at the time of execution of the work a basis for valuation so far as may be reasonable. If this fails
- Suitable rates or prices shall be agreed upon between the Engineer and the Contractor after due consultations among the Employer, the Consulting Engineer and the Contractor. These shall be based on
- The material costs, the labour costs, the cost of use of all plant, machinery and equipment, the cost of all temporary and incidental works, the overheads and the Contractors profit.
- The overheads shall be taken at 3 % of the sum of material costs, the labour costs, the cost of use of all plant, machinery and equipment, the cost of all temporary and incidental works.
- The Contractors profit shall be taken at 10 % of the sum of material costs, the labour costs, the cost of use of all plant, machinery and equipment, the cost of all temporary and incidental works, the overheads.

44.4 In the event of disagreement the Engineer shall fix such rates and prices as are, in his opinion appropriate and shall notify the Contractor accordingly with a copy to the Employer.

44.5 The Engineer shall determine provisional rates and prices to enable on account payments to be included in the Interim Payment Certificates, until rates and prices

es are agreed as final by the Employer, the Contractor and the Consulting Engineer.

44.6 Deleted

44.7 No valuation of varied works in accordance with above clauses 43.1, 43.2 and 44 is allowed unless the Contractor gives his notice to claim or the Engineer gives his notice to vary the rates or prices to the other party (The Contractor) within 14 days of the issue of instructions to vary in accordance with clause 40.

44.8 The Contractor shall not be entitled to additional payment for costs, which could have been avoided by giving early warning.

44.9 Day works: The Engineer may, if in his opinion it is necessary or desirable, issue an instruction that any varied work shall be executed on day work basis. The Contractor shall then be paid for such varied work under the terms set out in the day work schedules included in the contract and at the rates and prices affixed to thereto by him in his bid. Unless authorized and certified on a day to day basis by the Engineer in writing, no payments shall be allowed to the Contractor.

#### **45. Cash flow forecasts**

45.1 The Contractor shall, within 21 days of the date of the letter of acceptance provide to the Engineer for his information a detailed cash flow estimate, in quarterly periods, of all payments to which the Contractor will be entitled under the Contract.

45.2 The estimates shall be revised and submitted by the Contractor every quarter of each year if need arises due to various reasons.

#### **46. Payment Certificates**

46.1 The contractor shall submit to the Engineer a monthly statement after the end of each calendar month in three hard copies and three soft copies on CDs each signed by the Contractors authorized Representative in such form as the Engineer may prescribe from time to time. The Monthly Statement shall state

- The amount to which the Contractor is entitled.
- The value of the permanent works executed.
- Other sums such as day works payments.
- Any other sums to which the Contractor may consider himself entitled.

- 46.2 The Engineer shall check the Contractor's monthly statement within 14 days and certify for payment vide an Interim Payment Certificate the amount to be paid to the Contractor after taking into account any credit or debit for the month a) in respect of materials for the works in the relevant amounts and b) under various conditions set forth in these General Conditions of Contract and stated in brief in the Contract Data.
- 46.3 No payment shall be recommended by the Engineer through Interim Payment Certificate until he is fully satisfied that
- The Contractor has paid the Security deposit to the Employer.
  - All premiums towards the various insurance policies taken by the contractor in accordance with these General Conditions of Contract are paid.
  - Contractor has obtained the labour licenses and PF code numbers for site staffs and workers.
- 46.4 The Engineer may by any Interim Payment Certificate or in any subsequent Interim Payment Certificate make any correction or modification in any previous Interim Payment Certificate which shall have been issued by him and shall have authority, if any work is not carried out to his satisfaction, to omit or reduce the value of such work in any Interim Payment Certificate.
- 46.5 **Statement at Completion:** No later than 3 months after the issue of the Taking Over Certificate in respect of the whole of the Works, the Contractor shall submit 3 hardcopies and 3 soft copies in the form of CDs to the Engineer of a Statement at Completion with supporting documents (such as measurements, approvals, records related to materials, test data etc.) showing in details, in the form approved by the Engineer.
- The final value of all work done in accordance with the Contract up to date stated in the Taking over Certificate any further sums to which the Contractor considers himself due.
  - Any other amounts, which the Contractor considers, will become due to him under the contract to be shown in a separate statement.
  - The Engineer shall issue a Certificate of Payment after scrutiny in a similar manner as that for the Monthly Statements as described in clause 46.1 above.
- 46.6 **Final Statement:** The Contractor shall submit to the Engineer within 2 months of the issue of Defects liability Certificate pursuant to clause. 38.1b, in three hard

copies and three soft copies in the form of CDs, a draft Final Statement with supporting documents (such as measurements, approvals, records related to materials, test data etc.) showing in details, in the form approved by the Engineer

- i. The value of all work done in accordance with contract including variations
- ii. Any further sums which contractor considers being due to him under the contract or otherwise.

If the Engineer disagrees with or cannot verify any part of the draft final statement, the Contractor shall submit such further information as the Engineer may reasonably require and shall make such changes in the draft as may be agreed between them. The Contractor shall then prepare and submit to the Engineer the Final Statement as agreed. If a dispute exists between the Engineer and the Contractor for any part of the draft final statement, such part shall be dealt with in accordance with the procedure laid down in clause 23 of these General Conditions of Contract. The Third Party Inspection Agency (TPI) shall deliver to the Employer an Interim Payment Certificate for the agreed parts of the draft final statement.

46.7 **Discharge:** Upon submission of the Final Statement, the Contractor shall give to the Employer with a copy to the TPI, a written discharge confirming that the total of the Final Statement represents full and final settlement of all monies due to the Contractor arising out of or in respect of the Contract. Such discharge shall become effective after.

- Payment is made against Final Payment Certificate.
- Performance security amount / bank guarantee is returned to the Contractor.

46.8 **Final Payment Certificate:** The Employer shall issue the final payment certificate to the Contractor within 28 days after receipt of the final statement and the written discharge. The certificate will state :

- i) The amount which, in the opinion of the Engineer, is finally due under the Contractor or otherwise and
- ii) After giving the credit to the Employer for all amounts previously paid by the Employer and for all sums to which the Employer is entitled in accordance with clause 49(Liquidated damages) of these Conditions of the Contract,



the balance if any due from the Employer to the Contractor or vice versa as the case may be.

46.9 **Cessation of Employers liability:** The Employer shall not be liable to the Contractor for any matter or thing arising out of or in connection with the Contract or execution of the Works, unless the Contractor shall have included a claim in respect thereof in his Final Statement and in the Statement of Completion

## **47. Payments**

47.1 Payments shall be adjusted for deductions for advance payments, retention, other recoveries in terms of the contract and taxes at source, as applicable under the law.

The employer shall pay the contractor the amounts certified by the TPI and Engineer

- within 28 days of the date of issue of the Certificate of bill
- within 56 days of the date of the final payment certificate
- No payment of interest shall be made to the contractor for delayed payment if any.

If an amount certified is increased in a later date certificate due to corrections in previous certificates or as a result of an award from disputes review experts, Contractor shall be paid such amount only. The Contractor shall not be paid any interest upon such delayed payment.

Items of the Works for which no rate or price has been entered in will not be paid for by the Employer and shall be deemed covered by other rates and prices in the Contract.

47.2 All payments shall be made in Rajkot.

## **48. Taxes and duties**

The rates are inclusive of all the prevailing taxes and duties of the Central, State and Local Governing bodies prevailing on the date of award of the contract. The Contractor will have to pay all such taxes and duties for the performance of this Contract. The contractor shall have to quote their rates including GST and other taxes and the Invoice has to be submitted accordingly, failing which, such amount will be deducted from the bill of the agency and deposited accordingly.

The contractor shall keep himself fully informed of all acts and laws of the Central & State and local Governing bodies, all orders, decrees of bodies, tribunals having any jurisdiction or authority which in any manner affect those engaged or employed and anything related to carrying out the work. All the bye-laws lay down by RMC/RUDA and any other local bodies while executing the work shall be adhered to. All taxes of local bodies shall be borne by the contractor. The contractor shall arrange to give all notices required by any authority and to pay to such authority all the fees that may have to be paid for the material, plants, equipments etc. The contractor shall also adhere to all traffic restrictions notified by the local authorities. He shall protect and indemnify the Owner and its officials & employees against any claim or liability arising out of violations of any such laws, ordinances, orders, decree, whether by himself or by his employees or his authorized representatives. Nothing extra shall be payable on these accounts.

**48.1 Labour Welfare cess:**

As per circular No. GHR/2005/04/CWA/2004/841/M-3 dt. 3/1/05 and G.R. No.CWA/2004 1931-M(3) dt. 9/12/05 issued by G.O.G. 1 % cess tax (non-refundable) shall be deducted from every bills which shall be deposited to Govt. Labour Department for Labour welfare fund.

**49. Currencies**

All payments shall be made in Indian Rupees.

**49.1 Price adjustment**

No price adjustment is applicable for any item of work under this contract.

**50. Price Variation**

No price variation is applicable for any item of work under this contract.

**51. Retention**

51.1 The Employer shall retain from each payment against Interim Payment Certificate issued by the TPI to the Contractor 5% amount of the sum of value of work done. This retention shall continue until the sum of amounts thus retained reaches to 5 % of the contract sum.

51.2 The retention money will not normally be due for payment until the completion of the entire work and till such period of the work has been finally accepted by the corporation and a completion certificate issued by the corporation.

**52. Liquidated Damages**

52.1 If the Contractor fails to complete the work or designated part thereof within the stipulated completion date for the work or for the part, he shall pay liquidated damages at (0.10%) zero point one zero percentage of contract price for un-completed work per day subject to a maximum up to ten percentage of contract price or as decided by Municipal Commissioner.

52.2 The Contractor shall complete one-sixth quantum of work within one fourth period, four-tenth quantum of work within one-half period and eight-tenth quantum of work within three-fourth period, failing which, the Contractor shall be liable to pay liquidated damages an amount as specified above, or as decided by Municipal Commissioner.

52.3 The employer may, without prejudice to any other method of recovery deduct the amount of such damages from any monies due or to become due to the contractor. The payment or deduction of such damages shall not relieve the contractor from his obligation to complete the works or from any other of his obligations and liabilities under the contract.

52.4 If, before the Time for Completion of the whole of the Works or, if applicable, any Section, a Taking - Over Certificate has been issued for any part of the Works or of a Section, the liquidated damages for delay in completion of the remainder of the Works or of that Section shall, for any period of delay after the date stated in such Taking Over Certificate, and in the absence of alternative provisions in the Contract, be reduced in the proportion which the value of the part so certified bears to the value of the whole of the Works or Section, as applicable. The provisions of this Sub-Clause shall only apply to the rate of liquidated damages and shall not affect the limit hereof.

52.5 The Contractor shall pay liquidated damages to the Employer at the rate per day stated in the Contract Data for each day that the Completion Date is later than the Completion Date (for the whole of the works as stated in the contract data). The total amount of liquidated damages shall not exceed the amount

defined in the Contract Data. The Employer may deduct liquidated damages from payments due to the Contractor. Payment of liquidated damages does not affect the Contractor's liabilities.

- 52.6 If the Completion Date is extended after liquidated damages have been paid, the Engineer shall correct any over payment of liquidated damages by the Contractor by adjusting the next payment certificate.

**53. Securities**

- 53.1 The Performance Security (including additional security for unbalanced bids) shall be provided to the Employer no later than the date specified in the Letter of Acceptance and shall be issued in an amount and form and by a bank acceptable to the Employer, and denominated in Indian Rupees. The Performance Security shall be valid until a date 28 days from the date of expiry of Defects Liability Period

**54. Cost of Repairs**

- 54.1 Loss or damage to the Works or Materials to be incorporated in the Works between the Start Date and the end of the Defects Correction periods shall be remedied by the Contractor at the Contractor's cost if the loss or damage arises from the Contractor's acts or omissions.

## **E. FINISHING THE CONTRACT**

### **55. Completion**

55.1 The Contractor shall request the Engineer to issue a Certificate of Completion of the Works and the Engineer will do so upon deciding that the Work is completed.

### **56. Taking Over**

56.1 When the whole of the Works have been substantially completed and have satisfactorily passed any Tests on Completion prescribed by the contract, the Contractor may give a notice to that effect to the Engineer accompanied by a written undertaking to finish with due expedition any outstanding work during the Defects Liability Period. Such notice and undertaking shall be deemed to be a request by the Contractor for the Engineer to issue a Taking over Certificate in respect of the works. The Engineer shall, within 21 days of the delivery of such a notice, either issue to the Contractor with a copy to the Employer, a Taking over Certificate, stating the date on which, in his opinion, the Works were substantially completed in accordance with the Contract, or give instructions in writing to the Contractor, specifying all the work which, in the Engineer's opinion, is required to be done by the Contractor before the issue of such certificate. The Engineer shall also notify the Contractor of any defects in the works affecting substantial completion that may appear after the instruction and before completion of the works specified therein. The Contractor shall be entitled to receive such taking over certificate within 21 days of completion, to the satisfaction of the Engineer, of the Works so specified and remedying any defects so notified.

#### **56.2 Taking over of sections or parts:**

56.2.1 Similarly, in accordance with the procedure set out in the sub clause 56.1, the Contractor may request and the Engineer shall issue a Taking over certificate in respect of:

56.2.1.1 Any section in respect of which a separate Time for Completion is provided in the Contract data,

56.2.1.2 Any substantial part of the permanent works, which has been both completed to the satisfaction of the TPI and Engineer, otherwise than provided for in the contract, occupied or used by the Employer, or

56.2.2 Any part of the permanent works, which the Employer has elected to occupy or use prior to completion. The Contractor shall be deemed to have undertaken to complete with due expedition any outstanding work in that part of Permanent Works during the Defects Liability Period.

**56.3 Surfaces requiring reinstatement:**

Any ground or surface requiring reinstatement at the time of issue of Taking over Certificate for the whole of the works shall be reinstated by the Contractor without any extra costs even if the Engineer has issued a Taking over Certificate in respect of section or part work wherein is included such ground or surface requiring reinstatement.

**56.4 Defects Liability:**

56.4.1 "Defects Liability Period" as stated in the Contract data means the period calculated from:

- i. The date of completion of the works certified by the Engineer in accordance with Clause 56.1 and its sub clauses of these Conditions of Contract.
- ii. The respective dates in case different dates of completion of the part works are certified by the Engineer.

56.4.2 Completion of outstanding work and remedying defects:

- a) The Contractor shall complete the outstanding work with due diligence all such work as listed by the Engineer at the time of issue of "Taking over Certificate" and also.
- b) Execute all such work of amendment, reconstruction and remedying defects, shrinkages or other faults as the Engineer may, during the Defects Liability period or within 14 days of its expiration, as a result of an inspection made by or on behalf of the Engineer, prior to its expiration, instruct the Contractor to execute.

56.4.3 Costs of remedying defects: Costs of all works referred to in clause e above shall be borne by the Contractor, unless otherwise expressly stated in the contract.

**57. Claims:**

57.1 Notice of claims: Notwithstanding any other provision of the Contract, if the Contractor intends to claim any additional payment pursuant to any Clause of these conditions or otherwise, he shall give notice of his intention to the Engineer, within 28 days after the event giving rise to the claim has first arisen.

- 57.2 Contemporary records: Upon the happening of the event referred to in sub clause 57.1 the Contractor shall keep such contemporary records as may reasonably necessary to support any claim he may subsequently wish to make. Without necessarily admitting to Employers liability, the Engineer shall, on receipt of a notice under sub clause 57.1 inspect such contemporary records and may instruct the Contractor to keep any further contemporary records as are reasonably and may be material to the claim of which notice has been given. The Contractor shall permit the Engineer to inspect all records kept pursuant to this sub clause and shall supply to him copies thereof as and when the Engineer so instructs.
- 57.3 Substantiation of claims: Within 28 days or such other reasonable time as may be agreed by the Engineer, of giving notice under sub clause 57.1 the Contractor shall send to the Engineer an account giving detailed particulars of the amount claimed and the grounds upon which the claim is based. Where the event giving rise to the claim has a continuing effect, such account shall be considered to be an interim account and the Contractor shall, at such intervals as the Engineer may reasonably require, send further interim accounts giving the accumulated amounts of the claim and any further grounds on which it is based. In cases where interim accounts are sent to the Engineer, the Contractor shall send a final account within 28 days of the end of the effects resulting from the event.
- 57.4 Failure to comply:
- 57.5 If the Contractor fails to comply with any of the provisions of sub clauses 57.1, 57.2,57.3 above, in respect of any claim which he seeks to make, his entitlement to payment in respect thereof shall not exceed such amount as the Engineer or any arbitrator or arbitrators appointed pursuant to sub clause 31.1 of IT Bases sing the claim considers to be verified by contemporary records (whether or not such records were brought to the notice of the Engineer as required under sub clause 57.2 and 57.3)
- 57.6 Payment of claims: The Contractor shall be entitled to have included in any interim payment certified by the Engineer pursuant to clause 57 such amount in respect of any claim as the Engineer, after due consultation with the Employer and the Contractor, may consider due to the Contractor provided that the Contractor has supplied sufficient particulars to enable the Engineer to determine the

amount due. If such particulars are insufficient to substantiate the whole of the claim, the Contractor shall be entitled to payment in respect of such part of the claim as such particulars may substantiate to the satisfaction of the Engineer. The Engineer shall notify the Contractor of any determination made under this sub clause, with a copy to the Employer.

**58. Operating and Maintenance Manuals**

58.1 If "as built" Drawings and/or operating and maintenance manuals are required, the contractor shall supply them.

**59. Termination**

59.1 The Employer or the Contractor may terminate the Contract if the either party causes a fundamental breach of the Contract.

59.2 Fundamental breaches of Contract include, but shall not be limited to the following:

- a. The Contractor stops work for 14 days when no stoppage of work is shown on the current Program and the stoppage has not been authorized by the Engineer;
- b. The Engineer instructs the Contractor to delay the progress of the Works and the instruction is not withdrawn within 28 days;
- c. The Employer or the Contractor is made bankrupt or goes into liquidation other than for a reconstruction or amalgamation;
- d. A payment certified by the Engineer is not paid by the Employer to the Contractor within 90 days of the date of the Engineer's certificate.
- e. The Engineer gives Notice that failure to correct a particular Defect is a fundamental breach of Contract and the Contractor fails to correct it within a reasonable period of time determined by the Engineer;
- f. The Contractor does not maintain a security which is required;
- g. The Contractor has delayed the completion of works by the number of days for which the maximum amount of liquidated damages becomes payable as defined in the Contract data;
- h. If the Contractor, in the judgment of the Employer has engaged in corrupt or fraudulent practices in competing for or in the executing the Contract.



- i. For the purpose of this paragraph: "corrupt practice" means the offering, giving, receiving or soliciting of anything of value to influence the action of a public official in the procurement process or in contract execution. "Fraudulent practice" means a misrepresentation of facts in order to influence a procurement process or the execution of a contract to the detriment 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."
- 59.3 When either party to the Contract gives notice of a breach of contract to the Engineer for a cause other than those listed above, the Engineer shall decide whether the breach is fundamental or not.
- 59.4 Notwithstanding the above, the Employer may terminate the Contract for convenience.
- 59.5 If the Contract is terminated the Contractor shall stop work immediately, make the Site safe and secure and leave the Site as soon as reasonably possible and handover the site to the Employer including all materials and plant and equipment existing thereupon.
- 59.6 If Contractor fails to carry out the work in timely manner as mentioned in clause 52 (Liquidated damages), Rajkot Municipal Corporation may give notice in writing to the Contractor to expedite the progress of work, so that the work can be completed as per time schedule. If Contractor fails to expedite the progress of work within 14 days, Rajkot Municipal Corporation may terminate the contract and debar the Contractor for three years and the remaining work will be executed through other agency at the risk and cost of the Contractor.

**60. Payment upon Termination**

- 60.1 If the Contract is terminated because of a fundamental breach of Contract by the Contractor, the Engineer shall issue a certificate for the value of the work done less advance payments received up to the date of the issue of the certificate, less other recoveries due in terms of the contract, less taxes due to be de-

ducted at source as per applicable law and less the percentage to apply to the work not completed as indicated in the Contract Data. Additional Liquidated Damages shall not apply. If the total amount due to the Employer exceeds any payment due to the Contractor the difference shall be a debt payable to the Employer.

- 60.2 If the Contract is terminated at the Employer's convenience or because of a fundamental breach of Contract by the Employer, the Engineer shall issue a certificate for the value of the work done, the cost of balance material brought by the contractor and available at site 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.

**61. Default of Contractor:**

- 61.1 If the Contractor enters into voluntary or involuntary bankruptcy, liquidation or dissolution or becomes insolvent, or makes an arrangement with, or assignment in favor of, his creditors, or agrees to execute the contract under a committee of inspection of his creditors, or if a receiver, administrator, trustee or liquidator appointed over any substantial part of his assets, or if, under any law or regulations relating to reorganization, arrangement or readjustment of debts, proceedings are commenced against the Contractor or resolution passed in connection with dissolution or liquidation or if any steps are taken to enforce any security interest over a substantial part of the Contractor's assets, or if any act is done, or event occurs with respect to the Contractor or his assets which, under any applicable law has a substantially similar effect to any of the foregoing acts or events, or if the Contractor has contravened the sub clause regarding assignment and sub-letting or has an execution levied on his goods, or if the Engineer certifies to the Employer with a copy to the Contractor, that , in his opinion, the Contractor:
- a. Has repudiated the Contract,
  - b. without reasonable excuse has failed
- I. to commence the Works in accordance with sub clause 17.1 or

- II. to proceed with the Works, or any section thereof, within 28 days after receiving notice pursuant to sub clause 31.3 and 31.4,
- III. to comply with a notice issued pursuant to sub clause 40 within 41 days after having received it, or an instruction issued pursuant to sub clause 38 despite previous warning from the Engineer, in writing, is otherwise persistently or flagrantly neglecting to comply with any of his obligations under the contractor,
- IV. has contravened sub clause regarding sub-contracting, then the Employer may, after giving 14 day's notice to the Contractor, enter upon the site and the Works, and terminate the employment of the Contractor without thereby releasing the Contractor from any of his obligations or liabilities under the contract, or affecting the rights and authorities conferred on the Employer / Engineer by the Contract,, and may complete the works, or employ any other contractor to complete the Works. The Employer or such other contractor may use the Contractor's equipment, Temporary Works or materials he or they may think proper.

61.2 Assignment of benefit of agreement: Unless prohibited by law, the Contractor shall, if so instructed by the Engineer, within 14 days of such entry and termination referred to in clause 61.1 above assign to the Employer the benefit of any agreement for the supply of any goods or materials or services and/or for the execution of any work for the purposes of the contract, which the Contractor may have entered into.

## **62. Release from Performance due to Contractor's default**

62.1 If the Contract is frustrated by the outbreak of war or by any other event entirely outside the control of either the Engineer or the Contractor the Employer shall certify that the Contract has been frustrated. The Contractor shall make the Site safe and stop work as quickly as possible after receiving this certificate and shall be paid for all work carried out before receiving it and for any work carried out afterwards to which commitment was made.

## F. GENERAL DESCRIPTION AND SCOPE OF WORK

### 63. Scope of work, Planning and Site Condition

#### 63.1 Location of the Site

The Rajkot Municipal Corporation has planned to **CONSTRUCTION OF MINOR BRIDGE NEAR SHANTINAGAR-3 ON AIIMS HOSPITAL CONNECTING 30.0 MT. D.P. ROAD IN WARD NO.3**

The scope of work and explanatory notes given are neither complete nor exhaustive but are added to assist the contractor to understand the project. The detail scope is as described in the schedule B and specifications. However any item of work required to be carried out for proper and satisfactory completion of work with the highest standard of workmanship is deemed to be included in the scope of work whether or not it is specifically included in the schedule B.

#### 63.2 Bench Mark

63.2.1 Standard Pucca RCC bench marks of required numbers shall have to be established by contractor on both the ends on each bank sides before commencement of the work or connected to the nearest GTS bench mark according to which, whole work shall be carried out. The contractor shall establish reference benchmark at intermediate suitable spots with reference to these benchmarks or as may be directed. The maintenance of all these BM, till completion shall be the responsibility of the contractor.

63.2.2 Alignments of bridge and other components have not been fixed at site by the RMC. The contractor has to establish the correct position there of precisely on site, with respect to the co-ordinates given by RMC shown in the General Arrangement drawing and as may be indicated by the Engineer.

63.2.3 The contractor shall be solely responsible for the true and proper setting out of the alignments and for the provision of all necessary instruments, at any time during the execution of the work. In case of any error regarding location, levels, dimensions, or alignment of any part of the work, the contractor on being required to rectify such errors as may be pointed out by the Engineer, shall at his own expense do so, to the satisfaction of the Engineer. The checking of any setting out of any line or level by the Engineer or his representative shall not, in any way, relieve the contractor of his responsibilities for the correctness thereof. The contractor shall

carefully protect and preserve all benchmarks, site nails, pegs, reference pillars and other measures used in setting out of the work.

**64. Climatic Conditions**

It shall be deemed that the contractor has satisfied himself to the nature and location of the work, general and local conditions and particularly those pertaining to transport handling and availability and storage of materials, availability of labour, weather conditions, that he has estimated his cost accordingly and the client will bear no responsibility for the lack of such knowledge of site conditions and also consequences thereof, to the bidder. The information and the data shown in the drawings and mentioned herein and elsewhere under the contract are furnished for general information only and the client in no case will be held responsible for the strict accuracy thereof or any deductions, interpretations or conclusion drawn there from by the contractor.

The climate in this region is moderately hot. The monsoon depends upon the advent of the south -west wind but the normal rainy season commences from early June and lasts up to early October in this region. Occasionally, shower may be expected even earlier. There is generally no rain beyond October though some stray showers may be experienced. The yearly average rainfall in the area is about 550 – 1000mm.

**65. Availability of Labour**

Unskilled labour may be available locally and skilled labour may also be available locally or in the immediate city area for the work of this type and magnitude.

**66. Marketing Centers**

Nearest marketing centers for daily necessity situated near the work site.

**67. Housing, Water Supply and Drainage etc.**

Housing accommodation on hire is likely to be available in this area around the site. The contractor has to make his own arrangements for the housing of laborers. The land required for setting up batching plant, stacking of materials, site office will be arranged by contractor. Water Supply for drinking purposes and

construction purpose at the site shall also have to be arranged by the contractor at his own cost as may be required. The water can be by drilling bore hole with prior approval of authority.

**68. Facilities**

Nearest Railway Station is Main Railway Station, Rajkot from the work site. A post office is also available at Junction Road. The nearest airport is Rajkot Airport at a distance of about 5.0 km from city area.

**69. Materials**

69.1 All materials Plant and equipment and workmanship shall be:

- a) Of the respective kinds described in the contract and in accordance with the Engineers instructions and
- b) Subjected from time to time such tests as the Engineer may require at place of manufacture, fabrication or preparation, or on the Site OR at such other place or places as may be specified in the contract or at all or any of such places.

69.2 All Contractors materials, plant, machinery and equipment shall be deemed to have been exclusively brought to site for the execution of the works and shall not be removed from site without the consent of the Engineer.

69.3 Employer shall not be liable for damage to Contractors equipment at any time unless otherwise expressly stated in the contract.

69.4 The Contractor shall not bring on the site any hired Contractors equipment unless there is an agreement for the hire thereof which contains a provision that the owner will hire such Contractors hired equipment to the Employer in the event of the termination of the contract between the Employer and the Contractor. The terms of hire in such case will be same as that between the owner and the Contractor in all respects when the contract was in force. Moreover the Employer shall be authorized to allow other Contractors to use such hired equipment without any objections from the bidder.

69.5 The costs of hire by the Employer of the Contractors hired plant and equipment as detailed in clause 69.4 above shall be properly paid by the Employer to the owner of the plant, machinery and equipment.

- 69.6 The provisions of the sub clauses 69.2, 69.3, 69.4 and 69.5 shall be applicable to the subcontractors appointed by the Contractor in accordance with this contract.
- 69.7 All the above sub clauses 69.2, 69.3, 69.4, 69.5 and 69.6 do not in any way imply approval to any kind of materials used in the works.
- 69.8 The coarse aggregates for concrete works shall be procured from approved quarries only (black trap chippings) confirming to IS 383 and as per MORTH. The suitability of the same for the required quality, quantity, transport facilities for the same etc. maybe ascertained by the tenderer themselves before tendering and rates be quoted accordingly. Gravel shall not be permitted. The source of fine aggregate (Sand) should be responsibility of contractor.
- 69.9 All samples shall be supplied and tested by the contractor at his own cost.
- 69.10 The cost of all tests shall be borne by the Contractor except the tests that are required by the Engineer are clearly beyond the Contractors obligations of proving the quality and workmanship standards of all materials, equipment, plants and Works. The Engineer shall determine the costs and time effects of such tests that are not a part of the Contractors obligations.
- 69.11 The contractor will have to make his own arrangement for plants, equipments, and machinery to be used in the execution of this work well in time after award of the contract and as per work program given by him.
- 69.12 Contractor shall give Engineer a 24 hours notice for inspection of works or witnessing of test. The Contractor shall proceed with the works or tests in case the Engineer does not attend. Such tests and shall be deemed to have been carried out in the presence of the Engineer.
- 69.13 The Engineer may reject such material, plant, part of the works which are defective and/ or otherwise not in accordance with the contract and notify the Contractor. The notice shall state the Engineers objections and reasons. The Contractor shall then promptly rectify the defect or ensure that rejected materials or plant are not used in the Works and the same shall be removed from site with immediate effect. In case the Contractor wishes to retest such materials, plant or works declared defective by the Engineer, he has to bear the time and cost effects of such retests as mutually agreed with the Employer in consultation with the Engineer.

- 69.14 Contractor will have to pay the levies charges as amended from time to time. Random checking from approved local laboratory also shall be made as per the instruction of the Engineer and results be submitted at the contractor cost. Only screened sand shall be used. Whenever to the opinion to the Engineer the sand needs washing, the same shall be done at contractors cost. The source of sand should be responsibility of contractor and contractor has to get approval from engineer in charge.
- 69.15 The contractor shall have to make his own arrangement to get the power supply from concerned electric authority. The cost of electrical charges is to be borne by contractor including for service road for traffic safety.

## **70. Labour Employment**

- 70.1 Contractor shall, unless otherwise provided in the Contract, make his own arrangements for the engagement of all staff and labour, local or other, and their payment, housing, feeding and transport.
- 70.2 Contractor shall furnish the Engineer every week during the progress of the works, classified weekly returns of the number of the people employed on the work during the week. The report of skilled and unskilled labour shall be given in the prescribed form.
- 70.3 The contractor shall strictly observe all the requirements laid down in the contract labour (Regulation and Abolition) Act, 1979 and the contract labour (Regulation and Abolition) (Gujarat) Rules, 1972 and other acts as amended from time to time so far as applicable from time to time. The contractor, if directed by the Engineer shall increase or decrease the strength of the labour both skilled and unskilled required for the work. The contractor shall also furnish the following returns.
- a) A Weekly medical report showing the health of the contractor's labour camp (skilled or unskilled) and the number and the nature of their illness:
  - b) A report of any accident, which may have occurred, within 24 hours of its occurrence.
  - c) To maintain hygienic condition in labour camp and construction site as per the rules and regulation of authority and health department.
  - d) As it is repeated in (b) above



- e) Not to import, sell give or barter alcoholic liquor or drugs.
- f) Not to import, sell give or barter arms and ammunition.

**71. Program Through Net Work Technique**

71.1 The contractor shall furnish a complete Bar Chart considering all activities right from the award of work to mobilization at site, procurement of materials, machinery's /equipments/ labour etc. for completion of the work in all respects and get it approved from the Engineer, latest within two weeks after issue of notice to proceed with work. This shall form part of the contract agreement. This program will be reviewed by the Engineer, in consultation with the contractor every month to assess the shortfall and to decide actions to be taken.

71.2 The contractor shall further abide by the following instruction:

- a) The contractor shall cooperate fully for clarifying or evaluating schedule and also for ensuring control or monitoring the progress of the work, as per approved schedule from time to time.
- b) The contractor shall Endeavour to minimize revision of the program as far as possible after the work gets into the construction.
- c) The contractor shall immediately inform the Engineer whenever there is or there is likely to be, any change in his schedule.
- d) In case of a schedule slippage due to the contractor's inability to perform as contracted, the contractor shall immediately take such action as may be necessary to bring back his work to schedule without additional cost to the Client, either by employing over time operations, increasing the number of shifts, capacity of equipments etc. or as directed by the Engineer.

**72. Foreign Exchange Requirement**

It should be clearly understood that no foreign exchange sanction would be made available for either purchase of equipments, plants, machinery's, material of any kind or any other thing, required for execution of the work. It should also be clearly understood that no request for importing equipments, materials, plants, etc. that may be required in carrying out the work shall be entertained.

**73. Relation with Public Authorities**

The contractor shall comply with all obligations arising out of legal orders and directions that may be given to him from time to time, by any local or public authorities and shall pay out of his own money, all charges becoming payable to such authorities. He shall co-ordinate his activities during execution, with all agencies including RMC, Design Consultants, construction management consultants, agencies like PGMVCL (Paschim Gujarat Vij Company Limited), RMC (Rajkot Municipal Corporation), RUDA (Rajkot Urban Development Authority), Government of Gujarat, Central Government, Railway Authority, Telephone departments and their representatives without any dispute.

#### **74. Register to be Maintained**

##### **74.1 Cement Register**

A register in prescribed form, giving details regarding day to day receipts of cement as procured by the contractor, consumption in work and balance available on the site, will be maintained at the work site by the contractor. This register shall invariably be signed daily by the contractor or his authorized representative in token of its correctness and shall be made available to Engineer whenever asked, for his verification of every entry made, regarding procurement by the contractor and consumption of these materials in execution.

##### **74.2 Inspection Records and Registers:**

Contractor/s shall maintain accurate records, plans and charts shows the dates and progress of all main operations and the Engineer shall have access to this information at all reasonable times. Records of tests made shall be handed over to the Engineer after carrying out the tests.

##### **74.3 Site Order Register**

The Contractor/s shall promptly acknowledge and note by signing in the register the orders given in Site Order Register by the Engineer or his representative or his superior officers and comply with them. The Contractor/s shall report the compliance to the Engineer within reasonable time so that it can be checked.

##### **74.4 Steel Register**

This register will record the receipts of steel items and details of reinforcement and members wherever steel is used.

##### **74.5 Labour Register**

This register will be maintained to show daily strength of labour in different categories employed by the Contractor/s.

74.6 Log Book of Events

All events are required to be chronologically logged in this book shift wise and date wise. The representative of the Engineer will sign and the contractor will have to sign. The register Performa, charts, etc. will be property of the RMC.

74.7 Any other register considered necessary by the Engineer shall be maintained at site in which the representative to the Engineer and the Contractor/s will have to sign. All registers, program, charts etc. will be the property of the RMC.

74.8 Sampling and Testing

74.8.1 Contractor shall make all arrangements for collection & transportation from site and testing of samples in sufficient quantities as required and provided in relevant IS codes at the laboratory approved by the Engineer. All these will be at no extra cost to the client.

74.8.2 A register in prescribed Performa showing test results of materials and work tests will be maintained at the site of work by the contractor and every entry thereof shall invariably be signed by the contractor or his representative and also by Engineer or his authorized representative in token of its correctness.

74.9 The Contractor Shall Further Abide by the Following Instructions

74.9.1 Soon after receipt of work order awarding the contract, the Contractor for all purposes connected with the execution of work, shall immediately make his own arrangements for obtaining Electricity supply and required supply of water in such quantity and of such quality at such places on the work as may be necessary, by paying charges to the authorities supplying the same after completing all formal procedures as may be required as per the rules with them. The rates quoted in the tender are for completed items of work and shall cover cost of water and electricity as aforesaid. Water for drinking purposes for laborers etc. shall also have to be arranged by the contractor at his own cost. No cost shall be borne by client on this account. RMC shall not be responsible in any way for this purpose. However, the tenderer will be given all possible assistance in the procurement of these requirements but no assurance can be given.

74.9.2 The bidder must clearly understand that the rates quoted are for completed items of work and as such includes all costs associated with labour, mate-

rials, Wastage if any scaffoldings, plants, equipment, supervision, survey works, power, water., sales tax /income tax, and other taxes including turn over work tax, duties and any other requirements contingent upon and needed to carry out the construction. The income tax will be deducted from the running account bill as per rules.

74.9.3 No claim by the contractor for additional payment will be allowed on the ground of any misunderstanding or misapprehension in respect of technical interpretations of conditions or any such matter or otherwise on the ground of any allegation of fact that incorrect information was given to him in the tender or by any person, whether in the employment of the client or consultant or of the failure on his part, to obtain correct information. The bidder shall not be relieved of any risks or obligations imposed upon or undertaken by him, under the contract, or any such ground or on the ground that he did not or could not foresee any matter, which may in fact, affect or have affected the execution of the work.

## **75. Equipment and Accessories**

75.1 Slurry Preparation and Testing Equipment Tanks of suitable sizes and slurry pumps of suitable capacity should be used for storage, mixing and circulation of Betonies slurry at a site. A separate water pump may be used for water supply to slurry tank. Equipment for sampling the slurry form deep trenches and testing its concentrations, viscosity, pH value and hardness of ground water in which the betonies slurry and concrete are prepared, should also bemused. The testing of slurry after contamination with soil or cement indicates the need of disposal or reuse as the case may be. Vibrating screens, hydro cyclones, and centrifuges for cleaning the Betonies slurry for reuse may be employed.

### 75.2 Concreting Equipment

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

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

The necessary equipment shall be provided for conveying the concrete from mixer to the placing site as rapidly as practicable method. Concreting shall be done by tremmie pipes of suitable length and size and concrete pouring devices (mechanical) should be used. The lifting arrangement for tremmie pipes should be capable of doing the work with desired speed.

### 75.3 Lifting Devices

The mobile cranes to be used for handling, shifting and erection of precast girders should be of adequate capacity.

### 75.4 General Guidelines

Choice of rotary, percussion, grabbing equipment, and equipment for direct or reverse mud circulation, etc, shall be made to suit the soil conditions. Vibrations and noise produced during construction should not have any damaging effect on the people and existing structures. Consideration shall be given in selection of equipment when they are required to work on a site with restricted space or head room.

### 75.5 Compliance with statutes and regulations:

The Contractor shall comply with all statutes, regulations, laws and byelaws, ordinances of the Central and State governments and local governing bodies.

The Contractor shall keep the Employer indemnified against all penalties and liability of every kind for breach of any such statutes, ordinances and laws. The Employer shall be responsible for the permissions required for the works to proceed.

## **76. Patent rights**

The Contractor shall save harmless and indemnify the Employer from and against all claims and proceedings for or on account of infringement of any patent rights, design trademark or name or protected rights in respect of Contractors

equipment, material or Plant used for or in connection with incorporation in the Works.

**77. Royalties**

The Contractor shall pay all royalties for getting construction materials required for the Works.

**78. Urgent Remedial work:**

If, by reason of any accident, or failure, or other event occurring to, in, or in connection with the Works, or any part thereof, either during the execution of the Works, or during defects liability period, any remedial or other work is, in the opinion of the Engineer, urgently necessary for the safety of the Works and the Contractor is unable or unwilling at once to do such work, the Employer shall be entitled to employ and pay other persons to carry out such work as the Engineer may consider necessary. If the work or repair so done by the Employer is work which, in the opinion of the Engineer, the Contractor was liable to do at his own cost under the Contract, then all costs consequent thereon or incidental thereto shall, after due consultation with the Employer and the Contractor, be determined by the Engineer and shall be recoverable by the Employer from the Contractor, and may be deducted by the Employer from any monies due or to become due to the Contractor and the Engineer shall notify the Contractor accordingly, with a copy to the Employer. Provided that the Engineer shall, as soon after the occurrence of emergency as may be reasonably practicable, notify the Contractor thereof.

**79. Special Risks :**

79.1 The Contractor shall be under no liability whatsoever in consequence of any of the special risks referred to in sub clause 79.5 whether by way of indemnity or otherwise, for or in respect of :

79.2 Destruction or damage to work, except defective works to be removed and rectified, prior to the occurrence of the said special risks.

79.3 Destruction of or damage to property, whether of the Employer or third parties or Injury or loss of life, not caused by negligence of the contractor and even after following all the safety norms by the Contractor.

79.4 The special risks are as defined in sub clause 11.1 of these conditions. Destruction caused by a projectile, missile or bomb is also included in special risks.

79.5 The Contractor shall be entitled to payment in accordance with the Contract on account of damages covered under special risks as stated in clause 79.4 for any permanent work executed and for any material or plant so destroyed or damaged as required by the Engineer or as necessary for the completion of the works. The payment shall be for

- i. Rectifying any such destruction or damage to works
- ii. Replacing or rectifying such materials or Contractor's Equipment.

And the Engineer shall determine an addition to the Contract Price in accordance to the sub clause 43 of these conditions, and shall notify the Contractor accordingly with a copy to the Employer.

The Contractor shall inform by giving notice to the Engineer with a copy to Employer, as soon as events covered by special risks occur and the cost implications of these.

79.6 The Contractor shall use his best endeavors to complete the execution of Works in the event of outbreak of war in any part of the world.

79.7 In case the Employer chooses to terminate the contract on account of the outbreak of war, the Contractor shall remove his plant and machinery from site diligently. Similar facility shall be extended to the sub contractors.

79.8 In the event of termination of contract on account of outbreak of war, the Contractor shall be entitled to payment towards the following items apart from other payments due as per conditions of contract

79.9 Sum being the amount of any expenditure reasonably incurred by the Contractor, in the expectation of completing the whole of the works, in so far as such expenditure has not been covered by any other payments.

79.10 Proportionate demobilization costs towards manpower and machinery and plant.

## **80. Force Majeure**

Neither party shall be liable to the other for any loss of damage occasioned by or arising out of acts of god, and in particulars, unprecedented Floods, volcanic eruption earth quake or other convulsion of nature, and other acts such as but not restricted to general strike, invasion, the act of foreign countries, hostilities or war like operations before or after declaration of war, rebellion, military or usurped power which prevent performance of the contract and which could not have been for seen or avoided by a prudent person.

### **81. Release from performance**

If any circumstances outside the control of both the parties arises after the issue of the Letter of Acceptance which renders it impossible or unlawful for either or both parties to fulfill his or their contractual obligations, or under the law governing the Contract the parties are released from further performance, then the parties shall be discharged from the Contract, except as to their rights under this clause and sub clause 23 and without prejudice to the rights of either party in respect of any antecedent breach of the Contract, and the sum payable by the Employer to the Contractor in respect of the work executed shall be the same as that which would have been payable under clause 60 if the Contract had been terminated under the provisions of Clause 59.

### **82. Changes in Cost and Legislation**

There shall be no addition or deduction from the Contract Price due to changes to any National or State Statute, Ordinance, Decree, Law, Regulation or byelaw. The adjustment to Contract Price affected under various sub clauses detailed in clause 41 shall be deemed to cover such costs.

### **83. Safety aspects**

83.1 The Contractor shall take all reasonable steps to protect the environment on and off the site and avoid damage or nuisance to persons or property of the public and others arising as a consequence of his method of operation.



83.2 The Contractor shall maintain in good condition all work throughout execution, completion and defects liability period. The contractor shall be responsible for and to make good all injuries, damages and repairs, rendered necessary by fire, rain, traffic, floods or other causes

83.3 The Contractor shall be responsible for maintenance and watch and ward of the complete installation and shall also be responsible for any pilferage, theft, damage, penalty etc. in this regard. The Contractor shall indemnify the Engineer against any claim arising out of pilferage / theft, damage, penalty etc. whatsoever on this account. Security deposit for the work shall be released only after the clearance is obtained from the local authorities from whom temporary electric/ water / telephone connection have been obtained by the contractor.

83.4 The Contractor shall depute Engineers & skilled workers as required for the work. Necessary protective and safety equipment shall be provided to them by the Contractor at his own cost and used at site.

### **83.5 Security & Traffic Arrangements**

In event of any restriction being imposed by the Security Staff of The Employer, Rajkot Municipal Corporation traffic or any other local governing body having control over the project, on the working or movement of labour, materials, the Contractor shall strictly follow all such restrictions or instructions issued regarding the same and nothing extra shall be payable to the Contractor on account of such restrictions or instructions. In case of loss of time on this account if any, shall have to be made up by generating additional resources etc.

General security restrictions are given as under:

- i. The movement of trucks and vehicles shall be regulated in accordance with rules and regulations as approved by competent authorities.
- ii. The Contractor shall inform in advance, if required, the truck registration numbers ownership of the trucks, names and addresses of the drivers for necessary action by the security agency.
- iii. As and when there will be security requirements, certain additional restrictions can be imposed as per the requirement of the situation.
- iv. No claim whatsoever will be entertained by the Employer on account of any restriction that can be imposed as per the requirement of the situation.

## **Special Conditions of Contract**

### **84.0 Special Conditions of Contract**

84.1 As the work is to be constructed in heavy traffic area, Employer will not be in a position to give entire stretch of work at a time. No claim shall be entertained for the same.

84.2 If any underground utility line fouls during execution, same shall be shifted by the contractor as directed by Engineer-in-charge. No claim for time extension shall be entertained for the same.

84.3 Contractor is required to use his own national / international practices of tracing out or locate underground utilities below the ground at no cost to the Employer.

84.4 No claim shall be entertained if the items stipulated in the tender shall not be executed as per site condition/ requirements.

84.5 No idle charges shall be paid to contractor if any machinery and man power remain idle and no claim shall be entertained for the same.

84.6 Municipal Commissioner reserves the rights to reduce / increase the scope of work up to any extent without assigning reason thereof and the contractor has to execute the BOQ items at his tender rate.

84.7 If any underground cables (electric, telephone, communication, etc.), Gas line foul during execution contractor shall start work at other available work front until such cables / Gas line are shifted. No claim for time extension shall be entertained for the same.

84.8 Contractor shall have his own Automatic Computerized Batch Mix Plant of min 19 m<sup>3</sup>/hr for Ready Mixed Concrete within a 10 km radius of the site. Necessary office for RMC Engineers/TPI along with Laboratory and Testing Equipment shall be provided at plant location. The Plant shall be kept under CCTV Surveillance with

remote access with an internet connection. Designated RMC officials will be provided remote access. The entire recording will have backup.

84.9 The site will be kept under CCTV Surveillance. Cameras as per requirement will be fixed at pre-decided strategic locations with remote access with an internet connection. Designated RMC officials will be provided remote access. The entire recording will have backup.

## **85 LABOUR**

- a) The Contractor shall make his own arrangements for the engagement of all staff and labour, local or other, and for their payment, housing, feeding and transport.
- b) The Contractor shall, if required by the Engineer, deliver to the Engineer a return in detail, in such form and at such intervals as the Engineer may prescribe, showing the staff and the numbers of the several classes of labour from time to time employed by the Contractor on the Site and such other information as the Engineer may require.

## **86 COMPLIANCE WITH LABOUR REGULATIONS**

During continuance of the contract, the Contractor and his subcontractors shall abide at all times by all existing labour enactment and rules made there under, regulations, notifications and bye laws of the State or Central Government or local authority and any other labour law (including rules) regulations, bye laws that may be passed or notification that may be issued under any labour law in future either by the State or Central Government or the local authority. Salient features of some of the major labour laws that are applicable to construction industry are given below. The Contractor shall keep the Employer indemnified in case any action is taken against the Employer by the competent authority on account of contravention of any of the provisions of any Act or rules made there under, regulations or notifications including amendments. If the Employer is caused to pay or reimburse such amounts as may be necessary to cause or observe, or for non-

observance of the provisions stipulated in the notifications/bye laws/Acts/Rules/regulations including amendments, if any, on the part of the Contractor the Engineer or any person authorized by the Engineer shall have the right to deduct any money due to the Contractor including his amount of performance security. The Engineer or his nominee shall also have right to recover from the Contractor any sum required or estimated to be required for making good the loss or damage suffered by the Employer.

The employees of the Contractor and the Sub-Contractor in no case shall be treated as the employees of the Employer at any point of time.

## **87 SALIENT FEATURES OF SOME MAJOR LAWS APPLICABLE TO ESTABLISHMENTS ENGAGED IN BUILDING AND OTHER CONSTRUCTION WORK.**

- a) Workmen Compensation Act 1923:- The Act provides for compensation in case of injury by accident arising out of and during the course of employment.
- b) Payment of Gratuity Act 1972: Gratuity is payable to an employee under the Act on satisfaction of certain conditions on separation if an employee has completed 5 years service or more on death at the rate of 15 days wages for every completed year of service. The Act is applicable to all establishments employing 10 or more employees.
- c) Employees P.F and Miscellaneous Provision Act 1952: The Act Provides for monthly contributions by the employer plus workers @ 12%/8.33%. The benefits payable under the Act are:
  - a. Pension to family pension on retirement or death, as the case may be.
  - b. Deposit linked insurance on the death in harness of the worker.
  - c. Payment of P.F accumulation on retirement/death etc.
- d) Maternity Benefit Act 1951:- The Act provides for leave and some other benefits to workmen/ employees in case of confinement or miscarriage etc.
- e) Contract Labour (Regulation & Abolition) Act 1970:- The Act provides for certain welfare measures to be provided by the Contractor to contract labour and in case the Contractor fails to provide, the same are required to be provided, by the Principal Employer by Law. The Principal Employer is required to- take Certifi-

cate of Registration and the Contractor is required to take license from the designated Officer. The Act is applicable to the establishments or Contractor of Principal Employer if they employ 20 or more contract labor.

- f) Minimum Wages Act 1948: The Employer is supposed to pay not less than the Minimum Wages fixed by appropriate Government as per provisions of the Act if the employment is a scheduled employment Construction of Buildings, Roads, Runways are scheduled employment.
- g) Payment of Wages Act 1936:- It lays down as to by what date the wages are to be paid when it will be paid and what deductions can be made from the wages of the workers.
- h) Equal Remuneration Act 1979:- The Act provides for payment of equal wages for work of equal nature to Male and Female workers and for not making discrimination against Female employees in the matters of transfers, training and promotions etc.
- i) Payment of Bonus Act 1965: The Act is applicable to all establishments employing 20 or more employees. The Act provides for payments of annual bonus subject to a minimum of 8.33% of wages and maximum of 20% of wages to employees drawing Rs. 3500/- per month or less. The bonus to be paid to employees getting Rs. 2500/- per month or above up to Rs. 3500/- per month shall be worked out by taking wages as Rs. 2500/- per month only. The Act does not apply to certain establishments. The newly set-up establishments are exempted for five years in certain circumstances. Some of the State Governments have reduced the employment size from 20 to 10 for the purpose of applicability of this Act.
- j) Industrial Disputes Act 1947:- The Act lays down the machinery and procedure for resolution of Industrial disputes, in what situations a strike or lock out becomes illegal and what are the requirements for laying off or retrenching the employees or closing down the establishment.
- k) Industrial Employment's (Standing Orders) Act 1946:- It is applicable to all establishments employing 100 or more workmen (employment size reduced by some of the States and Central Government to 50). The act provides for laying down rules governing the conditions of employment by the Employer on matters provided in the Act and get same certified by the designated Authority.

- l) Trade Unions Act 1926:- The Act lays down the procedure for registration of trade union of workmen and employers. The Trade Union registered under the Act has been given certain immunities from civil and criminal liabilities.
- m) Child Labour (Prohibition & Regulation) Act 1986:- The Act prohibits employment of children below 14 years of age in certain occupations and processes and provides for regulation of employment of Children in all other occupations and processes. Employment of Child Labor is prohibited in Building and Construction Industry.
- n) Inter-State Migrant workmen's ( Regulation of Employment & Conditions of Service ) Act 1979:-
- o) The Act is applicable to an establishment which employs 5 or more inter-state migrant workmen through an intermediary (who has recruited workmen in one state for employment in the establishment situated in another state). The Inter-State migrant workmen, in establishment to which this Act becomes applicable, are required to be provided certain facilities such as housing, medical aid, travelling expenses from home upon the establishment and back, etc.
- p) The Building and Other Construction workers (Regulation of Employment and Conditions of Service) Act 1996 and the Cess Act of 1996:- All the establishments who carry on any building or other construction work and employ 10 or more workers are covered under this Act. All such establishments are required to pay cess at the rate not exceeding 2% of the cost of construction as may be modified by the Government. The Employer of the establishment is required to provide safety measures at the Building or Construction work and other welfare measures, such as Canteens, First-Aid facilities, Ambulance, Housing accommodations for workers near the work place etc. The Employer to whom the Act applies has to obtain a registration certificate from the Registering Officer appointed by the Government.
- q) Factories Act 1948:- The Act lays down the procedure for approval at plans before setting up a factory, health and safety provisions, welfare provisions, working hours, annual earned leave and rendering information regarding accidents or dangerous occurrences to designated authorities. It is applicable to premises employing 10 persons or more with aid of power or 20 more persons without the aid of power engaged in manufacturing process.

**88 TAXES, DUTIES, ETC. :**

1. Contractor agrees to and does hereby accept full and exclusive liability for the payment of any and all taxes including Sales Tax, Duties, etc., now or hereinafter imposed, increased or modified from time to time in respect of work and materials and all contributions and taxes for unemployment, compensation, insurance and old age pension or annuities now or hereinafter imposed by the Central or State Government authorities with respect to or covered by the wages, salaries or other compensation paid to the persons employed by Contractor.

If the Contractor is not liable to Sales Tax assessment, a certificate to that effect from the Competent Authority shall be produced without which final payment to the Contractor shall not be made No.P, 'C' and 'D' Form shall be supplied by the owner, and the Contractor shall be required to pay full tax as applicable.

2. Contractor shall be responsible for compliance with all obligations and restrictions imposed by the labour law or any other law affecting employer- employee relationship.

3. Contractor further agrees to comply and to secure the compliance of all sub contractors with applicable Central, State, Municipal and local laws and regulations and requirement. Contractor also agrees to defend, indemnify the hold harmless the owner from any liability or penalty which may be imposed by Central, State or local authority by reasons of any violation by Contractor or sub Contractor of such laws, regulations or requirements and also from all claims, suits or proceedings that may be brought against owner arising under, growing out of or by reasons or work provided for by this Contract by third parties or by Central or State Government authority or any administrative Sub-Division thereof.

The Sales Tax on work contract will be borne by Contractor.

**89 INSURANCE :**

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

1. Contractor agrees to and uses hereby accept full and exclusive liability for compliance with all obligations imposed by the Employer's State Insurance Act, 1948 and Contractor further agrees to defend, indemnify and hold owner hardness from any liability or penalty which may be imposed by the Central or State Government or local authority by reasons of any assorted violation by Contractor or Sub-Contractor or the Employees State Insurance Act, 1948 and also from all claims, suits or proceedings that may be brought against owner arising under, growing out of or by reasons of the work provided for by this contract whether brought by employees of Contractor by third parties or by Central or State Government authority or any administrative Sub-division thereof.

Contractor agrees to fill in with the Employees State Insurance Corporation, the declaration form and all forms which may be required in respect of Contractor's or sub-Contractor's employees whose aggregate remuneration is Rs.400/- p.m. or less and who are employed in work provided for or those covered by ESI from time to time under the agreement. The Contractor shall deduct and secure the agreement of the sub-Contractor to deduct the employees contribution as per the first schedule of the Employees State Insurance Act from wages. Contractor shall remit and secure the agreement of sub-contractor to remit to the State Bank of Indian Employees State Insurance Accounts, the employee's contribution as required by the Act. Contractor agrees to maintain all cards and records as required under the Act in respect of employees and payments and Contractor shall secure the agreements of the sub contractors to maintain in such records, any expenses incurred for the contributions, making contributions or maintaining records shall be to Contractors or sub-contractors own account. owner shall retain such sum as may be necessary from the contract value until Contractor shall furnish satisfactory proof that all contribution as required by the Employees State Insurance Act, 1948 have been paid.

2. **Workman's compensation and employees liability insurance:** Insurance shall be effected for all Contractors employees engaged in the performance of this contract. If any part of work is sublet, Contractor shall require the sub- Contractor to provide workman's compensation and employer's liability insurance, which may be required by owner.

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

#### **90 DAMAGE TO PROPERTY :**

1. Contractor shall be responsible for making good to the satisfaction of owner any loss of and any damage to all structures and properties belonging to owner or being executed or procured or being procured by owner or of other agencies within the premises of all work of owner, if such loss or damage is due to fault and / or the negligence of willful act or omission of Contractor, his employees, agent, representatives or sub-Contractor s.

2. Contractor shall indemnify and keep owner harmless of all claims for damage to properties other than property arising under by reasons of this agreement, such claims result from the fault and / or negligence or willful act or omission of Contractor, his employees, agents representative or sub-contractor.

#### **91 CONTRACTOR TO INDEMNIFY OWNER :**

1. The Contractor shall indemnify and keep indemnified the owner and every member, officer and employee of owner from and against all actions, claims, demands and liabilities whatsoever under the in respect of the breach of any of the above clauses and / or against any claim, action or demand by any workman



/ employee of the Contractor or any sub-contractor under any laws, rules or regulations having force of laws, including but not limited to claims against the owner under the workman compensation Act, 1923, the Employee's Provident Funds Act, 1952 and / or the contract labour (Abolition and Regulations) Act, 1970.

2. PAYMENTS OF CLAIMS AND DAMAGES : If owner has to pay any money in respect of such claims or demands aforesaid, the amount so paid and the cost incurred by the owner shall be charged to and paid by Contractor without any dispute not withstanding the same may have been paid without the consent or authority of the Contractor.

3. In every case in which by virtue of any provision applicable in the workman's Compensation Act, 1923 or any other Act, owner be obliged to pay compensation to workmen employed by Contractor the amount of compensation so paid, and without prejudice to the rights of owner under Section-(12) Sub-section-(2) of the said Act, owner shall be at liberty to recover such amount from any surplus due to on to become due to the Contractor or from the security deposit. Owner will not be bound to contest any claim made under Section-(12) Sub-section-(2) of the said act except on written request of Contractor and giving full security for all costs consequent upon the contesting of such claim.

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

## **92 IMPLEMENTATION OF APPRENTICE ACT 1954 :**

Contractor shall comply with the provisions of the apprentice Act 1954 and the orders issued there under from time to time. If he fails to do so, it will be a breach of contract.

## **93 HEALTH AND SANITARY ARRANGEMENTS FOR WORKERS:**

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

## **94 SAFETY CODE :**

General :

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

First Aid and Industrial Injuries :

Contractor shall maintain First-Aid facilities for its employees and those of his sub-contractors.

Contractor shall make outside arrangements for ambulance service and for the treatment of industrial injuries. Name of those providing these services shall be furnished to Engineer-In-Charge prior to start of construction, and their telephone numbers shall be prominently posted in Contractor's field office.

All injuries shall be reported promptly to Engineer-In-Charge and a copy of Contractor's report covering each personal injury requiring the attention of a physician shall be furnished to owner.

General Rules :

Carrying and striking, matches, lighters inside the project area and smoking within the job site is strictly prohibited. Violators of smoking rules shall be discharged immediately. Within the operation area, no hot work shall be permitted, without valid gas, safety, fire permits. The Contractor shall also be held liable and responsible for all lapses of his sub-Contractors / employees in this regard.

Contractor's Barricades :

Contractor shall erect and maintain barricades without any extra cost, required in connection with his operation to guard or protect during the entire phase of the operation of this contract for -

Excavation Hoisting areas

Areas adjudged hazardous by Contractor's OR Owner's inspectors.

Owner's existing property liable to be damaged by Contractor's operations, in the opinion of Engineer-In-Charge / Site Engineer.

Contractor's employees and those of his sub-contractors shall become acquainted with owner's barricading practices and shall respect the provisions thereof.

Barricades and hazardous areas adjacent to but not located in normal routes of travel shall be marked by red lantern at night.

Scaffolding :

Suitable scaffolding shall be provided for workman for all works that cannot safely be done from ladders. When a ladder is used, an extra mazdoor shall be engaged for holding the ladder and if the ladder is used for carrying materials as well suitable footholds and handholds shall be provided on the ladder and the same shall be given an inclination not steeper than 1 in 4 (1 horizontal and 4 vertical).

Scaffolding or staging, more than 3.6 M. (12') above the ground or floor, swing or suspended from an overhead support or erected with stationary support shall have a guard rail properly attached, bolted, braced and otherwise fixed at least 1.0 M (3') high above the floor or platform or scaffolding or staging and extending along the entire length of the outside ends thereof with only such openings as may be necessary for the delivery of materials. Such scaffolding or staging shall be so fastened as

to prevent it from swaying from the building or structure.

Working platforms, gangways, and stairways should be so constructed that they should not sag unduly or inadequately and if the height of the platform or the gangway of the stairway is more than 3.6 (12') above ground level or floor level, they should be closely boarded, should have adequate width and should be suitably fastened as described in 4.2 above.

Every opening in the floor of a building or in a working platform be provided with suitable means to prevent the fall of persons or materials by providing suitable fencing or railing whose minimum height shall be 1.0 M (3'.0").

Safe means of access shall be provided to all working platforms and other working places. Every ladder shall be securely fixed. No portable single ladder shall be over 9.0 M. (30') in length while the width between the side rails in rung ladder shall in no case be less than 30 cms (12 inches) for ladder up to and including 3.0 M. (10'), in longer ladders this width would be increased at least 6 mm (1/4") for each addition 30 c.m. (1.0) of length. Uniform step spacing shall not exceed 30 cms. (12"). Adequate precaution shall be taken to prevent danger from electrical equipment. No materials on any of the side of work shall be so stacked or placed as to cause danger or inconvenience to any person or public. The Contractor shall also provide all necessary all necessary fencing and lights to protect the workers and staff from accidents, and shall be bound to bear the expenses of defence of every suit action or other proceedings at law that may be brought by any persons for injury sustained owing to neglect of the above precautions and to pay damages and costs which may be awarded in any such suit or action or proceedings to any such person, or which, may be with the consent of the Contractor be paid to compromise any claim by any such person.

Excavation :

All trenches 1.2 M (4') or more in depth, shall at all time be supplied with at least one ladder.

Ladder shall be extended bottom of the trench to at least 3" above the surface of the ground. The side of the trench which are 1.5 M (5') or more in depth shall be stopped back to give suitable slope, or securely held by timber bracing, so as to avoid the danger of sides to collapse. The excavated materials shall not be placed within 1.5 M (5') of the trench of half of the trench depth whichever is more. Cutting shall be done from top to bottom. Under no circumstances, undermining or under cutting be done.

Demolition :

Before any demolition work is commenced and also during the progress of the work all roads and open area adjacent to the work site shall either be closed or suitably protected.

No electric cable or apparatus which is liable to be a source of danger shall remain electricity charged.

All practical steps shall be taken to prevent danger to persons employed from risk of fire or explosion of flooding. No floor or other part of the building shall be so over loaded with debris or materials as to render it unsafe.

#### Safety Equipment :

All necessary personal safety equipment as considered necessary by the Engineer-In-Charge should be made available for the use of persons employed on the site and maintained in a condition suitable for immediate use, and the Contractor should take adequate steps to ensure proper use of equipment by those concerned.

Workers employed on mixing asphaltic materials, cement and lime mortars shall be provided with protective footwear and protective gloves.

#### Risky Place :

When the work is done near any place where there is a risk of drowning, all necessary safety equipment shall be provided and kept ready for use and all necessary steps taken for prompt rescue of any person in danger and adequate provision should be made for prompt first-aid treatment of all injuries likely to be sustained during the course of the work.

#### Hoisting Equipment :

Use of hoisting machines and tackles including their attachments, and storage and supports shall conform to the following standards or conditions.

These shall be of good mechanical construction, sound material and adequate strength and free from patent defect and shall be kept in good condition and in good working order.

Every rope used in hoisting or lowering materials or as a means of suspension shall be of durable quality and adequate strength and free from patent defects.

Every crane driver or hoisting appliance operator shall be properly qualified and no person under the age of 21 years should be in-charge of any hoisting machine including any scaffolding.

In case of every hoisting machine and of every chain ring hook, shackle, swivel and pulley block used in hoisting or lowering or as means of suspension, the safe working load shall be ascertained by adequate means. Every hoisting machine and all gear referred to above shall be plainly marked with the safe working load and the conditions under which it is applicable shall be clearly indicated. No part of any machine or any gear referred to above in this paragraph shall be loaded beyond the safe working load except for the purpose of testing.

In case of departmental machine, the safe work load shall be notified by the Engineer-In-Charge, as regards Contractor's machine, the Contractor shall, notify, the safety working load of the machine to the Engineer-In-Charge. Whenever the Contractor brings any machinery to site of work he should get it verified by the Engineer-In-Charge concerned.

#### 10.0 Electrical Equipment :

Motors, gears, transmission, electric wiring and other dangerous parts of hoisting appliances shall be provided with efficient safeguards, hoisting appliances should be provided with such means when will reduce to the

minimum the risk of accidental descent of the load, adequate precautions shall be taken to reduce to the minimum the risk of any part or a suspended load becoming accidentally displaced. When workers are employed on electrical installations which are already energized, insulating mats, wearing apparel such as gloves, and booths as may be necessary shall be provided. The workers shall not wear any rings, watches and carry keys or other materials which are good conductors of electricity.

#### 11.0 Maintenance of Safety Devices :

All scaffolds, ladders and other safety devices as mentioned or described herein shall be maintained in sound condition and no scaffold, ladder or equipment shall be altered or removed while it is in use. Adequate washing facilities should be provided at or near place of work.

#### 12.0 Display of Safety Instructions :

The safety provisions should be brought to the notice of all concerned by display on a Notice Board at a prominent place at the work spot. The persons responsible for compliance of the safety code shall be named therein by the Contractor.

#### 13.0 Enforcement of Safety Regulations :

To ensure effective enforcement of the rules and regulations relating to safety precautions, the arrangement made by the Contractor shall be open to inspection by the Welfare Officer, Engineer-In-Charge or Safety Engineer of the owner or their representatives.

#### No Exemption :

Notwithstanding the above clause 1.0 to 13.0 there is nothing to exempt the Contractor from the operations of any other Act or Rules in force in the Republic of India.

In addition to the above, the Contractor shall abide by the safety code provisions as per C.P.W.D. safety code framed from time to time.

### **95 ACCIDENTS :**

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

In the event of an accident in respect of which compensation may become payable under the Workman's Compensation Act VIII of 1923 including all modification thereof, the Engineer-In-Charge may retain out of money due and payable to the Contractor such sum of sums of money as may in the opinion of Engineer-In-Charge be sufficient to meet such liability. On receipt of award from the Labour Commissioner in regard to quantum of compensation, the difference in amount will be adjusted.

Addi. Asst. Engineer  
R.M.C.

Dy.Ex. Engineer  
R.M.C.

Addi. City Engineer  
R.M.C.

Signature of Contractor.

**SECTION - III**

**CONTRACT DATA**

### Section - III:Contract Data

1. Name of Work : **CONSTRUCTION OF MINOR BRIDGE NEAR SHANTINAGAR-3 ON AIIMS HOSPITAL CONNECTING 30.0 MT. D.P. ROAD IN WARD NO.3**
2. The Employer isRajkot Municipal Corporation  
Address: The City Engineer, Rajkot Municipal Corporation, Central Zone, Dr.AmbedkarBhavan, Dhebarbhai Road, Rajkot – 360001.Gujarat.
3. Name of authorized Representative of Employer:The Municipal Commissioner, Rajkot or his representative deputed by him.
4. The Design Consultant is:  
**DELFI Consulting Engineers (I) Pvt Ltd**  
Address: 101 2<sup>nd</sup>floor, Shanay 1  
Opp. ShivalikPlazza,  
IIM ATIRA ROAD,  
Ahmedabad – 380 006  
Phone: 079-40076864.  
Email:[info@delfengineersindia.com](mailto:info@delfengineersindia.com)
5. The defects Liability Period is 3 years form date of completion.
6. The Start Date shall be 15 days from the date of issue of the Letter of acceptance.
7. The Completion Period for the whole of the Works shall be 6(Six) calendar months (excluding monsoon period) after the start date.  
The Site (Nala) is located at Shantinagar - 3 area near Nageshwar Temple on 30.0 mt. D.P. Road connecting AIIMS Hospital Road of RMC.
8. The following document also form part of the Contract:  
Invitation for Bids  
Instruction to Bidders  
Qualification Information and other forms  
The final accepted bid of the bidder after modifications, changes, additions and alterations after mutual agreement with Employer.  
General Conditions of Contract  
Contract Data  
Technical Specifications  
Form of bid



Schedule B

Drawings

Documents furnished by bidder

Pre bid Clarification and Amendments

9. The law which applies to the Contract is the law of Union of India
10. The language of the contract document is English
11. Subcontracting is not allowed.
12. The Schedule of Other Contractors : Nil
13. The Schedule of Key Personnel As specified.
14. The minimum insurance cover for physical property, injury and death is Rs. 5 lacs per occurrence with the number of occurrences limited to four. After each occurrence, contractor will pay additional premium necessary to make insurance valid for four occurrences always, up to expiry of defect liability period.
15. The Site Possession Date shall be the immediate next day on award of work
16. The period for submission of the programme for approval of Engineer shall be 15 days from the issue of Letter of Acceptance.
17. The period between programme updates shall be 1 Month.
18. The amount to be withheld for late submission of an updated programme shall be Rs. 1,00,000/- (Rupees One Lakh)
19. The following events shall not be compensated on any account: Contractor should make its own assessment for the following aspects before bidding.  
Substantially adverse ground conditions encountered during the course of execution of work not provided for in the bidding document.
  - (i) Removal of underground utilities
  - (ii) Significant change in classification of soil requiring additional mobilization by the contractor, e.g. ordinary soil to rock excavation,
  - (iii) Removal of unsuitable material like marsh, debris dumps, etc. not caused by the contractor
  - (iv) Artesian conditions
  - (v) Seepage, erosion, landslide
  - (vi) Presence of historical, archaeological or religious structures, monuments interfering with the works
  - (vii) Restriction of access to ground imposed by civil, judicial, or military authority
20. The currency of the Contract is Indian Rupees.

21. Retention Money (@ 5% of value of work done) will be deducted from each RA bill over & above S.D.
22. Maximum limit of liquidated damages for 10 per cent of the Initial Contract Price delay in completion of work. Rounded off to the nearest thousand.
23. The Securities shall be for the following minimum amounts equivalent as a percentage of the Contract Price: Performance Security for 5 percent of contract price. Additional sums (to be decided after evaluation of the bid) as additional security in terms ITB Clause 30.0.)
24. The standard form of Performance Security acceptable to the Employer shall be an unconditional Bank Guarantee or DD of Nationalized OR schedule bank (except cooperative bank) in an approved format by the Employer.

**SECTION - IV**

**WORK PLAN**

**&**

**TECHNICAL SPECIFICATIONS**

## SECTION – IV: WORK PLAN AND TECHNICAL SPECIFICATIONS

### Table of Clauses

#### A. Project Feature and Work Planning

1.0 Location of site

2.0 Scope of Work

#### B Specifications

3.0 Technical Specifications

4.0 General Specifications

### A – PROJECT FEATURES AND WORK PLANNING

#### 1.0 Location of the Site

**The Site (Nala) is located at Shantinagar- 3 area near Nageshwar Temple on 30.0 mt. D.P. Road connecting AIIMS Hospital Road of RMC.**

#### 2.0 Scope of Work

Salient Features of approach bridges

- (i) Estimated cost of work –**Rs.4,65,00,000.00**
- (ii) Foundation –Pile Foundation
- (iii) Substructure - Circular Pier
- (iv) Superstructure - R.C.C. solid slab superstructure
- (v) Bearing: Elastomeric Bearing
- (vi) Approaches –RCC Retaining Wall
- (vii) Service road & footpath
- (viii) Wearing coat of the bridge

#### 2.1 Work Planning

- a) The tender drawing shows the schematic layout and details of the proposed solid slab type River Bridge along 30m D.P. Road. The work plan should take into consideration presence of flowing water at bridge location
- b) Marking out of alignment of the proposed Bridge
- c) Start the execution work as per the approved work schedule and as directed by the Engineer in charge.

## **2.2 Space required for casting, stacking etc**

The contractor is advised to study the problems of stacking, storing, casting, working space, etc. Their construction methods, especially for following items should be carefully planned and shown in the methodology.

- a) Storing, stacking of materials like aggregates, steel, cement, shuttering scaffolding materials, dismantled material, etc.
- b) Planning of the equipments for batching plant, placement concreting, etc.
- c) Movement of trucks, transit mixture, cars, etc.
- d) Location of the site office store etc.
- e) Casting/Fabrication yard as required, it should be outside the ROB construction area.
- f) Coordinating work activities with ongoing work.

## **2.3 Concrete Mix Design**

Contractor should study all the possibilities of achieving the desired results for the concrete mixes proposed for the project. The contractor should collect the coarse and fine aggregates of the best quality. The cement used for this type of concrete should be got tested periodically and should not be more than 3 months old. The contractor may study the possibility should of adding the necessary plasticizers and ad-mixtures to achieve this strength with desired workability and finishes without affecting durability and damaging the reinforcement and high tensile steel. The cost for any plasticizer admixtures shall be borne by contractor.

## **2.4 Design of sub-structure and foundation in Approaches**

The design of substructure and the foundations has been based on the soil investigation data. The design is however, tentative to the extent this information is at variance with the actual foundation conditions met during construction. Necessary changes would be made in the design of foundation & substructure for the change data. The variation in the superstructure, sub-structure and foundations will not vitiate the contract and the work will be carried out at quoted rates according to the details furnished to the contractor during execution of the work. The contractor has to confirm the strata, SBC, etc. mentioned in the execution drawing by the required tests and if any changes are found, the same shall be brought to the notice of the Engineer in

charge. The necessary actions required for the same shall be carried out in consultation with the Engineer in Charge/design consultant. No extra payment shall be made for the same. The span arrangement shown is tentative and may be changed if any underground services are encountered and is fouling with pier foundation. In the bridge portions the contractor will be required to take trenches to the required depth to locate the underground services at pier location. The diversion of any services and water way required to be done will be done including all.

If any Item required to be executed the tender rate of RMC SOR will prevail and the item is not available, the rate in R&B SOR will prevail. Without any Tender Premium and if so in Minus, that will be calculated as per minus Tender premium

## **2.5 Setting out Works**

The contractor shall be responsible for the true and proper setting out of the works and for the correctness of the positions, levels, dimensions and alignment of all parts of the works and for the provisions of all necessary instruments and appliances and labour in connection therewith. If at any time during the progress of works any error appears or arises in the positions, levels, dimensions or alignment of any part of the works, the contractor is required to rectify the same at his own expenses to the satisfaction of the Engineer-in-Charge. The checking of any setting out or of any lines and levels by the Engineer-in-Charge or his representative shall not in any way relieve the contractor of his responsibility for correctness thereof and the contractor shall carefully protect, preserve and maintain all bench marks, site rails, pegs etc. used in setting out the works. The costs of providing, preserving, protecting and maintaining the site rails, pegs, benchmark etc. shall be deemed to be included in the rate quoted for various items in the schedule B and no separate payment will be made for the same.

The contractor shall incorporate into the structure the fixtures for lighting, drainage, road markers, signals etc. as may be given to him by the Engineer-in Charge, without claiming any extra cost.

## **2.6 Conformity to Codal Provisions**

All permanent and temporary works shall conform to the latest specifications of Codes of Indian Road Congress, Specifications of Road & Bridge works by Ministry of Road Transport and Highways, IS Standards and any other relevant codes and prevail-

ing sound Engineering practices as mentioned in the contract documents or approved by the competent authority as applicable.

## **2.7 Drawings**

It is very much necessary for the contractor to submit and get approved the detailed Lab., tests, Classification of strata boring and work plan/schedule. The detailed submission of the drawings shall be done only after these details. The drawings shall be issued to the contractor as and when necessary keeping in view that the construction schedule of the project is not disturbed.

The bar bending schedule and shop drawings for structural steel work shall be prepared by the contractor and got approved from the Engineer-in-charge before planning of work, fabrication, cutting or assembling. All the dimensions shown on the tender drawings are tentative and subject to variation during execution. Contractor cannot claim for any variation/change in the dimensions shown in the tender drawings during execution.

## **B –SPECIFICATIONS**

### **PREAMBLE:**

The 'Technical Specifications' contained hereunder shall be read in conjunction with the other bidding stipulations.

### **3.0 TECHNICAL SPECIFICATIONS:**

The Technical Specifications in accordance with which the entire work described herein after shall be constructed and completed by the Contractor shall comprise of the followings:

**3.0.1** The work specifications are described in the following clauses. However, wherever required, in opinion of the Engineer-in-Charge, reference shall be made to the General Technical Specifications given in the 'SPECIFICATIONS FOR ROAD AND BRIDGE WORKS (FIFTH REVISION, Reprint of September 2018)', as corrected in the original issued by the Ministry of Road Transport & Highways (MORT&H), Government of India (GOI) and published by the Indian Roads Congress (IRC), New Delhi.

**3.0.2** In the absence of any definite provisions on any particular issue in the aforesaid specifications, reference may be made to the latest codes and specifications of IRC and BIS in that order. Where even these are silent, the construction and completion of the works shall con-

form to good engineering practice as approved by the Engineer-in-Charge and in case of any dispute arising out of the interpretation of the above, the decision of the Engineer-in-Charge shall be final and binding on the contractor.

## **SECTION – B: CIVIL WORKS**

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## **SECTION: B-1: EARTH WORK IN TRENCH, EXCAVATION AND BACK FILLING**

### **B.1.1 Scope**

This specification covers the general requirements of earth work in excavation for foundations, pipe trench, form work etc. in different materials, filling in areas as shown in drawing, back filling around foundations trenches, conveyance and disposal of surplus soils or stacking them properly up to 90.0 mt lead as shown on the drawings and/or as directed by the Engineer-in-Charge and all operations covered within the intent and purpose of this specification. The scope also includes public utilities, such as cables, drains, service pipes water mains etc. However, for more details reference shall be made to the section no. 200, 300 and 1500 of MORT&H specifications.

### **B.1.2 Applicable Codes**



The following Indian Standard codes, unless specified otherwise elsewhere in the documents prepared by the client or the consultant, in relation to the project under consideration, shall be applicable. In all cases, the latest revision of the codes shall be referred to.

1. IS 783 - Code of practice for laying of concrete pipes
2. IS 1200 - Method of measurement of building
3. IS 3764 - Safety code for excavation
4. IS 3385 - Code of practice for measurement of Civil Engineering works
5. IS 2720 - Methods of test for soils

Part – I - Preparation of dry soil samples for various tests.

Part – II - Determination of water content.

Part – IV - Grain size analysis.

Part – V - Determination of liquid and plastic limit.

Part – VII - Determination of water content dry density relation using light compensation.

Part – IX - Determination of dry density – moisture content relation by constant weight of soil method.

Part – XIV - Determination of density index (relative density) of cohesion less soils.

Part – XXVIII - Determination of dry density of soils in place, by the sand replacement method.

Part – XXXIII - Determination of the density in place by ring and water replacement method.

Part – XXXIV - Determination of density of soil in place rubber balloon method.

Part – XXXVIII - Compaction control test (Hilf Method).

### **B.1.3.1 Definitions**

The following terms shall have the meanings hereby assigned to them

- **Top Soil** – Surface material including turf, suitable for use in soiling areas to be grassed or cultivated.
- **Excavation** – Excavation in open cut down to levels required as per approved drawings or otherwise as being the general levels after completion of excavation.

### **B.1.3.2 Drawings**

Engineer-in-Charge will furnish drawings, wherever, in his opinion, such drawings are required to show areas to be excavated or filled, grade level, sequences and priorities etc. The contractor shall strictly follow such drawings.

#### **B.1.4 General**

**B.1.4.1** Contractor shall furnish all tools, plants, instruments, qualified supervision personnel, labour, quality materials and consumables etc., anything and everything necessary, whether or not such items are specifically stated here for completion of the allotted job in accordance with drawings, specification and requirements related to the project as deemed fit by the Engineer-in-Charge. Contractor shall also be obliged to carry out any temporary work as directed by the Engineer-in-Charge, related to the project or safety to human beings in the project site.

**B.1.4.2** Contractor shall carry out the survey of the site before excavation and properly establish line and levels for various works such as earthwork excavation for 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 closer, as determined by the Engineer-in-Charge, based on the ground profile. These shall be checked by the Engineer-in-Charge and recorded properly thereafter.

**B.1.4.3** The excavation shall be carried out to correct lines and levels. This shall also include, wherever required, or as directed by the Engineer-in-Charge, provision of proper shoring to maintain walls of the excavations, furnishing, erecting and maintaining substantial barricades around the excavated areas, fitted with warning lamps blinking at night ensuring safety.

**B.1.4.4** The rates quoted shall also include De-watering, dumping of excavated materials in regular heaps, bunds, rip rap with regular slopes as directed by the Engineer-in-Charge, within the lead specified and leveling the same so as to provide natural drainage. Rock / soil excavated shall be stacked properly as directed by the Engineer-in-Charge. As a rule, softer materials shall be laid along the center of heaps formed by harder and more weather resisting materials forming casing on the sides and the top. Rock shall be stacked separately.

**B.1.4.5**The rates quoted shall include De-watering, carriage, staking properly, spreading the excavated material within a lead of 90.0 mt lead for backfilling the trenches with the selected excavated materials, as directed by the Engineer-in-Charge.

#### **B.1.5 Site Clearance**

The area to be excavated or filled up 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 met during excavation, they shall also be removed. The material so removed shall be burnt or disposed off as directed by the Engineer-in-Charge. Where earth fill is intended, the area shall be stripped of all loose/soft patches and top soil containing objectionable matter/materials shall be removed before fill commences.

#### **B.1.6 Precious objects, relics, objects of antiquity etc.**

All gold, silver, crude oil, minerals, archaeological and other findings of importance, trees cut or other materials of any description and all precious stones, coins, treasures, relics, antiquities and other similar things which may be found in or upon the site shall be the property of Client and Contractor shall duly preserve the same to the satisfaction of Owner and from time to time deliver the same to such person or persons as Owner may from time to time authorize or appoint to receive the same.

#### **B.1.7 Classification**

**B.1.7.1** All materials to be excavated shall be classified by Engineer, into one of the following classes and shall be paid for at the rate tendered for that particular class of material. No distinction shall be made whether the material is dry, moist or wet. The decision of Engineer regarding the classification of the material shall be final and binding on Contractor and not be a subject matter of any appeal or arbitration.

**B.1.7.2** Any earthwork will be classified under any of the following categories:

##### **B.1.7.2.1 Soil**

This shall comprise topsoil, turf, sand, silt, loam, clay, mud, peat, black cotton soil, soft shale or loose murrum, a mixture of this and similar material which yields to the ordinary application of peak, spade and/or shovel, rake or other ordinary digging implement. Removal of gravel or any other nodular material having dimension in any one direction not exceeding 75mm occurring in such strata shall be deemed to be covered under this category.

##### **B.1.7.2.2 Ordinary rock (not requiring blasting)**

This shall include:

- i) Rock types such as laterites, shales and conglomerates, varieties of limestone and sandstone etc., which may be quarried or split with crow bars, also including any rock which in dry state may be hard, requiring blasting but which when wet, becomes soft and manageable by means other than blasting.
- ii) Macadam surfaces such as water bound and bitumen/tar bound; soling of roads, paths etc. and hard core; compact murrum and stabilized soil requiring grafting tool or pick or both and shovel, closely applied; gravel and cobble stone having maximum dimension in any one direction between 75 and 300mm.
- iii) Lime concrete, stone masonry in lime mortar and brick work in lime/cement mortar below ground level, reinforced cement concrete which may be broken up with crow bars or picks and stone masonry in cement mortar below ground level, and
- iv) Boulders which do not require blasting having maximum dimension in any direction of more than 300mm, found lying loose on the surface or embedded in ricker bed, soil, talus, slope wash and terrace material or dissimilar origin.

#### **B.1.7.2.3 Hard rock (requiring blasting)**

This shall include:

- i) Any rock or cement concrete for the excavation of which the use of mechanical plant and/or blasting is required.
- ii) Reinforced cement concrete (reinforcement cut through but not separated from the concrete) below ground level, and
- iii) Boulders requiring blasting.

#### **B.1.7.2.4 Hard rock (blasting prohibited)**

Hard rock requiring blasting as described under B1.7.2.3 but where blasting is prohibited for any reason and excavation has to be carried out by chiseling, wedging or any other agreed method.

#### **B.1.7.2.5 Marshy soil**

This shall include soils like soft clays and peats excavated below the original ground level of marshes and swamps and soils excavated from other areas requiring continuous pumping or bailing out of water.

### **B.1.8 Excavation**

B.1.8.1 All excavation work shall be carried out by mechanical equipment's unless, in the opinion of Engineer, the work involved and time schedule permit manual work.

B.1.8.2 Excavation for permanent work shall be taken out of such widths, lengths, depths and profiles as are shown on the drawings or such other lines and grades as may be specified by Engineer. Rough excavation shall be carried out to a depth 150 mm above the final level. The balance shall be excavated with special care. Soft pockets shall be removed ever below the final level and extra excavation filled up a directed by Engineer. The final excavation if so instructed by Engineer, should be carried out just prior to laying the mud-mat.

B.1.8.3 Contractor may, for facility of work or similar other reasons, excavate, and also backfill later, if so approved by Engineer, at his own cost outside the lines shown on the drawings or directed by Engineer. Should any excavation be taken below the specified elevations, Contractor shall fill it up, with concrete of the same class as in the foundation resting thereon, up to the required elevation. No extra shall be claimed by Contractor on this account.

B.1.8.4 All excavation shall be done to the minimum dimensions as required for safety and working facility. Prior approval of Engineer shall be obtained by Contractor in each individual case, for the method he proposes to adopt for the excavation, including dimensions, side slopes, dewatering, disposal etc. This approval, however, shall not in any way relieve 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. Removal of the slipped earth will not be paid for if the slips are due to the negligence of Contractor.

B.1.8.5 Excavation shall be carried out with such tools, tackles and equipment as described here in before. Blasting or other methods may be resorted to in the case of hard rock; however not without the specific permission of Engineer.

B.1.8.6 Engineer may also direct that in some extreme case, the rock may be excavated by heating and sudden quenching for splitting the rock. Fire-wood shall be used for burning.

### **B.1.9 Stripping loose rock**

B.1.9.1 All loose boulders, semi detached rocks (along with earthy stuff 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 Engineer, to fall or otherwise endanger the workmen, equipment, or the work, etc. shall be stripped off and removed away from the area of the excavation. The method used shall be such as not to shatter, or render unstable or unsafe the portion which was originally sound and safe.

B.1.9.2 Any material not requiring removal as contemplated in the work, but which, in the opinion of Engineer, is likely to become loose or unstable later, shall also be promptly and satisfactorily removed as directed by Engineer. The cost of such stripping will be paid for at the unit rates accepted for the class of materials in question.

### **B.1.10 Fill, back filling and site grading**

#### B.1.10.1 General

B.1.10.1.1 All fill material will be subject to Engineer's approval. If any material is rejected by Engineer, contractor shall remove the same forthwith from the site at no extra cost to the owner. Surplus fill material shall be deposited / disposed off as directed by Engineer after the fill work is completed up to a distance of 10 Km.

B.1.10.1.2 No earth fill shall commence until surface water discharges and streams have been properly intercepted or otherwise dealt with as directed by Engineer.

#### B.1.10.2 Material

B.1.10.2.1 To the extent available, selected surplus soils from excavated materials shall be used as backfill. Fill material shall be free from clods, salts, sulphates, organic or other foreign material. All clods 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 fill up the voids and the mixture used for filling.

B.1.10.3 If any selected fill material is required to be borrowed, Contractor shall make arrangements for bringing such material from outside borrow pits. The material and source shall be subject to prior approval of Engineer. The approved borrow pit area shall be cleared of all bushes, roots of trees, plants, rubbish etc, top soil containing salts / sulphate and other foreign material shall be removed. The materials so removed shall be burnt or disposed off as directed by Engineer. Contractor shall make necessary access to borrow areas and maintain the same, if such access road does not exist, at his cost.

B.1.10.4 Filling in pits and trenches around foundations of structures, walls etc.

B.1.10.4.1 As soon as the work in foundations has been accepted and measured, the spaces around the foundations, structures, pits, trenches etc. shall be cleaned of all debris, and filled with earth in layers not exceeding 20 cm, each layer being watered, rammed and properly consolidated, before the succeeding one is laid.

Each layer shall be consolidated to the satisfaction of Engineer. Earth shall be rammed with approved mechanical compaction machines if instructed. Usually no manual compaction shall be allowed unless Engineer is satisfied that in some cases manual compaction by tampers cannot be avoided. The final backfill surface shall be trimmed and levelled to proper profile as directed by Engineer or indicated on the drawing.

B.1.10.5 Plinth filling

B.1.10.5.1 Plinth filling shall be carried out with approved material as described herein before in layers not exceeding 20 cm, watered and compacted with mechanical compaction machines. If required engineer may however permit manual compaction by hand tampers in case he is satisfied that mechanical compaction is not possible. When filling reaches the finished level, the surface shall be flooded with water, unless otherwise directed for at least 24 hours, allowed to dry and then the surface again compacted as specified above settlements at a later stage. The finished level of the filling shall be trimmed to the level / slope specified.

B.1.10.5.2 Where specified in the schedule of works, compaction of the plinth fill shall be carried out by roller in case of compaction of granular materials such as sands and gravel, vibratory rollers shall be used. A smaller weight roller may be used only if permitted by Engineer. As rolling proceeds water sprinkling shall be done to assist consolidation. Water shall not be sprinkled in case of sandy fill.

B.1.10.5.3 The thickness of each unconsolidated fill layer can in this case be up to a maximum of 200 mm. Engineer will determine the thickness of the layers in which fill has to be

consolidated depending on the fill material and equipment used. Rolling shall commence from the outer edge and progress towards the centre and continue until compaction is to the satisfaction of Engineer, but in no case less than 10 passes of the roller will be accepted for each layer. The compacted surface shall be properly shaped, trimmed and consolidated to an even and uniform gradient. All soft spots shall be excavated and filled and consolidated. At some locations / areas if may not be possible to use rollers because of space restrictions etc. Contractor shall then be permitted to use pneumatic tampers, rammers etc. and he shall ensure proper compaction.

#### B.1.10.6 Sand filling in plinth and other places

B.1.10.6.1 At places backfilling shall be carried out with local sand if directed by Engineer. The sand used 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. Any temporary work required to contain sand under flooded condition shall be to contractor's account. The surface of the consolidated sand shall be dressed to required level or slope. Construction of floor or other structures on sand fill shall not be started until Engineer has inspected and approved the fill.

#### B.1.10.7 Filling in Trenches

B.1.10.7.1 Filling in trenches for pipes and drains shall be commenced as soon as the joints of pipes and drains have been tested and passed. The backfilling material shall be properly consolidated by watering and ramming, taking due care that no damage is caused to the pipes.

B.1.10.7.2 Where the trenches are excavated in soil, the filling from the bottom of the trench to the level of the centerline 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 centerline of the pipe shall also be done with selected earth by hand compaction or other approved means in layers not exceeding 20 cm.

B.1.10.7.3 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, moorum etc. The filling up of the level of the centerline of the pipe shall be done by hand compaction in layers not exceeding 20 cm. Also the filling above the centerline of the pipe shall be done by hand com-



action or approved means in layers not exceeding 20 cm. The filling from a level 30 cm. Above the top of the trench shall be done by hand or other approved mechanical methods with broken rock filling of size not exceeding 20 cm mixed with fine material as available to fill up the voids.

B.1.10.7.4 Filling of the trenches shall be carried simultaneously on both sides of the pipe to avoid unequal pressure on the pipe.

### **B.1.11 General Site grading**

B.1.11.1 Site grading shall be carried out as indicated in the drawings and as directed by Engineer. Excavation shall be carried out as specified in the specification. Filling and compaction shall be carried out as specified under Clause B.1.10 and elsewhere unless otherwise indicated below.

B.1.11.2 If no compaction is called for, the fill may be deposited to the full height in one operation and levelled. If the fill has to be compacted, it shall be placed in layers not exceeding 200 mm and levelled uniformly and compacted as indicated in Clause 10.0 before the next layer is deposited.

B.1.11.3 To ensure that the fill has been compacted as specified, field and laboratory tests shall be carried out by Contractor at his cost.

B.1.11.4 Field compaction test shall be carried out at different stages of filling and also after the entire height has been completed. This shall hold good for embankments as well.

B.1.11.5 Contractor shall protect the earth fill from being washed away by rain or damaged in any other way. Should any slip occur, Contractor shall remove the affected material and make good the slip at his cost.

B.1.11.6 The fill shall be carried out to such dimensions and levels as indicated on the drawings after the stipulated compaction. The fill will be considered as incomplete if the desired compaction has not been obtained.

B.1.11.7 If specifically permitted by Engineer, compaction can be obtained by allowing loaded trucks conveying fill or other material to ply over the fill area. Even if such a method is permitted, it will be for contractor to demonstrate that the desired / specified compaction has been obtained. In order that the fill may be reasonably uniform throughout, the material should be dumped in place in approximately uniform layers. Traffic over the fill shall then be so routed to compact the area uniformly throughout.

B.1.11.8 If so specified, the rock as obtained from excavation may be used for filling and levelling to indicate grades without further breaking. In such an event, filling layers not exceeding 50 cms approximately. After rock filling 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 materials and earth shall be laid and consolidation carried out by a 12 tonne roller. No less than twelve passes of the roller shall be accepted before subsequent similar operations are taken up.

### **B.1.12 Fill density**

B.1.12.1 The compaction, only where so called for, in the schedule of quantities / items shall comply with the specified (Standard Proctor / modified Proctor) density at moisture content differing not more than 4 percent from the optimum moisture content. Contractor shall demonstrate adequately at his cost, by field and laboratory tests that the specified density has been obtained.

### **B.1.13 Lead**

B.1.13.1 Lead for deposition / disposal of excavated material shall be as specified in the respective item of work. For the purpose of measurement of lead, the area to be excavated or filled or area on which excavated material is to be deposited / disposed off shall be divided into suitable blocks and for each of the blocks, the distance between centerlines shall be taken as the lead which shall be measured by the shortest straight line route taken by Contractor. No extra compensation is admissible on the grounds that the lead including that for borrowed material had to be transported over marshy or 'katcha' land / route.

### **B.1.14 Measurement and payment**

B.1.14.1 All excavation shall be measured net. Dimensions for purpose of payment shall be reckoned on the horizontal area of the excavation at the base for foundations of the walls, columns, footings, tanks, rafts or other foundations / structures to be built, multiplied by the mean depth from the surface of the ground in accordance with the drawings. Contractor may make such allowance in his rates to provide for excavation in side slopes keeping in mind the nature of the soil and safety of excavation. Reasonable working space, beyond concrete dimensions and shuttering where considered necessary in the opinion of Engineer

will be allowed in excavation and considered for payment. However, if concreting is proposed against the excavated sides, no such over – excavation will be permitted. In such cases over-excavation shall be made good by Contractor with concrete of the same class as in the foundations at his cost.

B.1.14.2 Unless otherwise specified, the unit rates quoted for excavation in different types of material shall also account for a basic lead of 100 meters for disposal as specified or directed. Only leads beyond the basic lead of 100 meters will be considered as extra lead and paid for at the rates quoted in the schedules.

B.1.14.3 Backfilling as per specifications the sides of foundations of columns, footings, structures, walls, tanks, rafts, trenches etc. with excavated material will not be paid for separately. It shall be clearly understood that the rate quoted for excavation including backfilling shall include stacking of excavated material as directed, excavation / packing of selected stacked material, conveying it to the place of final backfill, compensation etc. as specified. As a rule material to be backfield shall stacked temporarily within the basic lead of 100 meters unless otherwise directed by the Engineer. If Engineer directs / permits a lead of over 100 meters for such material, the conveyance of the material for the extra distance over the basic lead of 100 meters for backfilling will be paid for.

B.1.14.4 Payment for fill inside trenches, plinth of similar filling with selected excavated material will be made for only compaction as specified / directed. Cost of all other operations shall be deemed to have been covered in the rate quoted for excavation. Payment for this work will be made based on measurement of trench dimensions filled. The plinth ground levels shall be surveyed beforehand for this purpose. If no compaction is specified / desired such filling will not be separately paid for. In such an event, the fill shall be levelled / finished to the profile as directed at no extra cost.

B.1.14.5 Backfilling with borrowed earth will be paid for at rates quoted. The quoted rate shall include all operations such as clearing, excavation, lead and transport, fill, compaction etc. as specified. Actual quantity of consolidated filling or actual quantity or excavation in the borrow pits (less such top soil which has been excavated and not used for filling) whichever is less shall be measured and paid for in cubic meters. The lead, lift etc. shall be as indicated in the schedule of quantities.

B.1.14.6 Actual quantities of consolidated sand filing shall be measured and paid in cubic meters.

## **SECTION: B-2: DEWATERING**

### **B.2.1 Scope**

B.2.1.1 This specification covers the general requirements of dewatering excavations in general. However for more details reference shall be taken from section no. 300 of MORTH specifications.

### **B.2.2 General**

B.2.2.1 All excavations shall be kept free of water. Grading in the vicinity of excavations shall be controlled to prevent surface water running into excavated areas. Contractor shall remove by pumping or other means approved by Engineer any water inclusive of rain water and subsoil water accumulated in excavation and keep all excavations dewatered until the foundation work is completed and backfilled. Sumps made for dewatering must be kept clear of the excavations / trenches required for further work. Method of pumping shall be approved by Engineer but 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.

B.2.2.2 When there is a continuous inflow of water and quantum of water to be handled is considered in the opinion of Engineer, as large, well point system – single stage or multistage, shall be adopted. Contractor shall submit to Engineer his scheme of well point system including the stages, the spacing, number and diameter of well points, heads etc. and the number, capacity and location of pumps of approval. the cost of dewatering is included in the item rate for excavation.

B.2.2.3 Where cofferdams are required, these shall be carried to adequate depths and heights, be safely designed and constructed and be made as water tight as is necessary for facilitating construction to be carried out inside them. The interior dimensions of the cofferdams shall be such as to give sufficient clearance for the construction and inspection and to permit installations of pumping equipments, etc., inside the enclosed area.

### **B.2.3 MEASUREMENT**

Dewatering is deemed to have been included in the unit rates quoted for excavation. No extra payment will be made against dewatering and excavation in wet soil condition.

## **SECTION: B-3: RAIN WATER DRAINAGE**

### **B.3.1 SCOPE**

B.3.1.1 This section covers the drainage of rain water in excavated areas. However for more details reference shall be taken from section no. 300 of MORTH specifications.

### **B.3.2 GENERAL**

B.3.2.1 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 at no extra cost to the owner. The scheme for pumping and discharge of such water shall be approved by the Engineer.

## **SECTION: B-4: SITE FILLING**

### **B.4.1 Scope**

B.4.1.1 Apart from any other work / purpose for which this specification may be made applicable by Engineer, this shall generally govern work involving filling site / plant over the entire area / most of the area to raise the general grade level to the desired elevation. This work shall be carried out as per applicable clauses "Earthwork in Grading, Excavation and Backfilling" particularly clauses B.1.10 & B.1.11. However for more details reference shall be taken from section no. 300 of MORTH specifications.

### **B.4.2 Fill Material**

#### **B.4.2.1 General**

B.4.2.1.1 All fill material whether such material is brought from outside borrow areas or excavation within the site, will be subject to Engineer's approval. Notwithstanding any approval given to the fill material or borrow areas from which fill material is proposed to be brought, Engineer / Owner reserves the right to reject such material which in his opinion either does not meet the specification requirements or is unsuitable for the purpose for which it is intended.

#### **B.4.2.2 Borrow Areas**

B.4.2.2.1 It shall be Contractor's responsibility to locate suitable borrow areas for borrowing fill material. Such areas will be inspected by Engineer and approved before Contractor makes arrangements to borrow the fill material. The top soil which may contain vegetation, rubbish, slush etc. shall not be used. If demanded by Engineer. Contractor shall arrange to have trial

pits of specified dimensions and numbers dug at locations specified, for Engineer to examine the nature and type of material likely to be obtained from the borrow area.

#### B.4.2.3 Lead, Lift and Transportation

B.4.2.3.1 Unless separately provided, for, all lead, lift and transportation required for bringing in the fill material from borrow areas or from excavation from within the site shall be included in the Contractor's quote unit rates.

#### B.4.2.4 Quality

B.4.2.4.1 The borrowed soil shall be generally granular, and non-cohesive. It shall consist of sand, silty sand, murrum, ordinary soil, gravel and shingle. Dredged material, free from clayey deposit, will be accepted. Fill material shall also be free from sulphates, salts, organise, foreign and other harmful or objectionable materials. Any material rejected by Engineer shall be removed from the site immediately.

### **B.4.3 Access road**

B.4.3.1 Roads, whether of temporary or other nature, required to be constructed for access and for movement of man, materials. Equipments, transport vehicles, vehicles carrying fill material etc. to or over borrow areas and/or to or over areas on which fill has to be deposited shall be constructed by Contractor at his cost. Such costs shall be deemed to have been included in the unit rates quoted by Contractor. Such access roads shall be maintained in good condition during all seasons to ensure completion of work according to time schedule.

B.4.4.1 Site clearing before filling shall be carried out as specified in the enclosed specification. Earthwork in Grading, Excavation and backfilling.

### **B.4.4 Clearing**

B.4.4.1 Site clearing before filling shall be carried out as specified in the sections B.1.5, and B.1.10.4 above.

### **B.4.5 Filling**

B.4.5.1 Backfill

B.4.5.1.1 Backfill shall be deposited to bring the grade level to desired elevation after compaction of fill.

B.4.5.1.2 Back fill shall be compacted, where so specified, by 12 tonne rollers as indicated in Clause B.5.5.2.3 below. The fill material shall be compacted to the specified density, where so specified.

B.4.5.1.3 If the density of fill use of rollers for compaction is not specified. Contractor shall ensure necessary compaction by the passage of trucks, carrying the fill material over the deposited fill in such a way that the entire fill area is covered. These will reasonably compact the sand fill will be accepted by Engineer. However, Contractor shall ensure that every layer is thus compacted before the succeeding layers are deposited. Each layer shall not exceed 200 mm in thickness.

B.4.5.1.4 Compaction of back fill by flooring the area shall be carried out where so specified. In this case, Contractor should ensure that the fill material is not washed away. This work shall be carried out as directed by Engineer.

#### B.4.5.2 Soil Fill

B.4.5.2.1 Approval soil fill consisting of ordinary soil, murrum, soil containing gravel, shingle etc. shall be deposited in layers not exceeding 200 mm. Contractor should ensure that all clods of earth are broken down to a size not larger than 100 mm.

B.4.5.2.2 Where density of fill or use of rollers is not specified, the fill shall be carried out as specified in Clause B.5.5.1.3 above.

B.4.5.2.3 Where the fill material has to be compacted by use of rollers procedure as specified in Clause B.1.10.5.2 of specification for "Earthwork in Grading, Excavation and Backfilling".

B.4.5.2.4 Where specified, the required density of fill shall be obtained by proper compaction.

### **B.4.6 Measurement**

B.4.6.1 The rate for this item includes in the relevant item of excavation and no extra payment will be made.

## **SECTION: B-5: CONCRETE WORKS**

### **B.5.1 Scope**

B.5.1.1 This Specification covers the general requirements for concrete using on-site production facilities including requirements in regard to the quality, handling, storage of ingredients, proportioning, batching, mixing, transporting, placing, curing, protecting, repairing, finishing and testing of concrete; form work; requirements in regard to the quality, storage, bending

and fixing of reinforcement; grouting as well as mode of measurement and payment for complete works.

B.5.1.2 It shall be very clearly understood that the specifications given herein are brief and do not cover minute details. However, all work shall have to be carried out in accordance with the relevant standards and codes of practices or in their absence in accordance with the best accepted current engineering practices or as directed by Engineer from time to time. The decision of Engineer as regards the specification to be adopted and their interpretation and the mode of execution of work shall be final and binding on Contractor and no claim whatsoever will be entertained on this account.

B.5.1.3 However for more details reference shall be taken from section no. 1000 and 1700 of MORTH specifications.

### **B.5.2 Applicable codes and specifications**

B.5.2.1 The following specifications, standards and codes, including all official amendments / revisions and other specifications and codes referred to therein, should be considered a part of this specification. In all cases the latest issue / edition / revision shall apply. In case of discrepancy between this specification and those referred to herein below or other specifications forming a part of this bid document, this specification shall govern.

#### **B.5.2.2 Code for Materials**

1. IS : 269 - Specification for 33 grade ordinary Portland cement
2. IS : 455 - Specification for Portland slag cement
3. IS : 1489(Part 1 & 2)- Specification for Portland pozzolona cement
4. IS : 8112 - Specification for 43 grade ordinary portland cement.
5. IS : 12330 - Specification for sulphate resisting portland cement
6. IS : 383 - Specification for coarse and fine aggregates from natural sources for concrete.
7. IS : 432(Part 1 & 2)- Specification for mild steel and medium tensile steel bars and hard drawn steel wires for concrete reinforcement.
8. IS : 1786 - Specification for high strength deformed steel bars and wires for concrete reinforcement.
9. IS : 1566 - Specification for hard drawn steel wire fabric for concrete reinforcement.
10. IS : 9103 - Specification for admixtures for concrete.
11. IS : 2645 - Specification for admixtures for concrete.



12. IS : 4990 - Specification for integral cement water proofing compounds.
13. IS : 12269 - Specification for 53 Grade Ordinary Portland Cement

#### B.5.2.3 Code for Material Testing

1. IS : 4031 (Parts 1 to 15) - Methods of physical tests for hydraulic cement.
2. IS : 4032 - Methods of chemical analysis of hydraulic cement.
3. IS : 650 - Specifications for standard sand for testing of cement.
4. IS : 2430 - Methods for sampling of aggregates for concrete.
5. IS : 2386 (Parts 1 to 8) - Methods of test for aggregates for concrete.
6. IS : 3025 - Methods of sampling and test (physical and chemical) water used in industry.
7. IS : 6925 - Methods of test for determination of water soluble chlorides in concrete admixtures.

#### B.5.2.4 Code for Materials Storage

1. IS : 4082 - Recommendations on stacking and storing of construction materials at site.

#### B.5.2.5 Code for Concrete Mix Design

1. IS : 10262 - Recommended guidelines for concrete mix design.
2. SP : 23 (S&T) - Handbook on Concrete Mixes.

#### B.5.2.6 Code for 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.

#### B.5.2.7 Code for 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 vibrators12 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.

#### B.5.2.8 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 (Parts 1 to 4 ) – Code of Practice for concrete structures for storage of liquids.
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 ( Part 1 & 2 ) - Code of practice for steel tubular scaffolding

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. (Part – 2) - Recommended practice for cold weather concreting.

#### B.5.2.9 Code for Construction safety

1. IS : 3696(Parts I and III) - Safety code for scaffolds and ladders.
2. IS : 7969 - Safety code for handling and storage of building materials.
3. IS : 8989 - Safety code for erection of concrete framed structures.

#### B.5.2.10 Code for Measurement

1. IS : 1200 (Part 1 to 28) – Method of measurement of building & engineering works
2. IS : 3385 – Code of practice for measurement of Civil Engineering works.

### **B.5.3 General**

B.5.3.1 Engineer 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 Engineer's approval obtained, prior to starting of concrete work. This shall, however, not relieve Contractor of any of his responsibilities. All materials which does not conform to this specification shall be rejected.

B.5.3.2 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 and after establishing their performance suitability based on previous data, experience or tests.

### **B.5.4 Materials**

#### B.5.4.1 Cement

B.5.4.1.1 Unless otherwise specified or called for by the Engineer, cement shall be **Ordinary Portland Cement Conforming** to IS specified above.

B.5.4.1.2 Where Portland pozzolana or slag cement 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.

B.5.4.1.3 Only one type of cement shall be used in any one mix. The source of supply, type or brand of cement within the same structure or portion thereof shall not be changed without approval from Engineer.

B.5.4.1.4 Cement which is not used within 90 days from its date of manufacture shall be tested at a laboratory approved by Engineer and until the results of such tests are found satisfactory, it shall not be used in any work.

#### B.5.4.2 Aggregates (General)

##### B.5.4.2.1 General

B.5.4.2.1.1 "Aggregate" in general designates both fine and coarse inert materials used in the manufacture of concrete (vide IS 456 & IS 383) and conforming to tests as per IS 2386 (Part I to VI).

B.5.4.2.1.2 "Coarse Aggregate" is aggregate most of which is retained when passed through on 4.75 mm BIS sieve.

B.5.4.2.1.3 All fine and coarse aggregates proposed for use in the works shall be subject to the Engineer-in-Charge's approval and after specific materials have been accepted, the source of supply of such materials shall not be changed without prior approval of the Engineer-in-charge.

B.5.4.2.1.4 Aggregates shall consist of natural sand, stone (crushed or uncrushed) from a source known to produce satisfactory aggregate for concrete and shall be chemically inert, non-flaky, strong, hard, and durable against weathering or limited porosity and free from deleterious materials that may cause corrosion of the reinforcement or may impair the strength and or durability of concrete. The grading of aggregates shall be such as to produce a dense concrete of specified strength and consistency that will work readily into position without segregation and shall be based on the "mix design" and preliminary tests on concrete specified later.

The aggregates shall be brought from the source as mentioned in Volume-I Clause C.1.39.

##### B.5.4.2.2 Sampling and testing

B.5.4.2.2.1 Samples of the aggregates for mixed design and determination of suitability shall be taken under the supervision of the Engineer-in-charge and delivered to the laboratory, well in advance of the scheduled placing of concrete. Records of tests, which have been made on proposed aggregates and on concrete made from this source of aggregates, shall be furnished to Engineer-in-charge in advance of the work, for use in determining aggregate suitability. The costs of all such tests, sampling etc. shall be borne by the contractor.

#### B.5.4.2.3 Storage of aggregates

B.5.4.2.3.1 All coarse and fine aggregates shall be stacked separately in stock piles in the material yard near the work site in bins properly constructed to avoid inter mixing of different aggregates. Contamination with foreign material and earth during storage and while heaping the materials shall be avoided. The aggregates must be of specified quality not only at the time of receiving at site but more so at the time of loading into mixer. Rakers shall be piled in layers not exceeding 1.20 m in height to prevent coning or segregation. Each layer shall cover the entire area of stock pile before succeeding layers are started. Aggregates that have become segregated shall be rejected.

#### B.5.4.2.4 Specific Gravity

B.5.4.2.4.1 Aggregates having a specific gravity below 2.4 (saturated surface dry basis) shall not be used.

#### B.5.4.3 Fine Aggregate

B.5.4.3.1 Fine aggregate shall consist of natural or crushed sand conforming to IS 383 conforming to tests as per IS 2386 part I to IV. The sand shall be clean, sharp, hard, strong and durable and shall be free from dust, vegetable substances, adherent coating, clay, alkali, organic matter, mica, salt or other deleterious substances, which can be injurious to the setting qualities / strength/ durability of concrete.

B.5.4.3.2 Screening and Washing: Sand shall be prepared for use by such screening or washing, or both, as necessary, to remove all objectionable foreign matter while separating the sand grains to the required size fraction.

B.5.4.3.3 Foreign Material limitations: The percentage deleterious substances in sand delivered to the mixer shall not exceed the following:

Sr. No.	Foreign Material	Percentage by weight	
		Uncrushed	Crushed
1	Material finer than 75 micron IS sieve	3.0	15.0
2	Shale	1.0	---
3	Coal and Lignite	1.0	1.0
4	Clay Lumps	1.0	1.0

B.5.4.3.4 Gradation: Unless otherwise directed or approved by the Engineer-in-charge, the grading of sand shall be within the limits indicated hereunder.

IS : Sieve Designation	Grading Zone-I	Grading Zone-II	Grading Zone-III	Grading Zone-IV
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10 mm	100	100	100	100
4.75 mm	99 – 100	90 – 100	90 – 100	95 – 100
2.36 mm	60 – 95	75 – 100	85 – 100	95 – 100
1.18 mm	30 – 70	55 – 90	75 – 100	90 – 100
600 microns	15 – 34	35 – 59	60 – 79	80 – 100

<b>IS : Sieve Designation</b>	<b>Grading Zone-I</b>	<b>Grading Zone-II</b>	<b>Grading Zone-III</b>	<b>Grading Zone-IV</b>
300 microns	5 – 20	8 – 30	12 – 40	15 – 50
150 microns	0 – 10	0 – 10	0 – 10	0 – 15

B.5.4.3.4.1 Where the grading falls outside the limits of any particular grading zone of sieves, other than 600 microns IS sieve, by total amount not exceeding 5%, it shall be regarded as falling within that grading zone. This tolerance shall not be applied to percentage passing the 600 micron IS sieve or to percentage passing any other sieve on the coarser limit of grading zone I or the finer limit of grading zone IV. Fine aggregates conforming to grading zone IV shall not be used. Mix designs and preliminary tests shall show its suitability for producing concrete of specified strength and workability.

#### B.5.4.3.5 Fineness Modulus

The sand shall have a fineness modulus of not less than 2.2 or more than 4.2. The fineness modulus is determined by adding the cumulative percentages retained on the following IS sieve sizes (4.75 mm, 2.35 mm, 1.18 mm, 600 microns and 150 microns) and dividing the sum by 100.

#### B.5.4.4 Coarse Aggregate

B.5.4.4.1 Coarse aggregate for concrete, except as noted above, shall conform to IS 383 and IS 2386. This shall consist of crushed stone and shall be clean and free from elongated, flaky or laminated pieces, adhering coatings, clay lumps, coal residue, clinkers, slag, alkali, mica, organic matter or other deleterious matter.

B.5.4.4.2 Screening and Washing: Crushed rock shall be screened and or washed for the removal of dirt or dust coating, if so requested by the Engineer-in-charge.

#### B.5.4.4.3 Grading

B.5.4.4.3.1 Coarse aggregate shall be either in single size or graded, in both cases the grading shall be within the following limits:

<b>IS Sieve</b>	<b>Percentage passing for single sized aggregate of normal size</b>	<b>Percentage passing for graded aggregate of normal size</b>
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Size	40	20	16	12.5	10	40	20	16	12.5
	mm	mm	mm	mm	mm	mm	mm	mm	mm
63	100	--	--	--	--	--	--	--	--
40	85-100	100	--	--	--	95-100	100	--	--
20	0-20	85-100	100	--	--	30-70	95-100	100	100
16	--	--	85-100	100	--	--	--	90-100	--
12.5	--	--	--	85-100	100	--	--	--	90-100
10	0-5	0-20	0-30	0-45	85-100	10-35	25-55	30-70	40-85
4.75	--	0-5	0-5	0-10	0-20	0-5	0-10	0-10	0-10
2.36	--	--	--	--	0-5	--	--	--	--

B.5.4.4.3.2 The pieces shall be angular in shape and shall have granular or crystalline surfaces. Friable, flaky and laminated pieces, mica and shale, if present, shall be only within tolerance limits which will not affect adversely the strength and or durability of concrete. The maximum size of coarse aggregate shall be 40 mm for M7.5 and M10 and 20 mm for M15 to M20 concrete, or as directed by the Engineer-in-charge or specified otherwise.

The maximum size of coarse aggregate shall be the maximum size specified above but in no case greater than  $\frac{1}{4}$ th of the minimum thickness of the member, provided that the concrete can be placed without difficulty so as to surround all reinforcement thoroughly and fill the corners of the form. For plain concrete the maximum size of aggregate shall be of 40 mm. for heavily reinforced concrete members, the nominal maximum size of the aggregate shall be 5 mm less than the minimum clear distance between the reinforcing main bars or 5 mm less than the minimum cover reinforcement whichever is smaller.

#### B.5.4.4.4 Foreign material limitations

B.5.4.4.4.1 The percentage of deleterious materials in the aggregate delivered to the mixer shall not exceed the following:

Sr. No.	Foreign Material	Percentage by weight	
		Uncrushed	Crushed
1	Material finer than 75 micron IS sieve	3.0	3.0
2	Coal and Lignite	1.0	1.0
3	Clay Lumps	1.0	1.0
4	Soft fragments	3.0	---

#### B.5.4.5 Water

B.5.4.5.1 Water 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.

#### B.5.4.6 Reinforcement

B.5.4.6.1 Reinforcement bars shall conform to IS : 432, IS : 226 or IS : 1786 and the welded wire fabric to IS : 1566 as shown or specified on the drawings.

B.5.4.6.2 All reinforcement shall be clean, free from pitting, oil, grease, paint, loose mill scales, rust, dirty dust or any other substance that will destroy or reduce bond.

B.5.4.6.3 If permitted by Engineer, welding of reinforcement shall be done in accordance with IS ; 2751 or IS : 9417 as applicable.

#### B.5.4.7 Admixtures

B.5.4.7.1 Accelerating, retarding, water-reducing and air entraining admixtures shall conform to IS : 9103 and integral water proofing admixtures to IS : 2645.

B.5.4.7.2 Admixtures may be used in concrete as per manufacturer's instructions only with the approval of Engineer based upon evidence that with the passage of time neither the compressive strength nor its durability is reduced. An admixture's suitability and effectiveness shall be verified by trial mixes with the other material 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's.

B.5.4.7.3 Calcium chloride shall not be used for accelerating set of the cement for any concrete containing reinforcement or embedded steel parts. When calcium chloride is permitted such as in mass concrete works, it shall be dissolved in water and added to the mixing water by an amount not exceeding 1.5 percent of the weight of the cement in each batch of concrete. The designed concrete mix shall be corrected accordingly.

#### B.5.4.8 Wastage

B.5.4.8.1 No wastage allowance for cement and steel shall be considered and paid for.

### **B.5.5 SAMPLES AND TESTS**

B.5.5.1 All materials used for the works shall be tested before use.

B.5.5.2 Manufacturer's test certificate shall be furnished, for each batch of cement / steel and when directed by Engineer samples shall also be got tested by the Contractor in a laboratory approved by Engineer at no extra cost to Client. However, where/material is supplied by Client, all testing charges shall be borne by Client; but transportation of material samples to the laboratory shall have to be done by Contractor at no extra cost.

B.5.5.3 Sampling and testing shall be as per IS : 2386 under the supervision of Engineer. The cost of all tests, sampling etc. shall be borne by Contractor.



B.5.5.4 Water to be used shall be tested to comply with requirement of IS : 456.

B.5.5.5 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 and approved laboratory at no extra cost.

### **B.5.6 STORING OF MATERIALS**

B.5.6.1 All material 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.

B.5.6.2 Contractor will have to make his own arrangements for the storage of adequate quantity of cement even if cement is supplied by Client. Cost of such rejected cement, where cement is supplied by Client, shall be recovered at issue rate or open market rate whichever is higher. 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 Engineer. Storage under tarpaulins shall not be permitted. Each consignment of cement shall be stored separately and consumed in its order or receipt.

B.5.6.3 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.

B.5.6.4 Contractor shall make his own arrangements for storing water at site in tanks to prevent contamination.

B.5.6.5 The reinforcement shall be stacked on top of timber sleepers to avoid contact with ground / water. Each type and size shall be stacked separately.

### **B.5.7 CONCRETE**

#### **B.5.7.1 General**

Concrete grade shall be as designated on drawings. In concrete grade M15, M20, M25 etc. the number represents the specified characteristic compressive strength of 150 mm cube at 28 days, expressed in N/sq.mm as per IS : 456. Concrete in the works shall be **“Design Mix Concrete”** or **“Normal Mix Concrete”**. All concrete works of **grade M5, M7.5 and M10 shall be Nominal whereas all other grades, M15 and above, shall be Design Mix Concrete.**

## **B.5.7.2 Design Mix Concrete**

### **B.5.7.2.1 Mix Design and Testing**

B.5.7.2.1.1 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 characteristics strength not less than appropriate values given in IS : 456. The design mix shall in addition be such that it is cohesive and does not segregate and should result in dense and durable concrete and also capable of giving the finish as specified. For water 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.

B.5.7.2.1.2 Unless otherwise specifically mentioned, the minimum cement content for Design Mix Concrete shall be as given below.

Grade of Concrete	Minimum Cement Content in Kg/Cu.m of concrete
M15	290
M20	360
M25	380
M30	410
M35	425

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 eventually and nothing extra shall become payable to the Contractor in 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.

B.5.7.2.1.3 It shall be Contractor's sole responsibility to carry out the mix designs at his own cost. He shall furnish to Engineer 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.

<b>Grade of concrete</b>	<b>Minimum compressive strength(N/Sq.mm at 7 days)</b>	<b>Specified Compressive strength(N/Sq.mm at 28 days)</b>
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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

B.5.7.2.1.4A range of slumps, which shall generally be used for various types of construction unless otherwise instructed by the Engineer is given below:

Structure / Member	Slump in millimeters	
	Maximum	Minimum
Reinforced foundation walls and footings	75	25
Plain footings, caissons and substructure walls	75	25
T.G. and massive compressor foundations	50	25
Slabs, beams and reinforced walls	100	25
Pumps and miscellaneous equipment foundations	75	25
Building columns	100	25
Pavements	50	25
Heavy mass construction	50	25

### **B.5.7.2.2 Batching and Mixing of Concrete**

B.5.7.2.2.1 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.

B.5.7.2.2.2 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 shall be main-

tained. Each time 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.

B.5.7.2.2.3 Arrangement should be made by Contractor to have the cubes tested in an approved laboratory or in field at his own expense, with prior consent of Engineer. Sampling and testing of strength and workability of concrete shall be as per IS: 1199, IS: 516 and IS: 456.

### **B.5.7.3 Nominal Mix Concrete**

#### **B.5.7.3.1 Mix Design and Testing**

B.5.7.3.1.1 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 Contractor's sole responsibility to adopt appropriate nominal mix proportions to yield the specified strength.

#### **B.5.7.3.2 Batching and Mixing Concrete**

B.5.7.3.2.1 Based on the adopted nominal mixes, aggregates and cement shall be measured by weight.

### **B.5.8 FORM WORK**

B.5.8.1 Form work shall be all inclusive and shall consist of but not limited to shores, bracings, sides of footings, walls, beams and columns, bottom of slabs etc. including ties, anchors, hangers, inserts, falsework, wedges etc.

B.5.8.2 The design and engineering of the formwork as well as its construction shall be the responsibility of Contractor. However, if so desired by Engineer the drawings and calculations for the design of the formwork shall be submitted to Engineer for approval.

B.5.8.3 Formwork shall be designed to fulfill the following requirements:

- a) Sufficiently rigid and tight to prevent loss of grout 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, wind and weather forces.

- e) Capable of easily striking 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.

B.5.8.4 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 Engineer. Timber for formwork shall be well seasoned, free from sap, shakes, loose knots, work holes, warps and other surface defects. Joints between formwork and formwork and between formwork and structures shall be sufficiently tight to prevent loss of slurry from concrete, using seals if necessary.

B.5.8.5 The faces of formwork coming in contact with concrete shall be cleaned and two coats of approved mould 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.

B.5.8.6 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 Engineer. The Contractor shall equip himself with enough shuttering to allow for wastage so as to complete the job in time.

B.5.8.7 Permanent formwork shall be checked for its durability and capability with adjoining concrete before it is used in the structure. It shall be properly anchored to the concrete.

B.5.8.8 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 spalling, rust staining or allowing the passage of moisture.

B.5.8.9 For liquid retaining structures sleeves shall not be provided for through bolts or 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.

B.5.8.10 Where specified or shown on drawings, all corners and angles exposed in the finished structure shall have chamfers or fillets of 20 mm x 20 mm size.

B.5.8.11 Forms for substructure may be omitted when, in the opinion of Engineer, the open excavation is firm enough (in hard non-porous soils) to act as a form. Such excavations shall be slightly larger, as directed by Engineer, than that required as per drawing to compensate for irregularities in excavation.

B.5.8.12 The Contractor shall provide adequate props carried down to a firm bearing without overloading any of the structures.

B.5.8.13 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 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 limit the drop of concrete to 1.0 m or as directed by Engineer. The Contractor shall temporarily and securely fix items to be cast in (embedments / inserts) in a manner that will not hinder the striking of forms or permit loss of grout.

B.5.8.14 Formwork showing excessive distortion, during any stage of construction, shall be repositioned and strengthened. Placed concrete affected by faulty form work, shall be entirely removed and formwork corrected prior to placement of new concrete at the cost of the Contractor.

B.5.8.15 The striking time for formwork shall be determined based on 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 temperature; and
- g) Aggressiveness of the environment (unless immediate adequate steps are taken to prevent damage to the concrete).

B.5.8.16 Under normal circumstances (generally where temperatures are above 20 Deg. C) forms may be struck after expiry of the time period given in IS : 456, unless directed otherwise by Engineer. For Portland pozzolona / slag cement the stripping time shall be suitably modified as directed by the Engineer. 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 un-

dergo excessive deformation and resist surface damage and any stressed arising during the construction period.

### **B.5.9 Reinforcement Workmanship**

B.5.9.1 Reinforcing bars supplied bent or in coils shall be straightened cold without damage at no extra cost. No bending shall be done when ambient temperature is below 5 Deg. C. Local warming may be permitted if steel is kept below 100 Deg. C.

B.5.9.2 All bars shall be accurately bent gradually and according to the sizes and shapes shown on the drawings / schedules or as directed by Engineer.

B.5.9.3 Re-bending or straightening incorrectly bent bars shall not be done without approval of Engineer.

B.5.9.4 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 Engineer 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 spalling of the concrete cover.

B.5.9.5 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.

B.5.9.6 Substitution of reinforcement, laps / splices not shown on drawing shall be subject to Engineer's approval.

### **B.5.10 Tolerances**

B.5.10.1 Tolerance for formed and concrete dimensions shall be as per IS : 456 unless specified otherwise.

B.5.10.2 Tolerances specified for horizontal or vertical building lines or footings shall not be construed to permit encroachment beyond the legal boundaries.

### **B.5.11 Preparation prior to concrete placement**

B.5.11.1 Before concrete is actually placed in position, the inside of the formwork shall be cleaned and mould oil applied, inserts and reinforcement shall be correctly positioned and securely held, necessary openings, pockets etc. provided.

B.5.11.2 All arrangements formwork, equipment and proposed procedure, shall be approved by Engineer. The Contractor shall maintain separate Pour Card for each pour as per the format enclosed and shall produce before commencement of concreting to Engineer-in-charge.

### **B.5.12 Transporting, placing and compacting concrete**

B.5.12.1 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.

B.5.12.2 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 1.0 m as stipulated in clause B.5.8.13.

B.5.12.3 Concrete shall not be placed in flowing water. Under water, concrete shall be placed in position by tremmie or by pipeline from the mixer and shall never be allowed to fall freely through the water.

B.5.12.4 while placing concrete the Contractor shall proceed as specified below and also ensure the following:

- a) Continuously between construction joints and predetermined 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 lining 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.

B.5.12.5 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 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.

B.5.12.6 Concrete may be conveyed and placed by mechanically operated equipment after getting the complete procedure approved by Engineer. The slump shall be held to the minimum necessary for conveying concrete by this method. When concrete is to be pumped concrete mix shall be specially designed to suit pumping. Care shall be taken to avoid stoppages in work once pumping has started.

B.5.12.7 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 determined by Engineer. Concrete shall be protected against damage until final acceptance.

### **B.5.13 Mass concrete works**

B.5.13.1 Sequence of pouring for mass concrete works shall be as approved by Engineer. The Contractor shall exercise great care to prevent shrinkage cracks and shall monitor the temperature of the placed concrete if directed.

### **B.5.14 Curing**

B.5.14.1 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 of frost;

(f) Vibration and impact which may disrupt the concrete and interfere with its bond to the reinforcement.

B.5.14.2 All concrete, unless directed otherwise by Engineer, shall be cured by use of continuous sprays or ponded water or continuously saturated coverings of sacking, canvas,essian 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.

B.5.14.3 Where a curing membrane is directed to be used by the Engineer, 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 got approved from the Engineer before use and shall be applied with spraying equipment capable of a smooth, even textured coat.

B.5.14.4 Curing may also be done by covering the surface with an impermeable material such as polyethylene, which shall be well sealed and fastened.

B.5.14.5 Extra precautions shall be exercised in curing concrete during cold and hot weather.

### **B.5.15 Construction joints and keys**

B.5.15.1 Construction joints will be as shown on the drawing or as approved by Engineer.

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 approved of Engineer.

B.5.15.2 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 directed by Engineer.

B.5.15.3 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 a 15 mm thick layer of cement sand mortar for horizontal layers, the ratio of cement and sand being the same as in the concrete mix.

B.5.15.4 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.

#### **B.5.16 Foundation bedding**

B.5.16.1 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 area shall be cleaned out and back filled with either soil cement mixture, lean concrete or clean sand compacted as directed by Engineer. The surfaces of absorptive soils shall be moistened.

B.5.16.2 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.

#### **B.5.17 Finishing of concrete surfaces**

##### **B.5.17.1 General**

Immediately after the removal of forms, all exposed bars or bolts passing through the reinforced cement concrete member and used for shuttering or any other purpose shall be cut inside the reinforced cement concrete member to a depth of at least 25 mm below the surface of the concrete and the resulting holes be closed by cement mortar. All fins caused by form joints shall be broken. All cavities produced by the removal of form ties, all holes and depressions, honeycomb spots, broken edges or corners and all other defects shall be thoroughly cleaned, saturated with water and carefully pointed and rendered true with mortar of cement and fine aggregate mixed in the proportions used in the grade of concrete that is being finished and of as dry a consistency as is possible to use. Considerable pressure shall be applied in filling and pointing to ensure thorough filling in all voids. Surfaces which have been filled/ pointed shall be kept moist for period of twenty-four hours. Any repair and rectification of defective work is to be undertaken and carried out as directed by the Engineer-in-charge and the cost is to be borne by the contractor.

If rock pockets/ honeycombs, in the opinion of the Engineer-in-charge, are of such an extent or character as to affect the strength of the structure materially or to endanger the life of the steel reinforcement, he may declare the concrete defective and require the removal and replacement of the affected portion of the structure.

All construction and expansion joints in the completed work shall be left carefully tooled and free from any mortar and concrete. Expansion joint filler shall be left exposed for its full length with clean and true edges.

Curing of the surface shall be continued for a period of 21 days.

### **B.5.17.2 Classes of Finishing**

The surface finish for formed and unformed surfaces are classified and defined as below. Surface irregularities permitted for the various classes of finishes are termed either "abrupt" or "gradual". Fins or offsets caused by displaced or misplaced from sheeting, lining or form sections, by loose knots in form timber or by otherwise defective form timber are considered abrupt irregularities. All other cases are described as gradual irregularities. Gradual irregularities will be measured with a template consisting of a straight edge for plane surfaces or its equivalent for curved surfaces. The length of template for testing gradual irregularities on formed surfaces shall be 1.5 m in length, the permissible gradual irregularities being measured over this length of the template. Special surfaces, finishes and treatments falling outside the classes described here but defined elsewhere by the Engineer-in-charge shall also form part of these specifications.

Finish F1, F2 and F3 shall describe formed surfaces.

Finish U1, U2 and U3 shall describe unformed surfaces.

#### **B.5.17.2.1 Class F1 Finish**

This class of finish shall apply to all formed surfaces for which class F2 or F3 is not specified. It shall generally be formed by sawn timber formwork so constructed that there shall be no loss of material from the concrete during placement and compaction. After hardening, the concrete shall be in the position required and shall have the shape and dimensions called for in the drawings. Any abrupt irregularities shall not exceed 8 mm and gradual irregularities shall not exceed 16mm. All fins and drifts in excess of the above limits shall be made good by chipping and grinding if required by the Engineer-in-charge. Small blemishes caused by entrapped air or water may be expected but the surface shall be free from voids, honeycombing or other large blemishes. Class F1 finish shall be generally specified for all surfaces buried in ground or not visible during service or for surfaces that are to receive further rendering treatment such as plastering etc. Unless otherwise specified in the schedule B the surface finish shall be understood to be Class F1.

#### **B.5.17.2.2 Class F2 Finish**

Class F2 finish shall be obtained by the use of properly designed forms, either close jointed wrought timber forms or with forms having plywood or steel sheet lining. The abrupt irregularities shall not exceed 5 mm and gradual irregularities shall be less than 8mm. Small blemishes caused by entrapped air or water may be permitted but the surface shall be generally free from honeycombing, voids and large blemishes. Surface irregularities in excess of those stipulated shall be removed by chipping or rubbing with abrasive stone.

#### **B.5.17.2.3 Class F3 Finish**

Class F3 finish shall be formed by specially designed close jointed rigid forms having lining of high quality form plywood. The surface irregularities shall be limited to nil for abrupt irregularities and 3 mm for gradual irregularities. Class F3 finish may be obtained from class F2 finish by carefully removing all abrupt irregularities including fins and projections by rubbing/ grinding. If steel forms are used they shall be subjected to Engineer-in-charge's approval.

In addition, finish F3 shall include filling air holes with mortar and treatment of the entire surface with sack rubbed finish. It shall also include clean up of loose and adhering debris. For a sack rubbed finish, the surface shall be prepared within two days after of removal of the forms. The surface shall be wetted and allowed to dry slightly before mortar is applied by sack rubbing. The mortar used shall consist of one part cement to one and one half parts by volume of fine (IS No. 16 mesh) sand. Only sufficient mixing water to give the mortar a workable consistency shall be used. The mortar shall then be rubbed over the surface with a fine burlap or linen cloth so as to fill the surface voids. The mortar in the voids shall be allowed to stiffen and solidify after which the whole surface shall be wiped clean with clean burlap such that all air holes etc. are filled and the entire surface presents a uniform appearance without air holes, irregularities etc.

#### **B.5.17.2.4 Class U1 Finish**

This is the screened finish used on surfaces over which other finishes such as wearing coats etc. are to be placed. It is also the first step in the formation of U2 and U3 finishes. The finishing operation consists of levelling and screeding the concrete to produce an even and uniform surface so that the gradual irregularities are not greater than 6 mm. Surplus concrete should be removed immediately after consolidation by striking it off with a sawing motion of a straight edge or template across a wooden or metal strip that has been set as guide. Unless the drawings specify a horizontal surface or show the slope required, the tops of narrow

surfaces, such as stair treads, walls, curbs and parapets shall be sloped approximately 10 mm per 300 mm width. Surfaces to be covered with concrete topping, terrazzo and similar surfaces shall be smooth and levelled to produce even surfaces, irregularities not exceeding 6 mm.

#### **B.5.17.2.5 Class U2 Finish**

This is a floated finish used on all outdoor unformed surfaces not prominently exposed to view such as tops of piers etc. The floating may be done by hand or power driven equipment. It should not however be started until some stiffening has taken place in the surface concrete and the moisture film or "shine" has disappeared. The floating should work the concrete no more than is necessary to produce a surface that is free from screed marks. All joints and edges should be finished with edging tools. It shall include the repair of gradual irregularities exceeding 6 mm. All abrupt irregularities shall also be repaired unless a roughened texture is specified.

#### **B.5.17.2.6 Class U3 Finish**

This is a trovelled finish used on all surfaces exposed to view at close quarters such as tops of parapets and kerbs etc. Steel troveling should not be started after the moisture film and "shine" have completely disappeared from the floated surface and the concrete has hardened enough to prevent an excess of fine material and water from being worked to the surface. Excessive troveling, especially if started too soon, tends to produce crazing and lack of durability. Too long a delay will result in a surface too hard for proper finishing. Steel troveling should be performed with a firm pressure that will flatten and smooth the sandy surface left by floating. Troveling should produce a dense, uniform surface free of blemishes, ripples and trovel marks. It shall include the repair of all abrupt irregularities and the repair of gradual irregularities exceeding 6 mm. It shall also include finishing the joints and the edges of concrete with edging tools.

### **B.5.18 Repair and replacement of unsatisfactory concrete**

B.5.18.1 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 brought to the notice of Engineer who may permit patching of the defective areas or reject the concrete work.

B.5.18.2 All through holes for shuttering shall be filled for full depth and neatly plugged flush with surface.

B.5.18.3 Rejected concrete shall be removed and replaced by Contractor at no additional cost to Client.

B.5.18.4 For patching of defective areas all loose materials shall be removed and the surface shall be prepared as directed by the Engineer.

B.5.18.5 Bonding between hardened and fresh concrete shall be done either by placing cement mortar or by applying epoxy. The decision of the Engineer as to the method of repairs to be adopted shall be final and binding on the Contractor and no extra claim shall be entertained on this account. 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 directed by Engineer.

#### **B.5.19 Vacuum dewatering of slabs**

B.5.19.1 Where specified floor slabs, either on 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 Engineer's approval.

#### **B.5.20 Hot weather requirements**

B.5.20.1 Concreting during hot weathers shall be carried out as per IS : 7861 (Part – I)

B.5.20.2 Adequate provisions shall be made to lower concrete temperatures which shall not exceed 40 Deg. C at the time of placement of fresh concrete.

B.5.20.3 Where directed by Engineer, Contractor shall spray non-wax based curing compound of unformed concrete surfaces at no extra costs.

#### **B.5.21 Cold weather requirements**

B.5.21.1 Concreting during cold weather shall be carried out as per IS : 7861 (Part-II).

B.5.21.2 The ambient temperature during placement and upto final set shall not fall below 5 Deg. C. Approved antifreeze / accelerating additives shall be used where directed.

B.5.21.3 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.

#### **B.5.22 Liquid retaining structures**

B.5.22.1 The Contractor shall take special care of concrete for liquid retaining structures, underground structures and those others specifically called for to guarantee the finish and water tightness.

B.5.22.2 The minimum level of surface finish for liquid retaining structures shall be type F2. All such structures shall be hydro-tested.

B.5.22.3 The Contractor shall include in his price of hydro-testing of structure, all arrangements for testing such as temporary bulk heads, pressure gauges, pumps, pipelines etc.

B.5.22.4 Any temporary arrangements that may have to be made to ensure stability of the structures shall also be considered to have been taken into account while quoting the rates.

B.5.22.5 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. All such rectification of the Client/Engineer at no extra cost to the Client.



### **B.5.23 Testing concrete structures for leakage**

B.5.23.1 Hydro-static test for water tightness shall be done at full storage by Engineer, as described below:

B.5.23.1.1 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.

B.5.23.1.2 In the case of structures whose external faces are submerged 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 day shall be taken as an indication of the water tightness of the structure. The Engineer shall decide on the actual permissible nature of this drop in the surface level, taking into account weather 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.

B.5.23.1.3 Each compartment / segment of the structure shall be tested individually and then all together.

B.5.23.2 For structures such as pipes, tunnels etc. the hydro-static 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.

### **B.5.24 OPTIONAL TESTS**

B.5.24.1 If Engineer 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, as per relevant IS Codes. Client shall pay only for the testing of material supplied by the Client, otherwise Contractor shall have to pay for the tests. Transporting of all material to the laboratory shall however be done by the Contractor at no extra cost to Client.

B.5.24.2 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 Engineer 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. All these tests shall be carried out by Contractor at no extra cost to the Client. Alternatively Engineer also reserves the right to ask the Contractor to dismantle and re-do such unacceptable work at the cost of Contractor.

B.5.24.3 If the structure is certified by Engineer as having failed, the cost of the test and subsequent dismantling/reconstruction shall be done by contractor.

B.5.24.4 The quoted unit rates / prices of concrete shall be deemed to provide for all tests mentioned above.

### **B.5.25 GROUTING**

B.5.25.1 Grout shall be provided as specified on the drawings. The proportion of standard Grout shall be such as to produce a flowable mixture consistent with minimum water content and shrinkage. Surface 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 ENGINEER. The grout proportions shall be limited as follows:

	<b>Use</b>	<b>Grout Thickness</b>	<b>Mix Proportions</b>	<b>W/C Ratio (max.)</b>
a)	Fluid mix	Under 25 mm	One part Portland cement to one part sand	0.44
b)	General mix	25 mm and over but less than 50 mm	One part Portland cement to 2 part sand.	0.53
c)	Stiff mix	50 mm and over	One part Portland cement to 3 part sand	0.53

#### **B.5.25.2 Non Shrink Grout**

B.5.25.2.1 Non-shrink grout where called for in the Schedule of Quantities or specified on the drawings shall be provided in strict accordance with the manufacturer's instructions/ specifications on the drawings.

### **B.5.26 Inspection**

B.5.26.1 All materials, workmanship and finished construction shall be subject to continuous inspection and approval of Engineer. Materials rejected by Engineer shall be expressly removed from site and shall be replaced by Contractor immediately at no extra cost to Client.

### **B.5.27 Clean-Up**

B.5.27.1 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.

### **B.5.28 Acceptance Criteria**

B.5.28.1 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 |   |

B.5.28.2 The Engineer's decision as to the acceptability or otherwise of any concrete work shall be final and binding of the Contractor.

B.5.28.3 For work not accepted, the Engineer may review and decide whether remedial measures are feasible so as to render the work acceptable. The Engineer 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. Nothing extra shall become payable to the Contractor by the Client for executing the remedial measures.

### **B.5.29 Mode of measurement and payment**

B.5.29.1 The unit rate for concrete work under various categories shall be all inclusive and no claims for extra payment on account of such items as leaving holes, embedding inserts, etc. shall be entertained unless separately provided for in the schedule of quantities. No extra claim shall also be entertained due to change in the number, position and / or dimensions of holes, slots or openings, sleeves, inserts or on account of any increased lift, lead of scaffolding etc. All these factors should be take into consideration while quoting the unit rates. Unless provided for in the Schedule of Quantities the rates shall also include fixing insets in all concrete work, whenever required.

B.5.29.2 Payments for concrete will be made on the basis of unit rates quoted for the respective items in the Schedule of Quantities. No deduction in the concrete quantity will be made for reinforcements, inserts etc. and opening less than 0.100 of a sq.m in areas where concrete is measured in sq.m and 0.010 cu.m where concrete is measured in cu.m. Where no such deduction for concrete is made, payment for shuttering work provided for such holes, pockets, etc. will not be made. Similarly the unit rates for concrete work shall be inclusive or exclusive of shuttering as provided for in the Schedule of Quantities.

B.5.29.3 Payment for beams will be made for the quantity based on the depth being reckoned from the underside of the slabs and length measured as the clear distance between supports. Payment for columns shall be made for the quantity based on height reckoned up to the underside of slab / beams.

B.5.29.4 The unit rate for precast concrete members shall include formwork, mouldings, finishing, hoisting and setting in position including setting mortar, provision of lifting arrangement etc. complete. Reinforcement and inserts shall be measured and paid for separately under respective item rates.

B.5.29.5 Only the actual quantity of steel embedded in concrete including laps as shown on drawings or as approved by Engineer shall be measured and paid for, irrespective of the level or height at which the work is done. The unit rates for reinforcement shall include lap chairs, spacer bars etc.

B.5.29.6 Where the formwork is paid for separately, it shall be very clearly understood that payment for formwork is inclusive of formwork, shuttering, shoring, propping scaffolding etc. complete. Only the net area of concrete formed (shuttered) shall be measured for payment.

**CONCRETE POUR CARD**

Client: \_\_\_\_\_ Date: \_\_\_\_\_  
 Project: \_\_\_\_\_ Structure: \_\_\_\_\_  
 Contractor: \_\_\_\_\_ Max. Aggregate size slump: mm/ mm/ Drg. NO. : Start/  
 Completion Time: \_\_\_\_\_  
 Concrete Grade: \_\_\_\_\_ Mixing Time: \_\_\_\_\_

Sr.	Item	Contractor's Rep. Signature	Engineer's Signature	Remarks
1	Centre lines Checked			
2	Form work and Staging checked for Accuracy, Strength & finish			
3	Reinforcement Checked			
4	Cover to Reinforcement Checked			
5	Verified test certificate for cement / steel	Yes / No	Yes / No	
6	Adequacy of Materials / Equipment	Yes / No	Yes / No	
7	Embedded Parts checked (Location and Plumb)	Civil		
		Mechanical		
		Electrical		

**Pour Authorized site Engineer**

- 8 Soffit(S) and pour top ( T ) levels S(B) S(A) T(B) T(A)  
 checked before ( B ) and after (A)  
 from removal (Only of Beams of  
 over 1 M. span & Important  
 Structures link T.G etc.)
- 9 Construction joint location & time  
 (If not as per Drawing)
- 10 Cement Consumption in Kgs.
- 11 Numbers of cubes and  
 identification mark
- 12 Test cube results (7 Days / 28Days)

13 Concrete Condition on Form  
Removal

**Very Good/ Good / Fair /  
Poor**

Engineer-in-charge

Contractor

Notes:

1. Each item to be checked & signed by the respective engineers.
2. Item 8 to 13 (Both inclusive) to be filled by only engineers of the client.
3. Each pour to have separate cards in triplicate one each for client & site
4. Under remarks indicate deviations from drawings & specifications congestion in reinforcement if any unusual occurrences such as failure of equipment sinking of supports / props, heavy rain affecting reasonable. Poor compaction improper curing other deficiencies observations etc.

## **SECTION: B-6: BRICK MASONRY**

### **B.6.1 Scope of work**

This work shall consist of construction of structures with bricks jointed together by cement mortar in accordance with the details shown on the drawings or as approved by the engineer. However for more details reference shall be taken from section no.1000 and 1300 of MORTH specifications.

### **B.6.2 Materials and Codes**

All materials and codes are as per Section B-5 of these specifications.

### **B.6.3 Soaking of bricks**

All bricks shall be thoroughly soaked in a tank filled with water for a minimum period of one hour prior to being laid. Soaked bricks shall be removed from the tank sufficiently in advance so that they are skin dry at time of actual laying. Such soaked bricks shall be staked on a clean place where they are not contaminated with dirt, earth, etc.

### **B.6.4 Joints**

The thickness of joints shall not exceed 10mm. all joints on exposed faces shall be tooled to give concave finish.

### **B.6.5 Equipment**

All tools and equipment used for mixing, transporting, and laying, of mortar and bricks shall be clean and free from set mortar, dirt or other injurious foreign substances.

#### **B.6.6 Finishing of surfaces**

B.6.6.1 In jointing, the face of the mortar shall be worked out while still green to give a finished surface flush with the face of the brick work.

B.6.6.2 Pointing shall be carried out using mortar not leaner than 1:3 by volume of cement and sand or as shown on the drawing. The mortar shall be filled and pressed into the rack joints before giving the required finish.

B.6.6.3 Plastering shall be done where shown on the drawing. Superficial plastering may be done, if necessary, only in structures situated in fast flowing rivers or in severely aggressive environment.

#### **B.6.7 Acceptance of work**

All work shall be true to the lines and levels as indicated on the drawing or as directed by the engineer, subject to tolerances as indicated in these specifications.

Mortar cubes shall be tested in accordance with IS: 2250 for compressive strength, consistency of mortar and its water retentively. The frequency of testing shall be one sample for every 2 cubic meters of mortar, subject to a minimum 3 samples for a day's work.

#### **B.6.8 Mode of Measurement**

All brick work shall be measured in cubic meters. Any extra work done by the contractor over the specified dimensions shall be ignored.

The work of plastering and pointing shall be measured in square meters of the surface treated.

#### **B.6.9 Rate**

The contract unit rate shall include the cost of all labour, materials, tools and plant, scaffolding and other expenses incidental to the satisfactory completion of the work, sampling, testing, and supervision as described in these specifications and as shown on the drawings.



## **SECTION: B-7 STRUCTURAL STEEL**

All structural steel shall comply with the requirements of IS 226-1961 and structural steel work IS 1915-1962 specifications for structural steel appropriate for bridge work. However for more details reference shall be taken from section no. 1000, 1600 and 1900 of MORTH specifications.

### **B.7.1 Steel for Pins and Rollers**

Rolled steel pins and rollers, shall comply with requirements of the IS specifications appropriate for the work. Steel casting for cast steel pins shall conform to grade 1 or 3 of IS 1030-1956 specifications for steel casting (for general engineering purposes as appropriate).

### **B.7.2 Bolts and Nuts**

Mild steel for bolts and nuts when tested shall comply with IS 1608-1960 and shall have tensile strength of not less than 2500 Kg/cm<sup>2</sup>. Plain washers shall be made of steel.

### **B.7.3 Welding Electrode**

Mild steel electrodes shall comply with requirements of IS 814-1957 specification for covered electrodes for metal arc welding of mild steel.

### **B.7.4 Workmanship**

All work shall be in accordance with the drawings and shall satisfy IS specification No. 1915-1961. Care shall be taken to ensure that all parts in assembly fit accurately together. Notes or specifications on the drawings supplied by the Engineer-in-Charge/consulting Engineer, are to be constructed as superseding or cancelling any clause of this specifications with which they conflict. On all drawings dimensions shown in figures shall be acted in preference to measurement by scale.

### **B.7.5 Straightening**

All structural steel members and parts shall have straight edges. All straightening shaping and levelling etc. shall be done by pressure only and not by hammering. All joggles and knees shall be formed by pressure and where practicable in making these, the metal shall not be cut and welded.

### **B.7.6 Cutting**

All structural steel parts where required shall be sheared, cropped sawn or flame cut and ground accurately to the required dimensions and shape.

### **B.7.7 Bolts Holes**

The diameter of bolts holes B shall be 1.5 to 2.0 mm. larger than the nominal diameter of bolt. All holes for bolts shall be drilled unless permitted by Engineer-in-Charge for punching the holes. Care shall be taken; such as surrounding material is not deformed or damaged in case of punching the hole is allowed.

### **B.7.8 Welding**

Welding of steel conforming to relevant IS specifications shall be in accordance with general requirements of metal arc welding. In addition to general requirement, the following care shall be taken:-

- (a) The welding shall be positioned for downward welding wherever practicable.
- (b) The welding current shall conform with respect of voltage and ampere to the recommendations of the manufacturers of the electrode being used. The arc length, voltage and ampere shall be suited to the thickness of material, type of groove and other circumstances of the work.
- (c) The surface to be welded and surrounding material for a distance of at least 155 mm shall be free from scale, dirt, grease, paint, heavy rust or other surface deposit.
- (d) Members to be welded shall be held in correct position by holes, clamps, wedges, jigs or other suitable devices or by tack welding until welding has been completed, such fastening as may be used shall be adequate to ensure safety. Suitable allowance shall be made for war page and shrinkage.
- (e) Tack welds located where the final welds will later be made shall be subject to the same quality requirements as final welds. Defective and broken tack welds shall be removed before final welding.
- (f) Fusion faces shall be made or cut by shearing, chipping, machining or by gas cutting.
- (g) Exposed faces of welds shall be made reasonably smooth and regular so as to conform as closely as practicable to design requirements and shall not be of less than the required cross section.

(h) Finished welds and adjacent parts shall be protected with clean boiled linseed oil after all slag has been removed.

### **B.7.9 Safety Precautions**

B.7.9.1 (a) Operators of welding and cutting equipment shall be protected from the rays of the arc flame gloves and by helmet, hand shields, or goggles equipped with suitable filter lenses.

(b) Closed space shall be ventilated properly while welding is being done therein.

(c) Welders should be provided with such staging as will enable them to perform the welding operation. For site welding shelter should be provided to protect welders and the parts to be welded from the weather.

B.7.9.2 The Constructor shall employ a competent welding supervisor to ensure that the standard of workmanship and the quality of materials comply with requirements laid in this specification.

B.7.9.3 The Constructor shall provide free access to the representative of Engineer-in-Charge/Consulting Engineer to the work being carried out at all reasonable times and facilities shall be provided so that during the course of welding he may be able to inspect any layer of weld metal. He shall be at liberty to reject any material that does not conform to the terms of the specifications and to require any defective welds to be cut out and welded. The representative of the Engineer-in-Charge/Consulting Engineer shall be notified in advance of any welding operations.

B.7.9.4 Inspection and testing of welds shall be done as laid down in IS 822 and IS 11017.

B.7.9.5 No welder shall be employed in any position except those who are fully qualified to welding. Qualification for welders shall be as laid down in IS 812.

### **B.7.10 Joints**

All steel work intended to be bolted together must be in contact over the whole surface. Joints which have to take compressive stress and the ends of all stiffeners shall meet truly over the whole of the butting surface.

### **B.7.11 Assembling**

All members shall be so arranged that they can be accurately assembled, without being unduly packed, strained or forced into position and when built shall be true and free from twist kinks, buckles or open joints between component pieces. Work shall be kept properly

bolted together and no drifting shall be allowed except for the purpose of drawing assembled sections together in accuracy's in matching of holes may be corrected. But drifting to enlarge holes is prohibited. Failure in any of the above respect will involve the rejection of defective members.

### **B.7.12 Mode of Measurement and Payment**

B.7.12.1 Measurement of this item shall be as per IS 1200(Part VIII) - 1974 or as per its latest revision so far as applicable.

B.7.12.2 The contract rate shall be suitable for unit of one metric tonne of structural steel.

## **SECTION: B-8: REINFORCEMENT**

### **B.8.1 Specification for TMT bars reinforcement**

#### **B.8.1.1 Scope of work**

The scope of work consists of providing and laying TMT FE 500D reinforcement for RCC works of various components of the structure. . The steel to be used shall be procured from SAIL / VIZAG / TATA / JINDAL ELECTRO THERM / NATIONAL only for this project. This includes cuttings, bending, binding, placing, with all equipment and labour required for the work as directed by the Engineer-in-Charge and all operations covered within the intent and purpose of the specification. However for more details reference shall be taken from section no. 1000, 1600 and 1900 of MORTH specifications.

#### **B.8.1.2 Bending of Reinforcement**

Reinforcing steel shall conform accurately to the dimensions shown on relevant drawings and conforming to the relevant IS codes (latest revision) Bars shall be bent cold to the specified shape and dimensions or as directed by the Engineer in Charge using a proper bar bender, operated by hand or power to attain proper radii of bends. Bars shall not be bent or straightened in a manner that will cause injury to the material. Bars bent during transport or handling shall be straightened before being used on work; they shall not be heated to facilitate bending. The bending of the TMT bars shall be carried out as per the following:

Sr. No.	Operation	Size	TMT bars
1	Bend	Upto 22 mm dia.	3d
		Over 22 mm dia.	4d
2	Rebend	Upto 10 mm dia.	4d
		Over 10 mm dia.	5d

### **B.8.1.3 Placing of Reinforcement**

All reinforcing bars shall be accurately placed in the 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 conforming to IS: 280 and by using stays blocks or metal chairs, spacer, metal hangers, supporting wires or other approved devices at sufficiently close intervals. Bars will not be allowed to sag between supports nor displaced during concreting or any other operation over the work. All devices used for positioning shall be of non-corrodible material. Wooden and metal supports will not extend to the surface of concrete, except where shown on the drawings, Placing bars on layers of freshly laid concrete as the work progresses for adjusting bar spacing will not be allowed. Pieces of broken stone, brick or 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 protect reinforcement from corrosion, concrete cover shall be provided as indicated on the drawings. All bars protruding from concrete to which other bars are to be spliced and which are likely to be exposed for an indefinite period shall be protected by a thick coat of neat cement grout.

In the case of columns and walls, vertical bars shall be kept in normal position with timber templates having slots accurately cut in for bar position. Such templates shall be removed after the concreting has progressed up to a level just below them.

Bars crossing each other, where required, shall be secured by binding wire (annealed) of size not less than 1 mm and conforming to IS : 280 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 is not possible, overlapping of bars shall be done as directed by the Engineer in Charge. When practicable, overlapping bars shall not touch each other, but be kept apart by 25 mm or 1 1/4 times the maximum size of the coarse aggregates whichever is greater, by concrete between them. Where this is not feasible, overlapping bars shall be bound with annealed steel wire, not less than 1mm thickness twisted tight in eight shapes around the lapped bars. The overlaps shall be staggered for different bars and located at fixed locations only along the span where neither shear nor bending moment is maximum.

#### **B.8.1.4 Welding of Bars**

Welding of TMT bars can be permitted if specified on the drawings, joints of reinforcement bars shall be butt welded so as to transmit their full strength. 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 33 per cent of the rods are welded. No prewarming or post heat treatment is necessary. Interpose temperature should be limited to 200°C with low heat input and equivalent strength low hydrogen type electrode. Suitable means shall be provided for holding the bars securely in position during welding. It must be ensured that no voids are left in welding and when welding, is done in 2 or 3 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.

Welded pieces of reinforcement shall be tested. Specimens shall be taken from the actual site and their number and frequency of tests shall be as directed by Engineer in Charge.

The TMT bars shall be tested for any or all of the following tests as directed by the Engineer-in-charge.

- (1) Alternate immersion test
- (2) Salt spray test
- (3) Atmospheric exposure test
- (4) Sulphur dioxide test
- (5) Potentio dynamic test

#### **B.8.1.5 Measurements for payment**

Reinforcement shall be measured in lengths separately for different diameters as actually used in the work including overlaps/ From the length so measured the weight of reinforcements shall be calculated in tonnes as per IS: 1732 lengths shall include hooks at ends, wastage, avoidable overlaps, couples and welded joints, spaced bars and annealed steel wire for binding shall not be measured and cost of these items shall be deemed to be included in the rates for reinforcement.

### **B.8.1.5 Rate**

Rate for reinforcement shall include cost of all steel including procurement, cost of bending, placing, binding and fixing in position as shown on the drawings and as directed by the Engineer in charge. It shall also include cost of all devices for keeping reinforcement in approved position, cost of jointing as per approved method, and all wastage, overlaps and spacer bars.

## **SECTION: B-9 FILTER MEDIA**

### **B.9.1 SCOPE**

Well graded pebbles or metal of 40 mm. to 63 mm. size shall be used. The grading & tolerances of metal or pebbles should be as under.

<b>Sr.</b>	<b>No. of size range</b>	<b>Sieve designation</b>	<b>Percentage by weight passing through the sieve</b>
1.	63 mm. To 40 mm.	90 mm.	100-50
		63 mm.	85 -100
		50 mm.	35-70
		40 mm.	00 -15
		20 mm.	00 - 05

The size shall be 40 mm. to 63 mm. Wherein tolerance limit for oversize shall be upto 15% and that for lower size should be upto 15% & below 20 mm. it shall be tightly placed to a thickness not less allowable upto 5%, the filter material than 600 mm. & provided over the entire surface behind abutments wings or return walls to the full height.

### **B.9.2 MATERIALS**

Materials shall be first stacked in boxes of 2 m. x 1.5 m. x 0.5 m. size on fairly level ground and measured.

### **B.9.3 MEASUREMENTS**

The measurement for payment shall be made on cubic meter basis.

### **B.9.4 PAYMENT**

The unit rate includes to the cost of materials, scaffolding, labour & tools to complete the work.

**SECTION: B-10: WEEP HOLES**

**B.10.1** Providing weep holes in abutment and returns using 100 mm. dia. A.C. pipes and C.I. grating including cutting, fixing, the pipe in required slope. Weep holes with the backing of filter material shall be provided in abutments and returns as per detailed drawings, the quality of the A.C. pipe 100mm dia. and C. I. Grating shall be as per I. S. standards and the same shall have to be got approved from the Engineer in charge before using the same. The work shall be carried out to the full satisfaction of the Engineer-in-charge.

**B.10.2 MEASUREMENT**

Measurements shall be given on number of weep holes provided.

**B.10.3 PAYMENT**

The rate includes all materials, labors, equipment and plants etc. required for executing this item.

**SECTION: B-11: WEARING COAT**

**B.11.1** Wearing coat shall not be laid monolithic with the Top slab. The thickness of wearing coat shall be 75mm concrete. All carriageways and footpath surfaces shall have non-skid characteristics. The cross camber shall be provided 2.5 percent, level in longitudinal profile. For providing cross camber no variation in thickness of wearing coat shall be permitted.

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**B.11.2 MEASUREMENT**

Cement concrete wearing coat shall be measured in cubic meters. Asphaltic concrete wearing coat shall be measured in square meters.

**B.11.3 RATE**

The contract unit rate for wearing coat shall include the cost of all labour, material, tools and plant and other cost necessary for completion of the work.



## **SECTION: B-12: P.V.C. and G.I. pipe**

### **B.12.1 General**

The G.I. pipe used shall conform to IS: 1239. The PVC pipe used shall be of 75mm and 100 mm diameter and as per detail given in the drawings.

## **SECTION: B-13: EPOXY COATINGS**

**B.13.1** Prime coat to be used shall conform to the specifications of primers approved by the engineer. Primer shall be applied to the blast cleaned surface before any deterioration of the surface is visible. All coats shall be compatible with each other. The under coat and finishing coat shall be from same manufacturer. Typical guidelines for the epoxy based paints are as given below:

- I) Surface preparation: Remove oil/grease by use of petroleum hydrocarbon solution (IS: 1745) and grit blasting to near white metal surface.
- II) Paint System: 2 coats of epoxy zinc phosphate primer = 60 microns; Total 2 coats = 100 microns

### **B.13.2 Methods of application:**

The methods of application of all paint coatings shall be in accordance with the manufacturer's written recommendation and shall be as approved by the engineer. Spray paintings may be permitted provided it will not cause inconvenience to the public and is appropriate to the type of structure being coated. Areas hard to gain access to for painting and areas shaded for spray application shall be coated first by brushing. Oil based red lead primers must be applied by brush only, taking care to work into all corners and crevices. The primer, intermediate and finishing coats shall all be applied so as to provide smooth coatings of uniform thickness. Wrinkled or blistered coatings or coatings with pin holes, sags, lumps or other blemishes shall not be accepted. Where the engineer so directs, the coating shall be removed by abrasive blast cleaning and replaced at the contractor's expense.

### **B.13.3 Measurements for payment:**

The measurements of coatings shall be in sq.m. Based on the area on which coating is applied. No addition shall be made for the weight of protective coating.

### **B.13.4 Rate**

The contract unit rate shall include the cost of all materials, labour, tools and other costs necessary for completion of work.

## **SECTION: B-14: SETTING OUT ALIGNMENT WORK**

### **B.14.1 Marking of center line of bridge alignment along longitudinal axis and giving out foundation layout with theodolite levels including providing necessary masonry reference pillars, establishing bench mark etc. as directed.**

1. The contractor shall be responsible for the true and proper setting out of the works and for the correctness of the positions, levels, dimensions and alignments of all parts of the works and for the provision of all necessary instruments, appliances and labour in connection therewith. If at any time during the progress of the works any error may appear or arise in the positions, levels and dimensions of alignment of any part of the works, the contractor is required to rectify at his own cost, such errors to the satisfaction of the Engineer-in-charge. The checking of any setting out of any line or level by the Engineer or his representative shall not relieve in any way the contractor of his responsibility for the correctness thereof and the contractor shall carefully protect and preserve all bench marks, site rails, pegs and other things used in the setting out works.

2. The work under this item comprises of establishing a set of bench marks, permanent theodolite stations, center line pillars etc. and includes all materials, tools, equipment, labour etc. for performing all the functions necessary and ancillary thereto at commencement and during the progress of work till the physical completion of all the times of the work in question.

3. The centre line of the bridge, piers and abutments and their piles shall be established by theodolite and the center line marks shall be engraved on smoothly finished masonry or concrete pillars of such dimensions as are constructed at such intervals and places as approved and directed by the Engineer-in-charge. Prior approval of the Engineer-in-charge as to the positions, number, dimensions and design of such theodolite stations to be established shall be obtained.

4. The contractor shall also establish a series of interconnected permanent bench marks with reference to the standard bench marks in the vicinity. Suitable concrete or masonry pillars for permanent bench marks shall be constructed and maintained properly with necessary records of their values throughout the period of construction till final measurements as recorded for the works accepted. He shall also keep proper record of all such permanent

bench marks established denoting therein their correct values. The above work of establishing all such bench marks shall be carried out by the experienced staff of the contractor with the help of precision instruments suitable for the type of work and properly checked for the accuracy and for permanent adjustment before the commencement of the work and at frequent intervals during the progress of work. All such marks established by the contractor shall be subject to the check and approved by the Engineer-in-charge or his representative and any variation noticed in the work as a result of improper establishment or maintenance of such bench marks shall be made good at the Contractor's risk and cost. For the purpose no extra payment of this item will be done, however all bench marks, central line pillars, theodolite stations positions of piers, abutments, piles etc. established by the contractor for proper execution of all the foundations and various components of the bridge structure shall be done over all tendered rate shall include all materials, tools, equipment labour etc. for performing all functions described above and all other necessary and ancillary works there-to.

**B.14.2 Dismantling of the part of existing structure including removing and stacking the Dismantled material as and where directed.**

**(a) Dismantling of brick masonry**

**(b) Dismantling of RCC work**

1. The scope of work shall consist of dismantling portions of the existing brick masonry/ R. C. C. work of any structure in railway limit. Dismantling and removal operations shall be carried out with such equipment and in such a manner so as not to disturb the railway traffic moving on the running railway line.
2. All materials obtained from the dismantling of existing structure shall be the property of the Client unless otherwise specified. Materials having any salvage value shall be transported including all lifts and lead to RMC, stores and placed in neat stacks of like materials as directed by the Engineer-in-charge of work.
3. Materials which in the opinion of the Engineer cannot be used or auctioned, shall be disposed of as directed by Engineer with all lifts and leads.
4. The work shall be measured in Cubic meter.
5. The rates shall be inclusive of all labour, tools, equipment, safeguards and incidentals necessary to complete the work. This shall also include excavation and back filling where ne-

cessary to the required compaction and for handling, salvaging, piling and disposing of the dismantled materials within all lifts and leads.

### **B.14.3 Special Precautions to be taken regarding traffic**

Special precautions to safely divert the traffic with smooth movement of continuous traffic should be taking up before commencing the work. Safety precaution shall be taking up as required and direct by Engineer-in-charge particularly at cross road junctions.

For diversion of traffic during construction of suitable structure is proposed as the structure is passing through private and however if land is not available and diversion structure is not constructed payment for the same shall not be made however for ease of traffic suitably barricading / diversion shall be provided by bidder at low cost without any extra cost.

In addition to the normal barricading the diversion sign boards and signs showing directions etc are required to be provided. Contractor shall have to cater for following special safety measures.

- a) Blinking electric warning red coloured lights to warn the vehicular traffic of the obstruction on the road during construction activities.
- b) Strong barricading/fencing of approved design to keep pedestrians segregated from foundation, superstructure equipment, material, etc.
- c) Translucent reflectors, metallic or glass as directed by Engineer-in-Charge.

All schemes of providing safety measures shall be got approved from the Engineer-in-Charge and the concerned traffic controlling authorities.

It is essential that the contractor visits the site before submitting his offer to make himself fully acquainted with the situation and to plan his activities accordingly. No subsequent claims on this account will be entertained.

#### **4.0 GENERAL SPECIFICATIONS**

- 4.1 The details of reinforcement of RCC work shall be as per design and instructions of Authority and his order will be considered final.
- 4.2 The contractor shall have to maintain account of steel, cement and other materials that may be brought by him on site. The account shall be regularly maintained and kept open for inspection by Authority.
- 4.3 The contractor shall remain responsible for workmen's compensation if any, when such case occurs, the contractor shall arrange for red lamps at night and fencing and pagi and shall be responsible for any damage of life and lime or property if any happen, during the execution of work. In case of dispute for unseen or overlooked items, the decision of Authority shall be final. The Contractor shall have to give site clean of all rubbish on completion of work and hand over the bridge with final finishing of the work as directed. All the rejected materials shall be removed from site within 24 hours by contractor at his risk and cost.
- 4.4 For mixing mortar either for masonry or for plaster or for any other purpose contractor shall have to prepare trough of bigger size and mix the mortar in required proportion. In no case he shall be allowed to mix the mortar either on floor or any finished surfaces.
- 4.5 The Contractor shall have to make his own arrangement for water required for the work and shall pay the water charges as per rules.
- 4.6 If any extra item crops up during the progress of work the same shall be carried out by the contractor and he shall be paid at the rate fixed by Authority as per the rate analysis based on current market rates.
- 4.7 If in the interest of the RMC or site conditions it is necessary to change either any site or the design of the proposed work the contractor shall carry out the same at his quoted rates, without charging any extra and he will be paid at the rates quoted by him and no claim for extra charges made will be entertained.
- 4.8 Cement and Steel will not be supplied by the RMC. The Contractors have to make their own arrangements for procurement of indigenous Portland cement or imported Portland cement and M.S. Round Bars including Steel for Steel Girder the entire work. The contractors shall have to give necessary test certificates as per relevant I.S Code before using the same in the work.
- 4.9 Contractor will be fully responsible for compliance of the various provisions under Contract Labour Act, 1970 and the Rules framed there under.

4.10 As per circular No. MGR 2176(96), 2418 (ii) dt. 31.8.77 issued by the Government of Gujarat contractors are requested to procure their quarry materials required for construction work through legal sources i.e. only from the quarry lease holders permit holders or middle man who satisfies the contractor as to the legality of the source of purchase by him of these materials.

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

**Item No. 5**

**Removal of Excavated Stuff within RMC limit as directed by Engineer-in-Charge (in Interior Part Of City)**

The surplus excavated stuff shall be disposed off at the following sites as directed within the prescribed limits of Notification as directed by the engineering in charge.

1. Beside Kotharia Police Station near Stone Quarry
2. All Quarry areas of Raiya Smart City

The excavated material of black cotton soil should be stacked at the location specified by the engineer in charge at no extra cost.

If the contractor fails to dispose the excavated stuff as specified, penalty will be imposed by Rajkot Municipal Corporation as per the Notification for C&D waste.

After refilling surplus earth shall have to carted by the contractor within specified limit including loading transporting unloading spreading without any extra cost.

The payment of this item will be made on Cubic Meter basis.

**Item No. 16**

**Providing and fixing metal expansion joints as per drawings. Details of expansion joint 50 x 50 x 6mm size two IS and 100 x 6mm MS plate with 6 x 20 x 25mm long hold fast @ 50 cm / cc on both sides of expansion joints as detailed drawing.**

MORTH item Specification 2604 & 2608.

**Item No. 24A**

**Providing P.V.C Utility pipes 10 Kgf / Sqcmt. (For 75mm dia)**

**Item No. 24B**

**Providing P.V.C Utility pipes 10 Kgf / Sqcmt. (For 110mm dia)**

The G.I. pipe used shall conform to IS: 1239. The PVC pipe used shall be of 75mm and 110 mm diameter and as per detail given in the drawings.

**1. Material:**

Rigid and Flexible conduits:

A. All conduits shall be rigid PVC having minimum wall thickness of medium gauge 1.6 to 1.8 approved by F.I.A. & I.S.I. All rigid pipe and its accessories shall be of suitable material complying with IS: 3419-1989 and IS: 9537 (Part 5) 2000 for flexible conduits. The conduits shall be circular in cross-section and designated by their nominal outside diameter. Minimum thickness of walls shall be as follows:

a) Up to 38 mm. diameter - minimum 1.8 mm. wall thickness.

b) Above 40 mm. diameter - minimum 2.2 mm. wall thickness.

The maximum number of PVC insulated copper conductor cables of 650/1100V grade confirming to IS: 694-1990 that can be drawn in one conduit of various sizes shall be as specified.

B. Flexible conduits shall be formed from a continuous length of spirally wound interlocked steel strip with a fused zinc coating on both sides. The conduit shall be terminated in brass adapters.

Accessories:

A) PVC conduit fittings such as bends, elbows, reducers, chase nipples, split couplings, plugs etc. shall be specifically designed and manufactured for their particular application. All conduit fittings shall conform to IS: 2667-1964 and IS: 3857-1966. All fitting associated with galvanized conduit shall also be galvanized.

**2. Workmanship**

The workmanship shall be as per Item no. 30 & 34

**3. Mode of measurement**

The rate shall be for 1 mtr of PVC pipe complete with all required accessories.

**Item No. 17**

**Providing and fixing in position fully moulded restrained elastomeric Bearings as per detailed drawings.**

**2005 ELASTOMERIC BEARINGS**

Elastomeric bearings shall cater for translation and/or rotation of the superstructure by elastic deformation.

## 2005.1 Materials

- i) Chloroprene Rubber (CR) only shall be used.
- ii) Grades of raw elastomer of proven use in elastomeric bearings, with low crystallization rates and adequate shelf life viz. Neoprene WRT Neoprene W, Bayprene 110, Bayprene 210, Skyprene B-5, Skyprene B-30, Denka S-40V and Denka M-40, shall be used.
- iii) No reclaimed rubber or vulcanized wastes or natural rubber shall be used.
- iv) The polychloropene content of the compound shall not be lower than 60 per cent. The ash content shall not exceed 5 per cent of its weight. Polychloropene content shall be determined in accordance with ASTM-0297 and ash content as per IS: 3400-Part XXII.
- v) Use of synthetic rubber-like materials such as Ethyl Propylene Dimonomer (EPDM), Iso-butanelsoprene Copolymer (IIR) and Chloro-Isoprene Copolymer (CIIR) shall not be permitted.

### 2005.1.2 Properties of Elastomer

The elastomer shall conform to the properties specified in Table 2000-1.

**Table 2000-1: Properties of Elastomer**

Property	Unit	Value of the Characteristic Specified			Test Method IS Specification Reference
1.Physical Properties 1.1 Hardness	IRHD	50 ± 5	60 ± 50	70 ± 5	IS: 3400 (Part II)
1.2 Minimum tensile strength -Moulded test piece -Test piece from bearing	MPa	17 14	17 14	17 14	IS: 3400 (Part I)
1.3 Minimum elongation at break -Moulded test piece -Test piece from bearing	% %	450 450	400 400	300 200	IS: 3400 (Part II) IS: 3400 (Part II)
Property	Unit	Value of the Characteristic Specified			Test Method IS Specification Reference
2. Maximum compression Set (%) (24 h, 100 ± 1 °C)	%	< 35			IS: 3400 (Part X)
3. Accelerated aging (72 h, 100 ± 1 °C) (Maximum change from					IS: 3400 (Part IV)



unaged value)			
3.1 Maximum change in hardness	IRHD	± 5	
3.2 Maximum Change in tensile strength	%	± 15	
3.3 Maximum change in elongation	%	± 30	

**2005.1.3** Shear modulus (G) is the apparent "conventional shear modulus" of the elastomer bearing determined by testing. At nominal temperature of 23 °C ± 2°C, the value of G shall comply with the values given in Table 2000-2.

**Table 2000-2: Shear Modulus at Nominal Temperature**

Hardness (IRHD)	G (MPa)	Tolerances of G (MPa)
(1)	(2)	(3)
50± 5	0.7	± 0.15
60± 5	0.9	± 0.18
70± 5	1.15	±0.20

**2005.1.4** The adhesion strength of elastomer to steel plates determined according to 18:3400 (Part XIV) method A, shall not be less than 7 Kn/m.

**2005.1.5** For elastomeric bearings (CR) used in adverse climatic conditions, the ozone resistance of elastomer shall be proved satisfactory when assessed by test according to 18:3400 (Part XX). The testing shall be carried out for a duration of 96 hours at a temperature of 40±1°C, strain of 30 per cent and ozone concentration of 100 pphm by volume. If any cracking is detected by visual observation at the end of the test, the material shall be considered unsatisfactory. No specific tests for assessment of low temperature resistance are deemed necessary.

**Note:** For use of elastomer in extreme cold climates, the Engineer may specify special grade of low temperature resistant elastomer in conformity with operating ambient temperature conditions. The specifications for such special grade elastomer including the tests for low temperature resistance, shall be mutually agreed by the Engineer and the producer/ supplier and are outside the purview of these Specifications.

**2005.1.6** Laminates of mild steel conforming to IS: 2062/IS: 1079 or equivalent international grade, shall only be permitted. The yield stress of the material shall not be less than 250 MPa. Use of any other material like fibre glass or similar fabric as laminates, shall not be permitted.

**2005.1.7** The manufacturers of elastomeric bearings shall satisfy the Engineer that they have in-house facilities for carrying out the following tests on elastomer in accordance with the relevant provisions of ASTM D-297.

- a) Identification of polymers : to confirm the usage of chloroprene (Appendix X)
- b) Ash content : to determine their percentage (sub-section 34)
- c) Specific gravity : (sub-section 15)
- d) Polymer content : (sub-section 10)

The Engineer shall invariably get the test (a) performed in his presence or in the presence of his authorized representative. In case of any dispute regarding interpretation of results, the Engineer may carry out test as per ASTM S-3452-78 (chromatography test) at the manufacturer's cost in a recognized test house. The elastomer specimen to conduct the test shall be obtained from the bearing selected at random for destructive test. The remaining part of the test bearing shall be preserved by the Engineer for any test to be done later, if required.

### **2005.2 Manufacturing and Workmanship**

- i) Plain pad and strip bearing shall be moulded in one piece, or comprise single pieces cut from previously moulded strips or slabs. Cutting shall produce a smooth surface without injurious heating of the elastomer.
- ii) Bearing with steel laminates shall be moulded as a single unit in a mould and vulcanised under heat and pressure. Moulding of elements in separate units and subsequent bonding as well as cutting from large sized cast, shall not be permitted.
- iii) The moulds used shall have standard surface finish adequate to produce bearings free from any surface blemishes.
- iv) Steel plates for laminates shall be sand/grit blasted, clean of all mill scales and shall be free from all contaminants prior to bonding by vulcanization. Rusted plates with pitting shall not be used. The plates shall be rounded so as to be free of sharp edges.
- v) Bonding shall be carried out during vulcanisation using suitable bonding agent for bonding of elastomer to steel such that the bond peel strength is at least 7 N/mm width when tested in accordance with IS: 3400 Part XIV method A.
- vi) Spacers used in mould to ensure cover and location of laminates shall be of minimum size and number practicable. Any hole at surface or in edge cover shall be filled in subsequently.
- vii) Care shall be taken to ensure uniform vulcanizing conditions and homogeneity of elastomer through the surface and body of bearings.
- viii) The vulcanizing equipment/press shall be such that between the platens of the press, the pressure and temperature are uniform and capable of being maintained at constant values as required for effecting a uniform vulcanization of the bearing.
- ix) The moulding dies utilized for manufacturing the bearings shall be so set inside the platen of the press, that the pressure developed during vulcanization of the product is evenly distributed and the thickness maintained at all places are within acceptable tolerance limits taking into consideration the expansion/shrinkage allowance of vulcanizate (the product of vulcanization).
- x) The raw compound which is introduced inside the metal dies for vulcanization shall be accurately weighed each time and shall be of sufficient quantity to ensure proper flow of material to every part of the die so that a homogeneous and compact bearing is produced without any sign of sponginess or deficiency of material at any place.

- xi) Before the rubber mix of any batch is used for producing vulcanized bearings, test pieces in the form of standard slab and buttons shall be prepared in accordance with prescribed standards and salient properties tested and recorded regularly against each batch of production to monitor the quality of the products.
- xii) Bearings of similar size to be used in a particular bridge project shall be produced by identical process and in one lot as far as practicable Phased production may be resorted to only when the total number of bearings is large.

**2005.3 Manufacturing Tolerances**

The bearings shall be fabricated/manufactured with the tolerances specified in Table 2000-3. Tolerances of thickness of individual layer of elastomer, dimension of laminates, and flatness of laminates are primarily meant for quality control during production. In order to measure thickness of individual layer of elastomer, dimension of laminates and flatness of laminates of a finished bearing, it is essential to cut the bearing, which may be done if agreed upon between the manufacturer and the buyer.

**Table 2000-3: Tolerances**

	Items	Tolerances
1)	<b>Overall linear plan dimensions</b>	-3 mm, +6 mm
2)	<b>Total mean bearing thickness</b> (The mean thickness is the arithmetic average of the thickness measured at five points on the major surface as indicated for various shaped bearings: Rectangular : corners and centre Circular : corners of inscribed square and centre	-2.5%, +5%
3)	<b>Parallelism</b>	
a)	Of top surface of bearing with respect to the bottom 1 in 200 surface as datum	1 in 200
b)	Of one side surface with respect to the other as datum	1 in 100
4)	<b>Dimension of laminates</b>	
a)	Inner layer of elastomer	±12% (max of 2 mm)
b)	Outer layer of elastomer	+20% (max of 1 mm )
c)	Side cover	-0 mm, +3 mm
5)	<b>Dimension of laminates</b>	
a)	Plan dimensions of laminates	-3 mm, + 0
b)	Thickness of laminate	± 10%
c)	Parallelism of laminate with respect to bearing base as datum (with respect to diameter for plates circular in plan and shorter side for plates rectangular in plan)	1 in 100

6)     a)	<p><b>Flatness</b></p> <p>Flatness shall be assessed by placing a straightedge along the diagonal or diameter. The gap between the straightedge and the surface shall not exceed the tolerances specified below</p> <p>Load bearing surface of the bearing</p>	<p>0.3% of diameter or diagonal or 2% of mean bearing thickness whichever is higher 1% of diameter or diagonal (max of 1.5 mm)</p>
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**2005.4 Acceptance Specifications**

The manufacturer shall have all the test facilities required for the process and acceptance control tests installed at his plant to the complete satisfaction of the Engineer. The test facilities and their operation shall be open to inspection by the Engineer on demand. All acceptance and process control tests shall be conducted at the manufacturer's plant. Cost of all materials, equipment and labour shall be borne by the manufacturer unless otherwise specified or specially agreed to between the manufacturer and Engineer.

A testing programme shall be submitted by the manufacturer to the Engineer and his approval obtained before commencement of acceptance testing.

Any acceptance testing delayed 180 days beyond the date of production shall require special approval of the Engineer and modified acceptance specification, if deemed necessary by him.

All acceptance testing shall be conducted by the Inspector with the aid of the manufacturer's personnel having adequate expertise and experience in rubber testing, working under the supervision of the Inspector and to his complete satisfaction.

Inspection and acceptance shall be carried out lot by lot.

**2005.4.1 Acceptance Lot**

A lot under acceptance shall comprise all bearings, including the pair of extra test bearings where applicable, of equal or near equal size produced under identical conditions of manufacture, to be supplied for a particular project.

The size and composition of acceptance lot shall be got approved by the Engineer.

For the purpose of grading levels of acceptance testing, a lot size of 24 or larger number of bearings shall be defined as a 'large lot', while a lot size of less than 24 number of bearings shall be defined as a 'small lot'.

When the number of bearings of equal or near equal size for a single bridge project is large and phased production and acceptance is permitted, the number of bearings supplied in any single phase of supply shall comprise a lot under acceptance. When such phased supply is made, each such lot shall be considered as a large lot for the purpose of acceptance testing.

### **2005.4.2 Levels of Acceptance Testing**

The following two Levels of acceptance testing shall be adopted, depending on lot size: Acceptance testing Level 1 is a higher level of inspection and testing and shall be applicable to large lots only, unless otherwise specified. This shall involve manufacture of two extra bearings for each lot to be used as test bearings and eventually consumed in destructive testing.

Acceptance testing Level 2 shall be applicable to small lots only, for which one extra bearing shall be manufactured and shall not involve destructive testing of finished bearing. Out of the lot, one bearing shall be selected at random for carrying out material tests. This bearing shall be excluded from the lot accepted.

Acceptance testing Level 1 may be specified for small lots also at the sole discretion of the Engineer taking into account the special importance of a bridge project. The cost of extra bearings, in such cases shall be borne by the user, while the cost of all other materials, equipment and testing shall be borne by manufacturer.

### **2005.4.3 Testing**

Acceptance testing shall comprise general inspection, test on specially moulded test pieces and test on complete bearings or sections for measurement of various quality characteristics detailed below:

#### **2005.4.3.1 Acceptance Testing Level 1**

##### **General Inspection**

- i) All bearings of the lot shall be visually inspected for absence of any defects in surface finish, shape, hardness or any other discernible superficial defects.
- ii) All bearings of the lot shall be checked for tolerances for overall dimensions, mean bearing thickness, parallelism of bearing surfaces and flatness of load bearing surfaces as specified in Table 2000-3.
- iii) The test shall be carried out on all bearings as part of the standard production process. The temperature of the room in which the bearings are tested shall not vary more than 10 °C. The main objective of this test is to eliminate poorly made bearings by visual inspection in a quick and efficient way. All bearings of the lot shall be subjected to an axial load to correspond to the design load at serviceability limit state while visual examination is made to check for discernible defects like:
  - Misalignment of reinforcing plates
  - Poor bond at laminate/steel interface
  - Variation in elastomer layer thickness
  - Any surface defects developed during testing
- iv) During acceptance testing, complete test data shall be furnished by the manufacturer and one bearing per lot shall be selected at random and the same test shall be repeated. The bearings shall then be visually inspected for defects and the stiffness shall also be measured.
- v) During the test, the deflection between 30 percent and 100 percent of the maximum load for the application shall be recorded and used to check the consistency of the stiffness value. Variation in stiffness of any individual bearing from the mean of the

measured values for all such bearings of the lot, shall not be larger than 20 percent of the mean value.

- vi) In case of any visual defect or unacceptable stiffness during acceptance testing, all bearings of the lot shall be subjected to the same test again and only the bearing that passes the test in all respects, shall be accepted.

### **Tests on Specially Moulded Test Pieces**

- i) Test pieces shall be moulded by the manufacturer with identical compound and under identical vulcanising conditions as used in the manufacture of the bearings of the acceptance lot. The process shall be open to inspection by the Inspector/Engineer.
- ii) Test pieces offered for inspection shall be identified by suitable markings and duly certified by the manufacturer.
- iii) The quality characteristics to be tested are listed below. The specification reference in parenthesis shall define the corresponding specification for test piece, test method and criterion for acceptance.

Composition (see Note 1 below)

Hardness (Table 2000-1, 1.1)

Tensile strength (Table 2000-1, 1.2)

Elongation at Break (Table 2000-1, 1.3)

Compression Set (Table 2000-1, 2)

Accelerated Ageing (Table 2000-1, 3)

Adhesion Strength (Clause 2005.1.4)

Ozone Resistance (see Note 2 below)

Note 1 The properties enumerated in Clause 2005.1 and specific gravity of elastomer of test pieces from test bearing, shall be compared with those for corresponding specially moulded test pieces furnished by the manufacturer. The following variations shall be deemed maximum acceptable:

Specific Gravity + 0.2.

Ash Content  $\pm$  0.5 per cent (e.g., if the ash content of elastomer from test bearing is 4%, the ash content of the specially moulded test piece shall be within 3.5% to 4.5% or vice versa)

Hardness (Table 2000-1, 1.1)

Tensile strength (Table 2000-1, 1.2)

Elongation at Break (Table 2000-1, 1.3)

Compression Set (Table 2000-1, 2)

Accelerated Ageing (Table 2000-1, 3)

Adhesion Strength (Clause 2005.1)

Note 2 Ozone resistance test can be waived by the Engineer for bearings of CR when satisfactory results of ozone resistance tests on similar grade of elastomer may be avail-

able from process control records or development test data furnished by the manufacturer.

Where such process control data are not available or the frequency of testing not deemed adequate, ozone resistance test shall be mandatory for acceptance of bearings of CR.

However, such tests may not be insisted upon for bearings not located in adverse conditions of exposure and where the test on accelerated ageing could be considered as adequate.

Process and acceptance control tests for ozone resistance by an independent testing agency shall be acceptable.

#### **Tests on Complete Bearings or Samples**

- i) Two bearings shall be selected at random from the lot as test bearings. The tests to be conducted are:
  - a) Test for determination of shear modulus (on a pair of bearings) and
  - b) Test for determination of compression stiffness (on one bearing out of the selected pair).

The test specifications and acceptance criteria shall conform to those given in Appendix-3 of IRC: 83 Part II. The tested bearings shall be part of the lot accepted.

- ii) The test for determination of shear bond strength shall be conducted on two identical bearings selected at random from the lot as test bearings or on two identical specially moulded sample bearings of plan dimension 200 mm x 300 mm and overall thickness 41 mm (3 elastomer layers of thickness 8 mm each, 4 reinforcing plates of thickness 3 mm each, face cover 2.5 mm, and side cover 4 mm) as agreed upon between the manufacturer and buyer:

The test specifications and acceptance criteria shall conform to those given in Appendix-3 of IRC: 83 Part II. This is a destructive test and the test bearings shall not be used in the structure.

#### **2005.4.3.2 Acceptance Testing Level 2**

**General Inspection:** This shall conform to the provisions in Clause 2005.4.3.1 in all respects.

**Test on specially moulded test pieces:** This shall conform to the provisions in Clause 2005.4.3.1 in all respects.

**Test on complete bearings:** Test for determination of shear modulus shall be conducted using two bearings of the lot selected at random and conforming to relevant provisions of Clause 2005.4.3.1. These bearings shall, however, be part of the lot accepted. The remaining tests stipulated in aforesaid clause shall be carried out on two bearings selected at random which shall be excluded from the lot accepted.

#### **2005.4.4 Special Acceptance Inspection**

Special acceptance inspection shall comprise the following:

- i) Acceptance testing by a NABL accredited independent external agency with separate or supplemental test facilities provided by it for polymer identification

and confirmation about percentage of polymer content and ash content by TGA method.

- ii) Acceptance testing on test pieces prepared from the surface or body of the test bearings instead of specially moulded test pieces.
- iii) Acceptance testing on cut sample from finished bearing in order to measure thickness of individual layer of elastomer, dimension of laminates and flatness of laminates.
- iv) Acceptance test at ULS condition. Bearings tested at ULS condition cannot be used in the structure as its performance at SLS condition cannot be guaranteed after such test.
- v) Acceptance tests not covered by these specifications but according to the specifications laid down by the Engineer.

Special acceptance inspection may be specified under the following conditions:

- a) Special contract agreement between the manufacturer and the buyer. Cost of additional bearings to be consumed for special acceptance inspection, shall be borne by buyer.
- b) Evidence of unsatisfactory process or acceptance control

#### **2005.4.5 Inspection Certificate**

A lot under inspection shall be accepted by the Inspector and so certified, when no defect is found with respect to any of the quality characteristics tested on samples drawn from the lot, according to specifications laid down to Clause 2005.4.3 covering general inspection tests on specially moulded test pieces and on complete bearings.

In case any bearing is found defective, the lot shall be rejected by the Inspector and so certified.

In case any bearing is found to be defective with respect to any quality characteristic, discerned by general inspection tests specified in Clauses 2005.4.3.1 and 2005.4.3.2, tests on specially moulded test pieces and complete bearings as applicable according to those Clauses, shall nevertheless be completed. If the said lot, rejected by general inspection, satisfies the acceptance criteria in respect of these other tests, the lot and individual bearings found defective shall be clearly identified in the inspection certificate.

Immediately on completion of inspection by the Inspector authorized by the Engineer, the manufacturer shall obtain an inspection certificate which shall include the details of a lot or lots accepted/rejected by him and records of all test measurements.

#### **2005.4.6 Quality Control Certificate**

The manufacturer shall certify for each lot of bearings under acceptance that:

- a) An adequate system of continuous quality control was operated in his plant.
- b) The entire process remained in control during the production of the lot of bearings under acceptance, as verified from the quality control records/charts which shall be open to inspection of Engineer/Inspector on demand.

A certified copy of results of process control testing done on samples of elastomer used in the production of the lot shall be appended and shall include the following information:



composition of compound - raw elastomer and ash content, the grade of raw elastomer used (including name, source, age on shelf), test results of hardness, tensile strength, elongation at break, compression set, accelerated ageing, etc.

A higher level certification of the process quality control shall be called for at the sole discretion of the Engineer in special cases e.g. where adequate inspection of bearings similar to those comprising the lot under inspection produced in the same plant, is not available with the Engineer or where there is any evidence of process or acceptance control being deemed unsatisfactory. The higher level certification shall comprise submittal of a complete quality control report covering tests as given in Appendix 3 of IRC:83 (Part II), supplementing the quality control certificate.

#### **2005.4.7 Acceptance**

The manufacturer shall furnish the following to Engineer for obtaining acceptance:

- 1) Quality control certificate as laid down in Clause 2005.4.6.
- 2) Inspection certificate as laid down in Clause 2005.4.5.

The manufacturer shall furnish any supplementary information on the system of quality control and/or process and acceptance control testing as may be deemed necessary by the Engineer.

In case of any evidence of process or acceptance control testing being deemed unsatisfactory by him, Engineer at his sole discretion may call for a special acceptance testing of the lot according to specifications laid down by him, without any prejudice to his right to reject the lot. The entire cost of such supplementary inspection shall be borne by the manufacturer.

The Engineer shall be the sole authority for acceptance of a lot on scrutiny of the certificates along with any supplementary evidence as mentioned in this Clause, to his complete satisfaction therewith.

In case of rejection of a lot, the Engineer shall reserve the right to call for special acceptance inspection for the succeeding lots offered for inspection, according to the specifications laid down by him. The entire cost of such tightened inspection shall be borne by the manufacturer.

#### **2005.5 Certification and Marking**

Bearings shall be transported to bridge site after final acceptance by Engineer and along with an authenticated copy of the certificate to that effect.

Each bearing shall be uniquely and individually numbered on its external faces for identification. The identification number shall be unique and such as to enable other bearings manufactured at the same time, to be traced through the production control records, should the need arise. The manufacturer's name and unique identification number of the bearing should be vulcanized on the top or bottom of the bearing.

An information card giving the following details for the bearings, duly certified by the manufacturer, shall also be appended :

Name of manufacturer

Date of manufacture

Elastomer grade used

Bearing dimensions

Production batch no.

Acceptance lot no.

Date of testing

Name and specific location of bridge

Explanation of markings used on the bearing

All bearings shall have suitable index markings identifying the information. The markings shall be made in indelible ink or flexible paint and if practicable, should be visible after installation. The top of the bearing and direction of installation shall be indicated.

#### **2005.6 Storage and Handling**

Each elastomeric bearing shall be clearly labelled or marked. The bearing shall be wrapped in a cover and packed in timber crates with suitable arrangement to prevent movement and to protect corners and edges.

Care shall be taken to avoid mechanical damage, contamination with oil, grease and dirt, undue exposure to sunlight and weather of the bearings during transport and handling prior to and during installation.

#### **2005.7 Installation**

- i) Bearings shall be installed in the structure as specified or approved by the Engineer to ensure that right bearing is being installed at the right location.
- ii) Bearings must be placed between true horizontal surfaces (maximum tolerance 0.2 percent perpendicular to the load) and at true plan position of their control lines marked on receiving surfaces (maximum tolerance  $\pm 3$  mm).
- iii) Concrete surfaces shall be free from local irregularities (maximum tolerance  $\pm 1$  mm in height).
- iv) Departures from common planarity of twin or multiple bearings shall be within such tolerance as may be specified or approved by the engineer.
- v) Design shall be got checked for the actual inclination in seating if larger inaccuracies than those specified are permitted.
- vi) For cast in-situ concrete superstructure, where bearings are installed prior to concreting, the forms around the bearings shall be capable of easy removal. Forms shall also fit the bearings snugly and prevent any leakage of mortar/grout. Any mortar contaminating the bearings during concreting shall be completely removed before setting.
- vii) Fixing of bearing to precast concrete or steel superstructure elements, shall be done by application of epoxy resin adhesive to interface, after specified surface preparation. The specifications for adhesive material, workmanship and control shall be approved by the Engineer. Care shall be taken to guard against faulty application and consequent possibility of behaviour of the adhesive layer as a lubricant. The bonding by the adhesive shall be deemed effective only as a device for installation and shall not be deemed to secure bearings against displacement for the purpose of design.
- viii) Lifting of a cast in-situ post-tensioned bridge deck for relieving time dependent deformation shortly after installation of bearings, should be avoided. In case such lifting is unavoidable, the lifting arrangement, proper seating of the girder on the bearing, etc. shall be rigidly controlled to avoid any risk of misalignment.

- ix) Bulging of the rubber layer between the reinforcing steel laminates on free exposed perimeter under load, which is a normal phenomenon, shall be examined carefully for detecting any evidence of crack or bond failure.
- x) In case seating of bearings on a non-horizontal plane is required, it shall be carried out in accordance with acceptable practice and particular specifications as may be laid out and directed by the Engineer.
- xi) As a measure of ample precaution against accidental displacement, the bearings shall be placed in a recess as shown in Fig. 9 of IRC: 83 (Part II).
- xii) After installation, bearings and their surrounding areas shall be left clean.

### **2005.8 Maintenance**

- i) The maintenance of bearings shall be carried out according to a planned schedule.
- ii) The structure should be designed and detailed in such a way that the bearings are easily accessible after installation for inspection and maintenance. Arrangements for insertion of jacks to lift the bridge deck shall be made in detailing of structure.
- iii) The exposed bearing surface shall be maintained clean and free from contamination with grease, oil or other deleterious matter.
- iv) Annual routine maintenance inspection or special maintenance inspection of all bearings shall be made to check the following aspects and results reported:
  - The top and bottom load bearing surfaces shall be in full contact with the plinth (bottom supporting surface) and the soffit (top supporting surface). If there is imperfect contact between the bearing surfaces and the soffit and plinth, the angle between the soffit and plinth shall be checked against the design specifications.
  - The magnitude of the shear deflection of each bearing shall be checked to ensure that it is within the design specifications.
  - A visual inspection shall be made of all the accessible edges. A note shall be made of the size and position of any cracks, splits or uneven bulges.
  - The plinth and soffit shall be examined for signs of displacement from original position of bearing which may be indicated by black marks left on the plinth and soffit.
  - Where applicable, the sliding surfaces shall be examined for cleanliness and for any movements beyond the design range.
  - Where applicable, protective coating and/or dust protection shall be examined for signs of deterioration.
- v) Damaged bearings shall be replaced immediately. To avoid differences in stiffness, all adjacent bearings on the same line of support shall also be replaced.

### **MEASUREMENT OF PAYMENT**

**The Payment shall be made on quantity of Elastomeric bearing shall be measured in cubic centimetre of finished dimensions.**

#### **Item No. 31**

**Providing and fixing marble slab including transporting, engraving and painting all complete.**

**(ii) Size 60cm x 60cm x 40mm**

1. Marble plate shall be white and of approved quality and shall be of size as mentioned in the item. Lettering shall be done by V-shape engraving and shall be filled with black paint of approved quality, lettering shall be done as directed by the Engineer-in-charge. The Marble plate shall be fixed in neat cement at a place as directed by the Engineer-in-charge. Cement shall conform to relevant IS Specification.
2. Measurement shall be per number of marble plate fixed.
3. Unit rates includes cost of all material labour and tools to complete the work

### **Item No. 32**

**Providing and applying one coat of Epoxy phenolic primer of DFT 50 microns and two coats of Epoxy phenolic coating of DFT 100 microns each for RCC Element or any other equivalent epoxy coating system to all concrete surfaces exposed to atmosphere in substructure and superstructure including cost of material labour, transportation, scaffolding and preparing the surface by cleaning, washing, brushing, sand/grit blasting etc complete and as directed by engineer and as per specification. (Paint shall be approved from Engineer and tested from approved Laboratory) (Total DFT = 50+100+100 = 250 microns)**

### **Epoxy Coatings**

#### **1. Material specifications:**

Prime coat to be used shall conform to the specifications of primers approved by the engineer. Primer shall be applied to the blast cleaned surface before any deterioration of the surface is visible. All coats shall be compatible with each other. The under coat and finishing coat shall be from same manufacturer. Typical guidelines for the epoxy based paints are as given below:

- I) Surface preparation: Remove oil/grease by use of petroleum hydrocarbon solution (IS: 1745) and grit blasting to near white metal surface.
- II) Paint System: 2 coats of epoxy zinc phosphate primer = 60 microns; Total 2 coats = 100 microns

#### **2. Methods of application:**

The methods of application of all paint coatings shall be in accordance with the manufacturer's written recommendation and shall be as approved by the engineer. Spray paintings may be permitted provided it will not cause inconvenience to the public and is appropriate to the type of structure being coated. Areas hard to gain access to for painting and areas shaded for spray application shall be coated first by brushing. Oil based red lead primers must be applied by brush only, taking care to work into all corners and crevices. The primer, intermediate and finishing coats shall all be applied so as to provide

smooth coatings of uniform thickness. Wrinkled or blistered coatings or coatings with pin holes, sags, lumps or other blemishes shall not be accepted. Where the engineer so directs, the coating shall be removed by abrasive blast cleaning and replaced at the contractor's expense.

**3. Measurements for payment:**

The measurements of coatings shall be in sq.m. Based on the area on which coating is applied. No addition shall be made for the weight of protective coating.

**4. Rate**

The contract unit rate shall include the cost of all materials, labour, tools and other costs necessary for completion of work.

## ADDITIONAL CONDITIONS

1. The contractor shall have to provide his own level instrument for this work.
2. Work is required to be carried out in residential / outside area where all the services like water supply, sullage water pipeline, telephone / electric cable are existing. Under the circumstances, prior to starting the work agency shall have to excavate the trenches manually for upto 1 mt depth. During the course of execution, all the services shall have to be maintained by the agency and any damage to any services or property, the agency shall have to get it repair at their cost.
3. For excavation of trench, use of JCB machine will not be permitted directly on the top surface of the road. After excavation upto minimum 1.00 mt. depth from road surface or existing ground level, same shall have to be carried out manually or by using Breaker and after locating underground services like; water supply pipeline, water connection lines, pipe gutters, telephone cables, electric cables etc., and thereafter upon taking the prior approval of the Engineer-In-Charge, the excavation can be carried out by using JCB machine.
4. Rajkot Municipal Corporation shall recommend to the competent authority to give Controlled Blasting License to the contractor for carrying out excavation in hard rock. In case of blasting license not permissible from the competent authority in some places then excavation is to be done by using wedges and hammers, chiseling, breakers, pneumatic tools, etc. Also in case where blasting license is permitted but even then if there is no possibility of carrying out the blasting for whatsoever reason, the excavation is to be done by using Wedges and hammers, chiseling, breakers, pneumatic tools etc. No extra payment shall be made for excavation to be carried out in any of the above mentioned both the situations.
5. Excavation in soft rock and hard rock shall have to be carried out only by Chiseling, Breaker (pneumatic tools) etc., as far as possible. If excavation is not possible in terms of above and if excavation is required to be carried out with the help of blasting then the same shall have to be carried out only after taking prior approval and necessary license for blasting from the competent authority.
6. In case of excavation not possible manually or by chiseling in certain place(s) as well as if blasting is also not possible due to various reasons i.e. to avoid damage to nearby water pipeline, pipe gutter, telephone cables / Duct, Raw houses / week buildings / narrow street etc., then the excavation by blasting will not be permitted. Under these circumstances, excavation shall have to be carried out only by Breaker (pneumatic tools) as per the instruc-

tions of the Engineer-In-Charge. No extra payment will be made for such type of excavation done by using Breaker. The rate for excavation shall be paid as per the rate of related item mentioned in Schedule-B.

7. The safety of the trenches is the prime important factor. Along the trenches on both the side, a hump of excavated stuff of minimum height 3 to 5 ft shall have to be provided till the work is got completed. However, where there is no defined road, in such area, the fencing/ lighting etc., requires to be provided as per clause 1.1.15. Sign Board shall have to be provided at required locations, so that there will not be any fatal accident.
8. Regarding the width of excavation, as (a) it is difficult to carry out the vertical trench excavation, (b) possibility of sliding the soil, and (c) uneven excavation trench width in case of blasting. In this connection, for every 1.5 mt lift if there is less width upto 5 cm at the bottom then the top width of excavated trench, it shall be considered as per the specified trench width or actual trench width carried out at the ground level by the contractor whichever is less. If excavation is carried out more than the specified width then the payment will be made only for the specified width of excavation.
9. After entering into an agreement, the agency shall have to finalize the agency for supply of the material like Precast RCC slab and column and the name of manufacturer / supplier should immediately be informed to Rajkot Municipal Corporation so that Rajkot Municipal Corporation can also expedite the manufacturer / supplier for the material. If necessary, Rajkot Municipal Corporation will visit and inspect the factory. During the inspection, if Rajkot Municipal Corporation is not satisfied then the contractor shall have to procure the material from other manufacturer(s).
10. While the work in progress, there is possibility of change in location line according to the site conditions. Under these circumstances, the contractor shall have to carry out the work accordingly, for which, no extra payment shall be made in such situations. Over and above, the decision of Engineer-in-charge for change in line shall be final and binding to the contractor.
11. The quantity of various items mentioned in the schedule-B is liable to increase or decrease. Under the circumstances, the contractor shall have to carry out the work accordingly. Rajkot Municipal Corporation will not entertain any dispute in this regard.
12. In case of any ambiguity found in inspections / drawings, specifications, etc, the decision of engineer-in-charge shall be final and binding to the contractor.
13. Rates quoted in Bill of Quantities to cover everything necessary for complete Execution of work :  
The rates quoted will be held to cover everything necessary of the due and complete execution of the work according to the drawings and the several conditions and the stipulations of the contract, including specification, or the evident intent and meaning of all or either of them or according to customary usage and for the periodical and final inspection

and test and proof of the work in every respect and for measuring, numbering or weighing the same including setting out and laying or fixing in position and the provision of all materials, Power, tool rammers, beaters, labour, tackle platforms with impervious lapped joints for scaffolding ranging rods, straight edges, centering and boxes, wedges, moulds, templates, post straight rails, boning-staves, measuring rods, page boards, shores, barriers, fencing, lighting, pumping apparatus, temporary arrangements of passage of traffic, access to premises and continuance of drainage, water supply and lighting (if interrupted by the work) lard temporary sheds and buildings nahanis roofed in or otherwise haulage, painting, varnishing, polishing, establishments for efficient supervision and watching arrangements for the efficient protection of life and property and all requisite plant, implements and appliances every kind, except only such matter and things as it may be distinctly stated here in are to be supplied by the contractors. A rate for anyone description of work is to be held to include such items of other classes of and for these on separate specific charge will be admitted. The contractors shall keep every portion of the work clear of accumulation from time to time and shall leave every portion of the work clean, clear, perfect and at the conclusion of whole, providing at their own cost all such material implement appliances and labour as the Engineer may require to prove if it is to be so.

14. The contractors are particularly directed to observe from the Articles of Agreement and the specifications, what is to be included in their rates for the several portions of the work and also under what conditions payments are to be made.
15. No extra payment will be made by Rajkot Municipal Corporation for the RCC design to be submitted by contractor, which is to be prepared by License Holder Structural Engineer.
16. No extra payment will be made by Rajkot Municipal Corporation for the Mix Design for concrete to be submitted by contractor, which is to be prepared by authorized Technical Institute.
17. The contractor shall have to avail P F Code as per the prevailing Circular of Government for the employees on work. The process for preparation of bill will be taken up only after submission of the Challan for the amount of P.F. deposited every month for the employees on work, which will binding to the contractor. The required documents shall have to be submitted every month by the contractor to the competent authority.
18. The contractor shall have to get registered under ESI (Employer's State Insurance) Act and obtain ESI Registration number if the number of workers are 10 Nos. or more. Also, the agency shall have to give all the benefits to the workers as available under the ESI Act. The agency should follow all the rules and regulations of ESI Act as per prevailing norms.
19. This office Circular bearing No.RMC/C/329 dated 22-12-2012 and Order No.RMC/C/132 dated 10-06-2013 are uploaded separately as a part of tender document. The Contractors/Consultants quoting their rates shall ave to read, implement, and submit the same



duly signed along with the documents to be submitted during physical submission.

20. In reference to the above Circular and Order cited para above, the Contractors/Consultant who have quoted their rates for this work will be called in person for verification of original documents. The date and time for verification of original documents will be as prescribed in the tender document.
21. After issuance of work order for this tender, if the land for work falls under any kind of dispute then Rajkot Municipal Corporation reserves the right to terminate the contract for this work awarded to the contractor or execute part work. The decision of Rajkot Municipal Corporation in this regard will be final and binding to the contractor.
22. After issue of the work order for this tender, If the work is to be executed on Government land and if such land falls under any kind of dispute then Rajkot Municipal Corporation reserves the right to terminate the contract for this work awarded to the contractor and the decision of Rajkot Municipal Corporation will be final and binding to the contractor.
23. Till the Completion Certificate is issued by Rajkot Municipal Corporation, the agency will be the sole responsible for security of material and structure at site.
24. The quantities given in the Schedules are provisional. The Rajkot Municipal Corporation reserves the right to increase or decrease the quantity of work or totally omit any item work and the contractor shall not be entitled to claim any extras or damages on these grounds & he is bound to execute the work as per the instruction of the Engineer-in-charge.
25. It is further clarified that Performance Guarantee (SD) for extra work will also be recovered @ 10% from the bill of extra work i.e. works beyond tender amount.
26. The bidder must understand clearly that the prices quoted are for the totally works or the part of the total works quoted for and include all costs due to materials, labour, equipments, supervision, other services, royalties, taxes, duties, etc., and to include all extra to cover the cost. No claim for additional payment beyond the prices quoted will be entertained and the bidder will not be entitled subsequently to make any claim on any ground.
27. Qualified engineer must be deployed on site and at Plant. The details of qualified engineers are to be given to RMC at the time of bidding of this tender.
28. The whole work shall be executed by qualified Site Engineer. The required L-Section and Cross section is to be prepared by contractor at his own cost. The work should be done by leveling instrument. The Drawings shall be submitted accordingly in advance before starting the work. No extra payment will be made for the above work. Contractor has to submit Bill form with hard copy and soft copy of cross section and L-section of work completed.

- No bill be accepted without above drawings.
29. The agency to whom the work will be awarded shall have to arrange its own vehicle for to and fro transportation of the staff of Rajkot Municipal Corporation till the work is completed at his own cost.
  30. If any irregularities found during construction then penalty will be imposed by Engineer-in-charge or any higher officer. If any disputes arises regarding penalty imposed by Engineer-in-charge than decision of Municipal Commissioner will be final and binding to agency.
  31. The time limit will remain same as mentioned in the tender document and the work is to be completed accordingly.
  32. Tender of such Contractor not having registration in appropriate Class and Category will be treated as non-responsive. In case of any conflicting provisions between registration of appropriate category and Pre-qualification criteria, the later shall govern the process of bid evaluation.
  33. The agency shall have to quote their rates only after visiting the site and looking to the site conditions.
  34. DEFECTS: Date of completion for start of defect liability period for a work will be considered as the last date mentioned in the completion of work recorded in Measurement Book. The contractor shall be required to make good all the damages / defects identified and conveyed to him, during the entire defect liability period prescribed in the tender document. The method and time limit of rectification will be decided by the Engineer in charge. If the contractor fails to carry out rectification as per the instructions, the same will be carried out at his cost and and the cost will be recovered from the amount retained.
  35. Joint venture shall not be allowed under this tender.
  36. After the completion of work, at the interval of every three months, joint inspection must be done by the agency and RMC staff and then agency has to submit the report stating the condition of structure to Rajkot Municipal Corporation. The final checking report stating the condition of structure is also to be submitted by the agency before one month of the expiry of defect liability period to the competent authority.

## 37. INTERPRETATIONS OF TECHNICAL SPECIFICATIONS

If RMC finds discrepancies, or omission in the Technical specifications or other documents or should be in doubt as to their meaning, Addl. City Engineer, R.M.C will accordingly interpret such technical specifications of this tender as per actual requirement of work/item. Such interpretation / decision in the Technical specifications will be binding to the contractor to execute and complete the whole work according.

38. The word "Arbitration" or "Arbitration Clause" wherever mentioned in this tender document, is now to be treated as "Deleted". In this context, an Order bearing No.RMC/Legal/1858 dated 18-02-2017 of Legal Department of Rajkot Municipal Corporation is uploaded separately along with this tender, which Order, will hereafter be referred and taken into consideration for Arbitration related purpose for the tenders of Rajkot Municipal Corporation.

Addl.Asst.Engineer  
Rajkot Muni. Corporation

Dy.Ex.Engineer  
Rajkot Muni. Corporation

Addl. City Engineer  
Rajkot Muni. Corporation

Signature of Contractor

**BIDDERS ARE REQUIRED TO FILL UP ALL BLANK SPACES IN THIS BID FORM**

The Commissioner  
 Rajkot Municipal Corporation  
 Dr. Ambedkar Bhavan  
 Dhebar Road  
 Rajkot

Dear Sir,

**SUB : CONSTRUCTION OF MINOR BRIDGE NEAR SHANTINAGAR-3  
 ON AIIMS hospital connecting 30.0 mt. D.P. Road in WARD  
 NO.3**

Having visited the site and examined the Bid Documents, Drawings, Conditions of Contract, Specifications, Schedules, Annexures, 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 carry out as given in Conditions of Contract and in conformity with the Drawings, Conditions of Contract, Specifications, Preamble to Price Schedules, Price Schedules, Annexures, Bidding Documents, including Addenda Nos. \_\_\_\_\_ (insert numbers) for \_\_\_\_\_ %age (in figure) \_\_\_\_\_ (in words) below / above than the rates given in Price Schedule.

1. I / We agree that
2. 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  
 if we incorporate into the Works, materials before they are tested and approved by the Engineer's representative  
 or  
 if we fail to deliver raw 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 prescribed time limit, from the date of Work order issued to us by you.
4. We agree to abide by this Bid for a period of 150 days from the

date fixed for receiving the same 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 Bond/Security in the forms and of value specified in the Conditions of Contract of a sum equivalent to 5% of the Contract price for due performance of the 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. I/We agree to pay the Government Income-Tax, CGST, SGST, Royalty, Value Added Tax, Labour Cess, Professional Tax and Other Taxes prevailing from time to time on such items on which the same leviable and the rates quoted by me/us are inclusive of the same.
- 9. We understand that you are not bound to accept the lowest or any Bid you may receive.

Dated this \_\_\_\_\_ day of \_\_\_\_\_ 2019.

\_\_\_\_\_  
 (Signature)  
 \_\_\_\_\_  
 (Name of the person)  
 \_\_\_\_\_  
 (In the capacity of)  
 \_\_\_\_\_  
 (Name of firm)

Company Deal  
Duly authorized to sign Bid for and on behalf of  
(Fill in block capitals)

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Witness  
Signature \_\_\_\_\_  
Name \_\_\_\_\_  
Address \_\_\_\_\_  
 \_\_\_\_\_

PREAMBLE TO PRICE SCHEDULES

## Note on Schedule

1. The bid is percentage rate bid for Strengthening of vonkala joining upto Sulabh Sauchalay of Gayakwadi Street No.3 adjoining Kitipara Awas Yojana in Ward no.3
2. The rates and prices shall be submitted in the formats given in the on-line Price Schedules. 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.
4. In Price Schedule, bidder shall quote his percentage Equal/Above/Below for items listed in the schedule. Prices quoted in Schedule only will be considered for price evaluation & shall form a part of the Contract Agreement.
5. The Only Price Schedule will be considered for financial evaluation of the bid with the successful bidder.
6. 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, dewatering 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.
7. Where there is a discrepancy between the unit rates and the amount entered, the latter shall govern.
8. 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.
9. Prices quoted by the bidder shall be firm for the entire period of Contract without any escalation.
10. The bidder shall interpret the data furnished and carry out any additional survey work, or investigative work required at his own cost.
11. The prices quoted shall also include the cost of materials utilized for testing.
12. The bidder should acquaint himself with the site conditions including the access to Worksite. The successful bidder shall have to make suitable access to worksites at his own cost. These accesses will be used by the other contractors working for RMC.
13. The contractor shall have to engage approved Structural Engineer as suggested by Rajkot Municipal Corporation only, for RCC design and steel work and shall have to submit the design, get approval from the competent authority and complete the work accordingly and submit certificate from Structural Engineer for reinforced cement concrete work done by contractor as per structural design. No extra payment will be made by Rajkot Municipal Corporation.
14. The contractor shall have to quote their rates including GST and other taxes and the Invoice with break-up of GST is to be submitted accordingly, failing which, such amount will be deducted from the bill of the agency and deposited accordingly.

15. The contractor shall have to purchase the material required for this tender work, only from the supplier having registered GST Number. RMC will not be responsible to pay any amount towards GST if the material is purchased from the unregistered supplier / not having GST Number.

Addl.Asst.Engineer  
Rajkot Muni. Corporation

Dy.Ex.Engineer  
Rajkot Muni. Corporation

Addl. City Engineer  
Rajkot Muni. Corporation

Signature of Contractor.



1. The contractor shall have to depute an qualified Engineer at site for full time till the completion of whole work. The said Engineer shall be experienced in this types of works. No extra payment will be made by Rajkot Municipal Corporation for this.
2. All required leveling shall have to be carried out by the contractor.
3. The contractor shall have to provide Contour, all detailed drawings with layout, cross sections with technical details etc., as per the instructions of engineer in charge to the competent authority first, which Rajkot Municipal Corporation will approve if found suitable and then after only the contractor shall carry out the work accordingly, for which, no payment will be made by Rajkot Municipal Corporation.
4. The contractor shall have to arrange and provide by carrying out required drainage system, rain water removal, surface water disposal system, water works related services etc. as desired by engineer-in-charge.
5. The contractor shall have to carry out all types of necessary testing of material as per National Standard in Government approved Laboratory as per the instructions of engineer-in-charge, the cost of which, is to be borne by the contractor. The testing shall have to be carried out in presence of officials of Rajkot Municipal Corporation.
6. All necessary testing required at site shall have to be carried out by the contractor during the execution of the work as per instructions of engineer in charge, at free of cost.
7. After finalization of tender, Rajkot Municipal Corporation will approve the Ready Mix Mega Major Cement Concrete Plant for the work.
8. Total Station survey of entire project shall have to be carried out by the agency, for which, no extra payment will be made by Rajkot Municipal Corporation.

Addl.Asst.Engineer  
Rajkot Muni. Corporation

Dy.Ex.Engineer  
Rajkot Muni. Corporation

Addl. City Engineer  
Rajkot Muni. Corporation

Signature of Contractor.