

# **STANDARD BIDDING DOCUMENT**

## **PROCUREMENT OF**

### **CIVIL WORKS**

**Name of Work: - Repair and maintenance Works for  
Bavka Minor irrigation scheme,  
Taluka-Dahod, Dist.: Dahod**



**GOVERNMENT OF GUJARAT**

**Narmada, Water Resources, Water Supply and Kalpsar Department**

**Vadodara Panchayat Irrigation Circle, Vadodara.**

**Panchayat Irrigation Division, Dahod**

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**INVITATION FOR BID  
(IFB)**

## NATIONAL COMPETITIVE BIDDING

1. The Executive Engineer, Panchayat Irrigation Division, Dahod invites bids for the construction of works detailed in the table. The bidders may submit bids for any or all of the following works.

**TABLE**

Packag e No.	Name of work	Approximate value of works (Rs.)	Bid security (Rs.)/EMD (Rs)	Cost of docume nt/Ten der Fee (Rs)	Period of comple tion	Class of Registrat ion / Category of contracto r if Required
1	2	3	4	5	6	7
1	Repair and maintenance Works for Bavka Minor irrigation scheme, Taluka-Dahod, Dist.: Dahod	1,14,16,020.24	1,15,000.00	3,600/-	11 Months	"C" Class & Above

2. Prospective / Interested bidder may download the Bid Documents from website <https://www.nprocure.com> free of cost till the Time and Date as mentioned on online NIT at website <https://www.nprocure.com>.

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3. However, Bidder who is submitting the Bid Online will have to pay the Bid Document Fee / Tender Fee through Demand Draft only of any Schedule Bank payable at Panchayat Irrigation Division, Dahod and in favour of 'Executive Engineer, Panchayat Irrigation Division, Dahod'. Once the Bid is received online, Bid Document / Tender Fee will not be refundable. As Per GoG R&B Department's Circular No. PARACH/102/000/IB/221/(59)/C Dated.24/01/2007

The Demand Draft for Bid Document / Tender fee and FDR / Bank Guarantee against Bid Security / EMD shall be submitted in electronic format through online (by scanning) while uploading the bid, this submission shall mean that bid document / tender fee and Bid Security / EMD has been received. Accordingly, the offer of only those shall be opened whose Bid Document / Tender Fee and Bid Security / EMD have been received electronically. However, for the purpose of realization of Demand Draft, and FDR / Bank Guarantee bidder shall send the same in original through R.P.A.D. so as to reach to #Executive Engineer, Panchayat Irrigation Division, Dahod, within 7 Days from the last day of bid submission.

Penaltative action for not submitting Demand Draft / FDR / Bank Guarantee in original to Executive Engineer / Tender Inviting Authority by bidder shall be initiated. **WRD GR No. PRC-102014-1-MICell-K.1 Dated: 29/10/2014**

4. Bids received online, will be opened on the time, date and place as specified in the online NIT at website <https://www.nprocure.com> in the presence of the bidders or their authorized representatives, who wish to remain present.  
If the office happens to be closed on the day of opening of the bids as specified, the bids will be opened on the next working day at the same time and venue.
5. A pre bid meeting will be held on : NA

6. #Bid Security (EMD) is equal to 1% of Estimated Amount put to bid / tender and should be rounded off to the next thousand rupees.
  7. Other Information is as under:
    - A. Agencies can prepare and edit their offers a number of times before the end of the tender submission date and time. After the tender submission date and time, the bidder cannot modify / edit / withdraw their submitted offer in any case. No written or online request in this regard shall be granted.
    - B. Offers in physical form will not be accepted in any case.
  - C. Demand Draft purchased by the other than bidder and issued after the last date of submission of Bids, will not be considered or accepted.
  - D. The cost incurred by the contractor for this offer for clarification or attending discussion, conferences or site visits will not be reimbursed by the Employer or Engineer-in-Charge.
  - E. Conditional tender shall not be accepted.
  - F. Any changes, addition, alternation made in the prescribed form attached with tender are liable to be rejected.
  - G. Any change in format or conditional Bank Guarantee will not be accepted and the bidder will be considered non-responsive.
  - H. All the bidders are instructed to fill in information strictly in accordance with the format given in the checklist /qualification document / tender document.
  - I. It is mandatory for the bidders to supply each and every information as asked strictly in electronic format at appropriate places only.
  - J. Blank / insufficient information shall be treated as nil information and shall result in disqualification.
  - K. Even if the bidder has been qualified in a similar or larger size of project in the past, it shall not be deemed to be a ground / reason for not giving required information for this work / bid.
  - L. Information supplied for earlier projects shall not be considered while evaluation of this bid. The Government will not ask for any other information, unless it is found absolutely necessary by the competent authority.
  - M. If found necessary, the contractor will be intimated for negotiation,
- # For the works costing up to Rs. 7.5 crore (WRD Works), R s . 7.0 crore (ROAD/ BRIDGE/ BUILDING WORKS), Rs. 0.5 Crore (Electrical Works) kindly refer to GoG NWRWS & K Department's Circular No. Paracha/1097/1397(11)/pa.fa./ MICELL(k-1) dated 18/01/2018 and Dated 30/09/2022**

For the works costing under Rs. 7.5 crore for Construction work of Water Resources Department, Rs. 7.0 crore for Roads, Bridges and Building and Rs. 050 crore for Electrical work following documents shall be submitted in electronic format only through online by scanning and the (i) Bid Document Fee / Tender Fee (ii) Bid Security / EMD should be sent in original to the Tender opening authority through RPAD, so as to reach the Executive Engineer within 7 days from last day of submission of Bid.

- (i) Bid Document Fee / Tender Fee
- (ii) Bid Security / EMD or Valid EMD Exemption Certificate of Appropriate Class of Registration of Approved Contractors
- (iii) Registration Certificate of Appropriate Class

- ~~(iv) — Registration Certificate of special category – Road/Building and Category I/II/III, if required~~
- (v) GST Number and Pancard.
- (vi) A solvency certificate of an 25% of the Tender Amount will have to be produced along with tender. It shall be of Scheduled Bank or Nationalized Bank or Bank Approved for Government business. Solvency Certificate shall have validity of same calendar year as that of date in which lender is issued.
- ~~(vii) — Work Experience.~~
- (viii) Copy of Partnership Deed or Memorandum as well as Articles of Association in case of the company and intimate permanent addresses of his partners/Directors of the Company. All copies submitted shall be duly attested.
- (ix) Letter of transmittal signed by authorized signatory to be provide after issue of Work Order. (addressed to the office the Executive Engineer, Panchayat Irrigation Division, Jilla Panchayat Bhavan, Dahod-389151.)
- (x) Power of Attorney - A power of attorney duly authorized by a notary public, if power is delegated for signing the bid persons other than applicant.
- (xi) Supporting documents - Every blank (fields) in the tender documents (Forms, schedules, etc.,) must be filled by the Tenderer / Bidder and submitted Online. Tender forms shall be completed in all respects. Online user of dash (-) is not permitted. Please write "Not applicable" or "Nil" as and where required by Tenderer/ Bidder.
- (xii) Undertaking for Engaging Technical Staff and machineries as per Prescribed Proforma.
- (xiii) Information regarding any current litigation in which the applicant is involved.
- ~~(xiv) — The Applicant should give undertaking that he has access to, or has available, liquid assets and / or credit facilities up to 25 percent of the value of the contract / contracts applied. As per Prescribed Proforma.~~
- (xv) Last Five Financial Year IT Return.
- (xvi) Details of Existing commitments and on-going works as per prescribe Performa.
- (xvii) All other required details as per stated in the Tender Documents and as per Section -10 Documents to be furnished by Bidder.

**SECTION - 1**  
**INSTRUCTIONS TO BIDDERS**  
**(ITB)**

## Section 1: Instructions to Bidders

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## **A. GENERAL**

### **1. Scope of Bid**

- 1.1 The Employer (Named in Appendix to ITB) invites bids for the Construction of works (as defined in these documents and referred to as 'the works') detailed in the table given in IFB. The bidders may submit bids for any or all of 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 date specified in the Contract data.
- 1.3 Throughout these bidding documents, the terms 'bid' and 'tender' and their derivatives (bidder/ tenderer, bid / tender, bidding/ tendering, etc.) are synonymous.

### **2. Source of Funds**

- 2.1 The expenditure on this project will be met from the budget of Govt. of Gujarat / Govt. of India for centrally sponsored projects.

### **3. Eligible Bidders**

- 3.1 This Invitation for Bids is open to all eligible bidders.
- 3.2 All bidders shall provide in Section 2, Forms of Bid and Qualification Information, a statement that the Bidder is neither associated, nor has been associated, directly or indirectly, with the consultant or any other entity that has prepared the design, specifications, and other documents for the Project or being proposed as Project Manager for the Contract. A firm that has been engaged by the Employer to provide consulting services for the preparation or supervision of the works, and any of its affiliates, shall not be eligible to bid.

### **4. Qualification of the Bidder**

- 4.1 All bidders shall provide in Section 2, Forms of Bid and Qualification Information, a preliminary description of the proposed work method and schedule, including drawings and charts, as necessary. The proposed methodology should include a program of construction backed with equipment planning and deployment duly supported with broad calculations and quality assurance procedures proposed to be adopted justifying their capability of execution and completion of work as per technical specifications, within stipulated period of completion.

4.2 Deleted

4.3 Deleted

4.4 Deleted

### **4.5 QUALIFICATION CRITERIA:**

**(Applicable for the works which require Pre Qualification) As Per GoG NWRWS & K Department's Circular No. Paracha/1097/1397(11)/pa.fa./MICELL(k-1) Dated 18/01/2018**

- ~~4.5.1 Qualification will be based on Applicant's meeting all the following minimum pass/fail criteria regarding the Applicant's general and particular experience, personnel and equipment capabilities and financial positions, as demonstrated by the applicant's responses in the forms attached to the letter of application ( specified requirement for joint ventures are given under para 4.6 below ) Subcontractors experience and resources shall not be taken in to account in determining the applicants compliance with the qualifying criteria~~

~~To qualify for more than one contract, the applicant must demonstrate having experience and resources sufficient to meet the aggregate of the qualification criteria for each contract given in paragraphs 4.5.4, 4.5.5 and 4.5.9 below~~

#### **4.5.2 Base year and Escalation**

The base year shall be taken as Current financial year

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

<u>Year</u>	<u>Financial Year</u>	<u>Multiplying factor</u>
Base year of inviting tender	2025-2026	1.00
-1	2024-2025	1.10
-2	2023-2024	1.21
-3	2022-2023	1.33
-4	2021-2022	1.46
-5	2020-2021	1.61

Applicant should indicate actual figures of costs and amount for the works executed by them without accounting for the above-mentioned factors.

In case the financial figures and value of completed works are in foreign currency the above enhanced multiplying factors will not be applied. Instead, the current market exchange rate (State Bank of India BC Selling rate as on the last date of submission of the bid) will be applied for the purpose of conversion of the amount in foreign currency into India rupees.

#### **4.5.3. General Experience.**

~~The Applicant shall meet with the following minimum criteria:~~

- ~~(a) Achieved a minimum annual financial turnover of Rs. ---Crore for works in progress and completed in all classes of civil engineering construction works in any one year, over the last five financial years.~~
- ~~(b) Experience in successfully completing or substantially completing at least one contract of similar work (Irrigation works or Canal Lining works) of at least 40 percent of the value of proposed contract within the last five financial years.~~

~~The works may have been executed by the applicant as prime contractor or as a member of a joint venture or as a nominated sub-contractor. As subcontractor, he should have acquired the experience of execution of all major items of works under the proposed contract. In case a project has been executed by a joint venture, weight towards experience of the project would be given to each joint venture in proportion to their financial participation in the joint venture if work executed jointly otherwise as per the scope of work define in Joint Venture agreement.~~

~~Substantially completed works means those works which are at least 90 % completed as on the date of submission (i.e. gross value of work done up to the last date of submission is 90 % or more of the original contract price) and continuing satisfactorily.~~

~~For these, a certificate from the employers shall be submitted along with the application incorporating clearly the name of the work, contract value, billing amount, date of commencement of works, satisfactory performance of the contractor and any other relevant information.~~

~~(the experience certificate should be signed by the officer not below the rank of EE)~~

- ~~(c) Contractor should have completed 60% of quantity of principal items of work like concrete, earthwork, pipeline, pumping station etc. within last five financial years. Certificate of competent authority of work done with detail shall be produced.~~

#### **4.5.4. Personnel Capabilities.**

Availability for his work of personnel with adequate experience as required; as per Appendix.

#### **4.5.5. Equipment Capabilities**

~~Based on the studies carried out by the Engineer, the minimum suggested major equipment to attain the completion of works in accordance with the prescribed construction schedule are shown in the Appendix.~~

~~The bidders should, however, undertake their own studies and furnish with their bid, a detailed construction planning and methodology supported with layout and necessary drawings and calculations to allow the employer to review their proposals. The numbers, types and capacities of each plant/equipment shall be shown in the proposals along with the cycle time for each operation for the given production capacity to match the requirements.~~

#### **4.5.6. Financial Position**

The Applicant should give undertaking that he has access to, or has available, liquid assets (aggregate of working capital, cash in hand and uncommitted bank guarantees) and / or credit facilities up to 25 percent of the value of the contract / contracts applied.

- ~~4.5.7. The audited balance sheets for the last five years should be submitted, which must demonstrate the soundness of the applicant's financial position, showing long term profitability including an estimated financial projection for the next two years. If necessary, the employer will make inquiries with the applicant's bankers.~~

#### **4.5.8. Litigation History**

The Applicant should provide accurate information on any litigation or arbitration resulting from contracts completed or under execution by him over the last five financial years. A consistent history of awards against the Applicant or any partner of a joint venture may result in failure of the applicant.

#### **4.5.9. Disqualification**

Even though the applicants meet the above criteria, they are subject to be disqualified if they have:

Made misleading or false representation in the forms, statements submitted, and / or Record of poor performance such as abandoning the work, rescinding of contract for which the reasons are attributable to the non – performance of the contractor; consistent history of litigation awarded against the applicant or financial failure due to bankruptcy. The rescinding of contract of a joint venture on account of reasons other than non – performance, such as Most Experienced partner of joint venture pulling out, court directions leading to breaking up of a joint venture before the start of work, which are not attributable to the poor performance of the contractor will, however, not affect the qualification of the individual partners.

- ~~4.5.10. The bidder who have applied for corporate Debt Restructuring (CDR) / facing recovery proceedings from financial institutions / facing winding up processing / those under BIFR in the last 5 financial year shall be considered for bid qualification. However if the bank / financial institution has accepted the proposal of debt restructuring on or before the last date of online submission, the same shall be considered for further evaluation. An affidavit by bidder along with certificate from bank must be produced in such cases. In case of Joint Venture agreement, this provision shall be applicable for both lead partner and JV partner.~~

**#4.6 ~~JOINT VENTURE: (Maximum 3 Members i.e. 1 Lead & 2 Others)-  
(Applicable only for estimated project cost of 50 Crore and above)~~**

**~~4.6.1. — Joint ventures must comply with the following requirement:~~**

~~(a) — Following are the minimum qualification requirements:~~

~~(i) — The lead partner shall meet not less than 50 percent of all criteria given in para 4.5.3 & 4.5.6 above. The joint venture must collectively satisfy the criteria of para 4.5.3 & 4.5.6 above. The experience of the other joint venture partners shall be considered if it is not less than 30 percent of the qualifying criteria in para 4.5.3 & 4.5.6 above.~~

~~(ii) — Individually each member must satisfy the requirements of para 4.5.7 & 4.5.8 above.~~

~~(b) — Bid shall be signed so as to legally bind all partners, jointly and severally, and shall be submitted with a copy of the joint venture agreement providing the joint and several liabilities with respect to the contract.~~

**~~4.6.2. Qualification of a joint venture does not necessarily qualify any of its partners individually or as a partner in any other joint venture. In case dissolution of a joint venture, each one of the constituent firms may qualify if they meet all the qualification requirements, subject to the written approval of the Employer.~~**

**4.7. Bid Capacity.**

Applicants who meet the minimum qualification criteria will be qualified only if their available bid capacity at the expected time of bidding is more than the total estimated cost of the works. The available bid capacity will be calculated as under:

**Assessed Available Bid Capacity = (A\*N\*2-B), where**

A = Maximum value of work executed in any one year during the last five years (updated to the price level of the year indicated in appendix) taking into account the completed as well as works in Progress.

B = Value at current price level of the existing commitments and ongoing works to be completed during the next (period of completion of work for which bids are invited); and

N = Number of years prescribed for completion of the works for which the bids are invited.

**Note :- In Case of joint venture, the available bid capacity will be applied for each partner to the extent of his proposed participation in the execution of the work.**

**4.8 Even though the bidders meet the above qualifying criteria, they are subject to be disqualified if they have:**

- Made misleading or false representation in the forms, statements and Attachments the submitted in proof the qualification requirements; and / or

- Record of poor performance such as abandoning the works, not properly completing the contract, inordinate delay in completion, litigation history, or financial failures etc.; and/ or
- Participated in the previous bidding for the same work and had quoted unreasonably high bid prices and could not furnish rational justification to the employer.

## **5. One bid per bidder**

- 5.1. Each bidder shall submit only one bid for one package. A bidder who submits or participates in more than one bid (other than as a subcontractor or in cases of alternatives that have been permitted or requested) will cause all the proposals with the bidder's participation to be disqualified.

## **6. Cost of Bidding**

- 6.1. The bidder shall bear all costs associated with the preparation and submission of his Bid, and the Employer will in no case be responsible and liable for those costs.

## **7. Site Visit**

- 7.1. The Bidder, at the Bidder's own responsibility and risk is encouraged to visit and examine the Site of work and its surrounding 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.

## B. BIDDING DOCUMENTS

### 8. Content of Bidding Documents

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

Section	Particulars	Volume No.
-	Invitation for Bids	I
1	Instructions to Bidders	
2	Qualification Information, and other forms	
3	Conditions of Contract	
4	Contract Data	
5	Technical Specifications	II
6	Form of Bid	III
7	Bill of Quantities	
8	Securities and other forms	
9	Drawings	IV
10	Documents to be furnished by bidder	V

- 8.2. Volumes I, II, III and IV are available online and documents to be furnished by the bidder in compliance to section 2 will be prepared by him and furnished as Volume- V in two parts (refer clause 12).
- 8.3. The bidder is expected to examine carefully all instructions, conditions of contract, contract data, forms, terms, technical specifications, bill of quantities, forms, Annexes and drawings in the Bid Document. Failure to comply with the requirements of Bid Documents shall be at the bidder's own risk. **Pursuant to clause 26 hereof**, bids which are not substantially responsive to the requirements of the Bid Documents shall be rejected.

### 9. Clarification Bidding Documents

- 9.1 A prospective bidder requiring any clarification of the bidding documents may notify the Employer in writing or through E-mail at the Employer's address indicated in the invitation to bid. The Employer will respond to any request for clarification which he received earlier than 15 days prior to the deadline for submission of bids. Employer's response will be published on website including a description of the enquiry but without identifying its source.

#### ~~9.2. Pre-bid meeting~~

- ~~9.2.1. 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 the appendix.~~

- ~~9.2.2. The purpose of the meeting will be to clarify issues and to answer questions on any matter that may be raised at that stage.~~
- ~~9.2.3. The bidder shall be required to submit any questions in writing or e-mail to reach the Employer not later than 03 days before the meeting.~~
- ~~9.2.4. Minutes of the meeting, including the question raised (Without identifying the source of enquiry) and the responses given will be published without delay on the tender website i.e. [www.nprocure.com](http://www.nprocure.com). Any modification of the bidding documents listed in sub-Clause 8.1 which may become necessary as a result of the pre-bid meeting shall be made by the Employer exclusively through the issue of an Addendum pursuant to Clause 10 and not through the minutes of the pre-bid meeting.~~
- ~~9.2.5. Non-attendance at the pre-bid meeting will not be a cause for disqualification of a bidder.~~

## **10. Amendment of Bidding Documents**

- 10.1 Before the deadline for submission of bids, the Employer may modify the bidding documents by issuing addenda.
- 10.2 Any addendum thus issued shall be part of the bidding documents. The Employer will assume no responsibility for the same.
- 10.3 To give prospective bidders reasonable time in which to take an addendum into account in preparing their bids, the Employer may, at his discretion, extend as necessary the deadline for submission of bids, in accordance with Sub-Clause 20.2 below.

## C. PREPARATION OF BIDS

### 11. Language of the Bid

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

### 12. Documents Comprising the Bid

12.1. The bid be submitted by the bidder as Volume V of the bid document (refer Clause 8.1) shall be in two separate parts:

**Part I shall be named “Technical Bid” and shall comprise**

- (i) Bid Security in the form specified in Section 8
- (ii) Qualification Information and supporting documents as specified in Section 2
- (iii) Certificates, undertakings, affidavits as specified in Section 2
- (iv) Any other information pursuant to Clause 4.5 of these instructions
- (v) Undertaking that the bid shall remain valid for the period specified in Clause 15.1

**Part II shall be named “Financial Bid” and shall comprise**

- (i) Form of Bid as specified in Section 6
- (ii) Priced Bill of Quantities for items specified in Section 7

12.2. The Bidder shall submit the details / information pertaining to each part i.e. technical as well as financial and must be submitted online only.

12.3. Following documents will be deemed to be part of the bid.

Section	Particulars	Volume No.
<b>Invitation for Bids (IFB)</b>		
1	Instruction to Bidders	Volume I
3	Conditions of Contract	
4	Contract Data	
5	Specifications	Volume II
9	Drawings	Volume IV

### 13. Bid Prices

13.1 The Contract shall be for the whole works as described in Sub-Clause 1.1, based on the priced Bill of Quantities submitted by the Bidder.

13.2 The bidder shall fill in rates and prices and line item total (both in figures and words) for all items of the Works described in the Bill of Quantities along with total bid price



(Both in figures and words). Items for which no rate or price is entered by the bidder will not be paid for by the Bill of Quantities.

- 13.3 All duties, taxes, and other levies except GST 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. (GST will be paid extra)

- 13.4 Deleted

- 13.5 The rates and prices quoted by the bidder are subject to adjustment during the performance of the Contract in accordance with the provisions of Clause 47 of the Condition of Contract **(Irrespective of the time limit and Bid Amount)**

#### **14. Currencies of Bid and Payment**

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

#### **15. Bid Validity**

- 15.1 Bids shall remain valid for a period of not less than 120 days after the deadline date for bid submission specified in Clause 20.

- 15.2 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 period. 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 security for a period of the extension, and in compliance with Clause 16 in all respects.

#### **16. Bid Security**

- 16.1. The Bidder shall furnish, as part of his Bid, a Bid security in the amount as shown in column 4 of the table of IFB for this particular work. This Bid security shall be in favor of Employer as named in Appendix and may be in one of the following forms;

- a. Bank Guarantee from any scheduled Indian bank, in the format given in Volume III. **(Bank Guarantee is applicable only for Bid Estimated Amount of 01 Crore and above)** and Bank Guarantee of Schedule and Private Banks shall be considered as per GoG Finance Department's Circular No. FD/MSM/e- file/4/2023/4020/D.M.O. Date 11/03/2024 or as per their latest amendment.
- b. Fixed Deposit Receipt issued by any Scheduled Indian Bank or a foreign Bank approved by the Reserve Bank of India.

**OR**

# A Valid Bid Security / EMD Exemption Certificate issued by (1) Road & Building Department or (2) Narmada Water Resources, Water Supply and Kalpsar Department of Govt of Gujarat. **Exemption Certificate is applicable only when Registration Certificate of Appropriate Class and Category of Approved Contractors is required as eligible criteria of bidder.**

- 16.2. Bank guarantees (and other instruments having fixed validity) issued as surety for the bid shall be valid for 45 days beyond the validity of the bid i.e. total validity of 120+45 = 165 Days
- 16.3. Any bid not accompanied by an acceptable Bid Security and not secured as indicated in Sub-Clauses 16.1 and 16.2 above shall be rejected by the Employer as non-responsive.
- 16.4. The Bid Security of unsuccessful bidders will be returned within 28 days of the end of the bid validity period specified in Sub-Clause 15.1
- 16.5 The Bid Security of the successful bidder will be discharged when the bidder has signed the Agreement and furnished the required Performance Security.
- 16.6. The bid Security may 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, if any or
  - (c) In the case of a successful Bidders, if the Bidder fails the specified time limit to
    - (i) Sign the Agreement; or
    - (ii) Furnish the requirement Performance Security.
  - (d) #If found necessary, the bidder will be intimated for negotiation, He will be intimated maximum three times within the validity period for negotiation, If contractor does not respond in time, his Bid Security (EMD) will be forfeited and his tender will be rejected. Punitive action will be taken on such contractors. (As per GoG R&B Dept's Gr. No. S/22/2017/639/D, Dt.08/06/2018)

## **17. Alternative Proposals by Bidders.**

- 17.1. Bidders shall submit offers that fully comply with the requirements of the bidding documents, including the conditions of contract (including mobilization advance or time for completion), basic technical design as indicated in the drawing and specifications. Conditional offers or alternative offers will not be considered further in the process of tender evaluation.

## **18. Format and Signing of Bid**

- 18.1. The Bidder shall prepare documents comprising the bid as described in Clause 12 of these Instructions to bidder as the "Technical Bid "and "Financial Bid" in separate parts to be uploaded.

## **D. SUBMISSION OF BIDS**

**19. Deleted**

**20. Deadline for Submission of the Bids**

- 20.1. Complete Bids must be received online by the Employer at the tender website specified above not later than the date indicated in appendix.
- 20.2. The Employer may extend the deadline for submission of bids by issuing an amendment in accordance with Clause 10, in which case all right and obligation of the Employer and the bidders previously subject to the original deadline will then be subject to the new deadline.

**21. Deleted**

**22. Modification and Withdrawal of Bids**

- 22.1. Bidders may modify or withdraw their bids online before the deadline prescribed in Clause 20 or pursuant to Clause 23.
- 22.2. Deleted
- 22.3. No bid shall be modified or withdrawn after the deadline for submission of Bid.
- 22.4. 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 15.1 above or as extended pursuant to Clause 15.2 may result in the forfeiture of the Bid security pursuant to Clause 16.

## **E. BID OPENING AND EVALUATION**

### **23. Bid Opening**

- 23.1 The Employer will open all the Bids received including modifications made pursuant to Clause 22, in the presence of the Bidders or their representatives who choose to attend at time, date and the place specified in Appendix in the manner specified in Clauses 20 and 23.3, In the event of the specified date of Bid opening being declared a holiday for the Employer, the Bids will be opened at the appointed time and location on the next working day.
- 23.2. Deleted.
- 23.3. The “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 3), and has not been furnished in the form specified in Clause 16, the technical bid will not be opened.
- 23.4. (i) Subject to confirmation of the bid security by the issuing Bank, the bids accompanied with valid bid security will be taken up for evaluation with respect to the Qualification information and other information furnished in part I of the bid pursuant to Clause 12.1.
- (ii) If required, the bidder will be asked in writing to clarify his Qualification Documents with respect to any required clarification.
- (iii) The bidders will respond in not more than 7 days of issue of the clarification letter.
- (iv) Immediately (usually within 3 or 4 days), on receipt of these clarification the Evaluation Committee will finalize the list of responsive bidders whose financial bids are eligible for consideration.
- 23.5. Deleted
- 23.6 At the time of opening of “Financial Bid”, the names of the bidders were found responsive in accordance with Clause 23.4(iv) will be announced. The bids of only these bidders will be opened. The responsive Bidders’ names, the Bid prices, the total amount of each bid, any discount and such other details as the Employer may consider appropriate, will be announced by the Employer at the opening.
- 23.7 the time of opening of “Financial Bid”, the names of the bidders were found responsive in accordance with Clause 23.4(iv) will be announced. The bids of only these bidders will be opened. The responsive Bidders’ names, the Bid prices, the total amount of each bid, any discount, and such other details as the Employer may consider appropriate, will be announced by the Employer at the opening.
- 23.8 In case bids are invited for more than one package, the order for opening of the “Financial Bid” shall be in order of Estimated amount of Bids from highest to lowest.
- 23.9 The Employer shall prepare minutes of the Bid opening, including the information disclosed to those present in accordance with Sub-Clause 23.6.

## **24 Process to be Confidential**

- 24.1 Information relating to the examination, clarification, evaluation, and comparison of Bids and recommendations for the award of a contract shall not be disclosed to Bidders or any other persons not officially concerned with such process until the award to the successful Bidder has been announced. Any effort by Bidder to influence the Employer's processing of Bids or award decisions may result in the rejection of his Bid.

## **25. Clarification of Financial Bids**

- 25.1. To assist in the examination, evaluation, and comparison of Bids, the Employer may, at his discretion, ask any Bidder for clarification of his Bid, including breakdowns of unit rates. The request for clarification and the response shall be in writing or by e-mail, but no change in the price or substances of the Bid shall be sought, offered, or permitted except as required to confirm the correction of arithmetic errors discovered by the Employer in the evaluation of the Bids.
- 25.2 Subject to sub-clause 25.1, no Bidder shall contact the Employer on any matter relating to his Bid opening to the contract is awarded. If the Bidder wishes to bring additional information to the notice of the Employer, it should do so in writing.
- 25.3. Any effort by the Bidder to influence the Employer in the Employer's bid evaluation, bid comparison or contract award decision may result in the rejection of the Bidders' bid.

## **26. Examinations of Bids and Determination of Responsiveness**

- 26.1 During the detail evaluation of "Technical Bid", the Employer will determine whether each Bid (a) meets the eligibility criteria defined in Clause 3 and 4; (b) has been properly signed; (c) is accompanied by the required securities and; (d) is substantially responsive to the requirements of the Bidding document. During the detailed evaluation of the "Financial Bid", the responsiveness of the bids will be further determined with respect to the remaining bid conditions, i.e., priced bill of quantities, technical specifications, and drawings.
- 26.2 A substantially responsive "Financial Bid" is one which confirms all the terms, conditions and specifications of bidding documents, without material deviation 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.
- 26.3 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.

## **27. Deleted**

**28. Deleted**

**29. Evaluation and Comparison of Financial Bids**

- 29.1. The Employer will evaluate and compare only the Bids determined to be substantially responsive in accordance with Sub-Clause 26.2.
- 29.2. Deleted.
- 29.3. The Employer reserves the right to accept or reject any variation or deviation. Variation and deviations and other factors, which are in excess of the requirements of the Bidding documents or otherwise result in unsolicited benefits for the Employer, shall not be taken in to account in Bid evaluation.
- 29.4. The estimated effect of the price adjustment conditions under Clause 47 of the Conditions of Contract, during the period of implementation of the Contract, will not be taken in to account in Bid evaluation.
- 29.5. If the Bid of the successful Bidder is seriously unbalanced in relation to the Engineer's estimate of the cost of work to be performed under the contract the Employer may require the Bidder to produce detailed consistency of those prices with the construction methods and schedule proposed. After evaluation of the price analyses, the Employer may require that the amount of the performance security set forth in Clause 34 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.
- 29.6. A bid which contains several items in the bill of Quantities which are unrealistically priced low and which cannot be substantiated satisfactorily by the bidder may be rejected as non-responsive.

**30. Deleted**

## **F. AWARD OF CONTRACT**

### **31. Award Criteria**

31.1. Subject to Clause 32, 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 adjusted to account for his bid price which is the lowest evaluation in any of the packages opened earlier than the one consideration.

In no case, the contract shall be awarded to any bidder whose available bid capacity 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 evaluation bid price.

### **32. Employer's Right to Accept any Bid and to Reject any or all Bids**

32.1. Notwithstanding Clause 31, 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 Bidder or any obligation to inform the affected Bidder or Bidders of the grounds for the Employer's action.

### **33. Notification of Award and Signing of Agreement**

33.1. The Bidder whose Bid has been accepted will be notified of the award by the Employer prior to expiration of the Bid validity period by cable, telex or facsimile confirmed by registered letter. This letter (hereinafter and in the condition of contract called the "Letter of Acceptance") 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").

33.2 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.

33.3. The Agreement will incorporate all agreements between the Employer and the successful Bidder. It will be signed by the Employer and to the successful Bidder, within 28 days following the notification of award along with the Letter of Acceptance. Within 21 days of receipt, the successful Bidder will sign the Agreement and deliver it to the Employer.

33.4. Upon the furnishing by the successful Bidder of the Performance Security, the Employer will promptly notify the other Bidders that their Bids have been unsuccessful.

### **34. Performance Security**

34.1. (A) Within 10 (Ten) days of receipt of Letter of Acceptance, the successful Bidder shall furnish to the Employer an irrevocable and unconditional guarantee from a Bank in the form set forth in Section 8 (the "Performance Security") for an amount equal to 5% (five percent) of its Contract Price. In case of bids mentioned below, the successful Bidder, along with the Performance Security,

shall also furnish to the Authority an irrevocable and unconditional guarantee from a Bank in the same form given at Section 8 towards an Additional Performance Security (The “Additional Performance Security”) for an amount calculated as under:

- (a) If the Contract Price offered by the Selected Bidder is lower than 10% but upto 20% of the Estimated Project Cost, then the Additional Performance Security shall be calculated @ 20% of the difference in the (i) Estimated Project Cost (as mentioned in Bid Document) - Minus 10% of the Estimated Project Cost and (ii) Contract Price offered by the selected Bidder.
  - (b) If the Contract Price offered by the Selected Bidder is lower than 20% of the Estimated Project Cost, then the Additional Performance Security shall be calculated @ 30% of the difference in the (i) Estimated Project Cost (as mentioned in Bid Document) - Minus 10% of the Estimated Project Cost and (ii) Contract Price offered by the selected Bidder.
  - (c) This Additional Performance Security shall be treated as part of the Performance Security.
- (B) The Performance Security shall be valid beyond 60(sixty) days of the Defects Liability Period and the Additional Performance Security shall be valid beyond 28 (twenty-eight) days of Project Completion Date.

34.2. If the performance security is provided by the successful Bidder in the form of a Bank Guarantee, it shall be issued either (a) at the Bidder’s option, by a Nationalized/Scheduled Indian bank or (b) by a foreign bank located in India and acceptable to the Employer. As per GoG Finance Department’s Circular No. FD/MSM/e-file/4/2023/4020/D.M.O. Date 11/03/2024 or as per their latest amendment.

34.3. Failure of the successful Bidder to comply with the requirement of Sub-Clause 34.1 shall constitute sufficient grounds for cancellation of the award and forfeiture of the Bid Security.

### **35 Advance Payment and Security**

35.1 The Employer will provide an Advance payment on the Contract Price as stipulated in the Conditions of Contract, subject to maximum amount, as stated in the Contract Data.

### **36. Deleted**

### **37. Corrupt or Fraudulent Practices**

37.1 The Employer will reject a proposal if it determines that the Bidder recommended for award has engaged in corrupt or fraudulent practices in completing for the contract in question and will declare the firm ineligible, either indefinitely or for a stated period of time, to be awarded a contract with National Highways Authority of India/ State PWD and any other agencies, if it at any time determines that the firm has engaged in corrupt or fraudulent practices in completing for the contractor, or in execution.

37.2 Furthermore, Bidders shall be aware of the provision stated in Sub- Clause 59.2 of the Conditions of Contract.



## APPENDIX TO ITB

### Clause Reference With respect to Section -I

1. The Name of the Employer is Executive Engineer, Panchayat Irrigation Division, Dahod [ Cl.1.1]
2. The last five financial years.
  1. 2024-2025
  2. 2023-2024
  3. 2022-2023
  4. 2021-2022
  5. 2020-2021
3. This Annual Financial Turnover Amount is Rs. ---Not Applicable--- [Cl.4.5.3 (a)]
4. Value of Work is Rs 1,14,16,020.24
5. Deleted
6. The cost of electric work is Rs. 0.00/-
7. The cost of water supply / sanitary works is Rs. 0.00/-
8. Liquid assets and / or availability of credit facilities is Rs. -- Applicable--- [Cl.4.5.6 ]
9. Price level of the financial year 2025-26 [Cl. 4.5.2]
10. The pre-bid meeting will take place at:NA [Cl. 9.2.1]
11. The technical Bid will be opened at the office of the Superintending Engineer, Vadodara Panchayat Irrigation Circle, Vadodara on dt at .....AM/PM AS PER NIT
12. Address of the Employer: Executive Engineer, Panchayat Irrigation Division, Jilla Panchyat Bhavan, Dahod-389151
13. Deleted
14. The bid should be submitted latest by As stated on online NIT [Cl. 20.1 & 20.2]
15. The bid will be opened at As stated on online NIT at website <https://www.nprocure.com> [Cl. 23.1 ]
16. The Bank Draft in favor of "Executive Engineer, Panchayat Irrigation Division, Dahod"
17. Deleted
18. Escalation factors (for the cost of works executed and financial figure to a common base value) for works completed [Cl.4.5.2]

<u>Year</u>	<u>Financial Year</u>	<u>Multiplying factor</u>
Base year of invitingtender	2025-2026	1.00
-1	2024-2025	1.10
-2	2023-2024	1.21
-3	2022-2023	1.33
-4	2021-2022	1.46
-5	2020-2021	1.61

**#LIST OF KEY PLANT & EQUIPMENT TO BE DEPLOYED ON CONTRACT WORK**

**[Reference CL- 4.5.5]**

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

<b>Sr. No.</b>	<b>Plant or Machinery</b>	<b>Location</b>	<b>Age of Machinery (maximum 15 years)</b>	<b>Make</b>	<b>Capacity</b>	<b>Approximate Value</b>	<b>Remark</b>
<b>1</b>	<b>2(a)</b>	<b>2(b)</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>

## **List of Key Personnel to be deployed on Contract Work**

### **(Reference Cl. 4.5.4)**

#### **# Employment of a qualified site Engineer by the Contractor.**

The Contractor shall employ full-time technically qualified staff during the execution of this work as under: -

1. Two graduate Civil Engineers and three diploma Civil Engineers when cost of the work to be executed is more than Rs.50 lakhs.
- ~~2. One graduate & two Diploma, Civil Engineers when the cost of the work to be executed is more than Rs.15 lakhs but less than Rs.50 lakhs.~~
- ~~3. Minimum Two Diploma Civil Engineer when the cost of work is less than Rs.15 lakhs but more than Rs.5 lakhs.~~
- ~~4. Minimum One Diploma Civil Engineers for the work when the cost of work to be executed is less than Rs. 5 lakhs. The Engineer so employed for the Government work must have sufficient experience to handle the work independently. Such an Engineer shall have to stay at the site of work and he shall not be entrusted with other duty except this work.~~

In case the contractor or partner of the contractor firm is a Civil Graduate Engineer, Employment of a separate Engineer will not be necessary provided that the Engineer partner himself attends the execution of the work on the site.

Within 15 days of issue of work-order the Contractor will have to furnish to the Deputy Executive Engineer-in-charge of the work the Name, Qualifications, copy of marksheet, Color Photograph and the appointment order issued such engineers engaged for this contract work. If 15 days after issue of work order such designated Site Engineers do not resume or do not remain present on site of work, the recovery at the rate of Rs.30,000-00 per month per Engineer will be made from the bills/deposit/dues of the contractor. Such recovery shall be non-refundable.

Executive Engineer

**SECTION - 2**

**QUALIFICATION INFORMATION**

## QUALIFICATION INFORMATION

The information to be filled in by the Bidder in the following pages will be used for the purpose of post qualification as provided for in Clause 4 of the Instruction to Bidders. This information will not be incorporated in the Contract.

### **1. For Individual Bidders**

#### **1.1 Constitution or legal status of Bidder**

(Attach Copy)

Place of registration \_\_\_\_\_

Principal place of business \_\_\_\_\_

Power of attorney of signatory of Bid

(Attach)

1.2 Total value of Civil engineering constructions — 2018-2019 —  
Work performed in the last five years — 2019-2020 —  
(— in Rs. Lakhs) — 2020-2021 —  
2021-2022  
2022-2023

15.2.1 Work performed as prime contractor, work performed in the past as a nominated sub-contractor will also be considered the sub-contract involved execution of all main items of work described in the bid documents, provided further that all other qualification criteria are satisfied (in the same name) on works of a similar nature over the last five years\*\* and in current year before the submission of the bid.

Project Name	Name of the Employer	Description of work	Contract No.	Value of contract (Rs. Crore)	Date of issue of work order	Stipulated period of completion	Actual date of completion*	Remark explaining reasons for delay & work Completed

\*Attach certificate(s) from the Engineer(s) in-charge

\*\* Immediately preceding the financial year in which bids are received.

#1.3.2 Quantities of work executed as prime contractor, work performed, in the past as a nominated sub-contractor, will also be considered provided the sub-contract involved execution of all main items of work described in the bid document, provided, further that all other qualification criteria are called (in the same name and style) in the last five years\*\* and in current year before the submission of the bid.

\*To be modified as per the nature and scope of work

Year	Name of the work	Name of the Employer	Quantity of work performed (Cum/MT)				Remarks* (indicate contract Ref)- contract Ref)
			Cement Concrete (Including RCC & PCC) ITEM 1	Rubble Pitching ITEM 2	Earth Works ITEM 3		
20—20							
20—20							
20—20							
20—20							
20—20							

1.4 Information on Bid Capacity (works for which bids have been submitted and works which are yet to be completed) as on the date of this bid.

(A) Existing commitments and on-going works:

Description of works	Place & State	Contract No.	Name & Address of Employer	Value Contract (Rs. Cr)	Stipulated Period of Completion	Value of Works* remaining to be completed (Rs. Cr)	Anticipated of completion
1	2	3	4	5	6	7	8

\*Attach certificate (s) from the Engineer(s) in-charge

\*\* Immediately preceding the financial year in which bids are received.

~~1.5 Availability of key items of Contractors Equipment for carrying out the works (Ref. Clause 4.5.5). The Bidder should list all the information requested below.~~

Item of Equipment	Requirement		Availability Proposals			Remarks (from whom to be purchased)
	NO	Capacity	Owned/ Leased to be procured	Nos./ Capacity	Age/ Conditions	

~~1.6 Qualifications and experience of key personnel required for administration and execution of the contract. Attach biographical data. Refer also to Sub Clause 9.1 of the Conditions of Contract.~~

Position	Name	Qualification	Year of Experience (General)	Year of experience in the proposed position
Senior Engineer		BE-Civil		
Site Engineer		BE-Civil		

~~1.7 Proposed sub-contract and firms involved~~

Sections of the works	Value of Sub-Contractor	Sub-Contractor (Name & Address)	Experience in similar work

~~Attach copies of certificates on possession of valid license for executing water supply/ sanitary work/ building electrification works.~~

- ~~1.8 Financial reports for the last five years: balance sheets, profit and loss statements, auditors' reports (in case of companies/corporations), etc. List them below and attach copies.~~
- ~~1.9 Evidence of access to financial resources to meet the qualification requirements: cash in hand, lines of credit, etc. List them below and attach copied documents.~~
- ~~1.10 Name, address, and telephone, telex, and fax numbers of the Bidders bankers who may provide references if contacted by the Employer.~~
- ~~1.11 Information on Litigation history in which the Bidder is involved.~~

<b>Other Party (ies)</b>	<b>Employer</b>	<b>Cause of Dispute</b>	<b>Amount Involved</b>	<b>Remarks- showing Present Status</b>

- ~~1.12. Statement of compliance under the requirements of Sub Clause 3.2 of the instruction to Bidders. (Name of Consultant engaged for project preparations is~~
- 
- 

- ~~1.13 Proposed work method and schedule. The Bidder should attach descriptions, drawings and charts as necessary to comply with the requirements of the Bidding documents. (Refer ITB Clause 4.1)~~

- ~~1.14 Programme~~

## ~~2. Deleted~~

### **3. Additional Requirements**

- 3.1 Bidders should provide any additional information required to fulfill the requirements of Clause 4 of the Instructions to the Bidders, if applicable.

- (i) Affidavit
- (ii) Undertaking

\* Fill the name of Consultant



**SAMPLE FORMAT FOR EVIDENCE OF ACCESS TO OR  
AVAILABILITY OF CREDIT FACILITIES**

(CLAUSE 4.5.6 OF ITB)

**BANK CERTIFICATE**

This is to certify that M/s. \_\_\_\_\_ is a reputed company with a good financial standing.

If the contract for the work, namely \_\_\_\_\_ is awarded to the above firm, we shall be able to provide overdraft/credit facilities to the extent of Rs. \_\_\_\_\_ to meet their working capital requirements for executing the above during the contract period.

\_\_\_\_\_

(Signature)

Name of Bank

Senior Bank Manager

Address of the Bank

## AFFIDAVIT

(Notarized affidavit on Rs. 300 Stamp paper)

**Name of Work:** Repair and maintenance Works for Bavka Minor irrigation scheme,  
Taluka-Dahod, Dist.: Dahod

1. I, the undersigned, do hereby certify that all the statements made in the required attachments are true and correct.
2. The undersigned also hereby certifies that neither our firm M/s. \_\_\_\_\_  
\_\_\_\_\_ have not abandoned any work of Government of Gujarat/Government of India/any Board or Corporation under Government of Gujarat/Government of India nor any contract awarded to us for such works have been rescinded, during last five years prior to the date of this bid.
3. The undersigned hereby authorize(s) and request (s) any bank, person, firm or corporation to furnish pertinent information deemed necessary and requested by the Department to verify this statement or regarding any (our) competence and general reputation.
4. The Undersigned understands and agrees that further qualifying information may be requested, and agrees to furnish any such information at the request of the Department/ Project implementing agency.

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

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

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

\_\_\_\_\_  
Date

## UNDERTAKING

I, the undersigned do hereby undertake ..... that our firm  
M/s.....would invest a minimum cash  
up to 25% of the value of the work during implementation of the contract.

\_\_\_\_\_  
(Signed by an Authorized officer of the firm)

\_\_\_\_\_  
Title of officer

\_\_\_\_\_  
Name of firm

\_\_\_\_\_  
DATE

Executive Engineer

**SECTION - 3**

**CONDITIONS OF CONTRACT**

# Conditions of Contract

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# CONDITIONS OF CONTRACT

## A. GENERAL.

### 1. Definitions

- 1.1 Terms which are defined in the Contract Data are not also defined in the Conditions of Contract but keep their defined meaning.

**Bill of Quantities** means the priced and completed Bill of Quantities forming part of the Bid

**Compensation Events** are those defined in Clause 44 hereunder

The **Completion Date** is the date of completion of the Works as certified by the Engineer in accordance with Sub Clause 55.1

The Contract is the contract between the Employer and Contractor to execute, complete and maintain the Works **till the completion of Defects Liability Period**. It consists of the documents listed in Clause 2.3 below.

The **Contract data** defines the documents and other information which comprise the Contract.

The **Contractor** is a person or corporate body whose Bid to carry out the Work has been accepted by the Employer.

The **Contractor's Bid** is the completed Bidding document submitted by the Contractor to the Employer and includes Technical and Financial Bids.

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

**Days** are calendar days: **months** are calendar months.

The **Defects Liability Period** is the period named in the Contract Data and calculated from the Completion Date.

The **Employer** is the party who will employ the Contractor to carry out the Works.

**The Engineer** is the person named in the Contract Data (or any other competent person appointed and notified to the contractor to act in replacement of the Engineer) who is responsible for supervising the Contractor, administering the Contract, certifying payments due to the Contractor, issuing and valuing Variations to the Contract, awarding extensions of time, and valuing the Compensations Events.

**Equipment** is Contractor's machinery and vehicles brought temporarily to the site to construct the Works.

The **Initial Contract Price** is the Contract Price listed in the Employer's Letter of Acceptance.

The **Intended Completion Date** is the date on which it is intended that the Contractor shall complete the Works. The Intended Completion Date is specified in the Contract Data. The Intended Completion Date may be revised only by the Engineer by issuing an extension of time.

**Materials** are all supplies, including consumables, used by the contractor for incorporation in the works.

**Plant** is any integral part of the work which is to have mechanical, electrical, electronic or chemical or biological functions.

The **Site** is the area defined as such in the Contract Data.

**Site Investigation Reports** are those which were included in the Bidding documents and are factual interpretive reports about the surface and subsurface conditions at the site.

**Specifications** means the Specifications of the works included in the Contract and any modification or addition made or approved by the Engineer.

The **Start Date** is given in the Contract Data. It is the date when the Contractor shall commence execution of the works. It does not necessarily coincide with any of the Site Possession Dates.

A **Subcontractor** is a person or corporate body who has a Contract with the Contractor to carry out a part of the work in the Contract which includes work on the Site.

**Temporary Works** are works designed, constructed, installed, and removed by the Contractor which are needed for construction or installation of the Works.

A **Variation** is an instruction given by the Engineer, which varies the Works.

The **Works** are what the Contract requires the Contractor to construct, install, and turn over to the Employer, as defined in the Contract Data.

## 2. **Interpretation**

2.1 In interpreting these Conditions of Contract, singular also means plural, male also means female or neuter and the other way around. Heading have no significance. Words have their normal meaning under the language of the Contract unless specifically defined. The Engineer will provide instructions clarifying queries about Conditions of Contract.

2.2 If sectional completion is specified in the Contract Data, references in the Conditions of Contract to the Works, the Completion date, and Intended Completion Date apply to any Section of the Works (other than references to the Completion Date and Intended Completion date for the whole works)

2.3 The documents forming the Contract shall be interpreted in the following order of priority

- (1) Agreement
- (2) Letter of Acceptance, notice to proceed with works
- (3) Contractor's Bid

- (4) Contract Data
- (5) Conditions of Contract including Conditions of Contract
- (6) Specifications
- (7) Drawings
- (8) Bills of quantities and
- (9) Any other document listed in the Contract Data as forming part of the Contract.

### **3. Language and Law**

- 3.1 The language of the Contract and the law governing the Contract are stated in the Contract Data.

### **4. Engineers Decisions**

- 4.1 Except where otherwise specifically stated, the Engineer will decide contractual matters between the Employer and the Contractor in the role representing the Employer.

### **5. Delegation**

- 5.1 The Engineer may delegate any of his duties and responsibilities to other people after notifying the Contractor and may cancel any delegation after notifying the Contractor.

### **6. Communications**

- 6.1 Communications between parties which are referred to in the conditions are effective only when in writing. A notice shall be effective only when it is delivered (in terms of Indian Contract Act).

### **7. Sub-Contracting**

- 7.1 The Contractor may subcontract any portion of work, up to a limit specified in contract data, with the approval of the engineer but may not assign the Contract without the approval of the Employer in writing. Subcontracting shall not alter the Contractor's obligations. **Sub-contracting of supply or specific items of work is not allowed.**
- 7.2 The sub-contractor must be registered in appropriate class and category for the part of work to be subcontracted.

### **8. Other Contractors**

- 8.1 The Contractor shall cooperate and share the Site with other contractors, public authorities, utilities and the Employer between the dates given in the Schedule of other Contractor. The Contractors shall as refer 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 modifications.



## **9. Personnel**

- 9.1 The Contractor shall employ the key personnel named in the Schedule of Key Personnel as referred to in the Contract Data 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, abilities, 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 who is a member of the Contractor Staff or his work force stating the reasons the Contractor shall ensure that the person leaves the Site within seven days and has no further connection with the work in the Contract.

## **10. Employer's and Contractors Risks**

- 10.1 The Employer carries the risk which these Contract states are Employer's risks, and the Contractor carries the risks which these Contracts states are Contractors risk.

## **11. 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, riot commotion or disorder (unless restricted to the Contractor's employees), and contamination from any nuclear fuel or nuclear waste or radioactive toxic explosive.

## **12. Contractor's Risks**

- 12.1 All risks of loss of or damages to physical property and of personal injury and death which arise during and in consequence of the performance of the Contract other than the excepted risks are the responsibility of the Contractor.

## **13. Insurance**

- 13.1 The Contractor shall provide, in the joint names of the Employer and the Contractor, insurance cover from the Start date to the end of the Defects Liability Period, in the amounts and deductibles stated in the Contract data for the following events which are due to the Contractor's risks:

- (a) Loss of or damage to the works, Plant and materials,
- (b) Loss of or damage to Equipment
- (c) Loss of or damages of property (except the Works, Plant, Materials and Equipment) in connection with the Contract; and
- (d) Personal injury or death.

- 13.2 Policies and certificates for insurance shall be delivered by the Contractor to the Engineer for the Engineer's approval before the Start Date. All such insurance shall provide for compensation to be payable in the types and proportions of currencies required to rectify the loss or damage incurred.

13.3 If the Contractor does not provide any of the policies and certificates required, the Employer may affect the insurance which the Contractor should have provided and recover the premiums the Employer has paid from payments otherwise due to the Contractor or, if no payment is due, the payment of the premiums shall be a debt due.

13.4 Alterations to the terms of an insurance shall not be made without the approval of the Engineer.

13.5 Both parties shall comply with any conditions of the insurance policies.

#### **14. Site Investigation Report**

14.1 The Contractor in preparing the Bid shall rely on any site Investigation reports referred to in the Contract Data, supplemented by any information available to the Bidder.

#### **15. Queries about the Contract data**

15.1 The engineer will clarify queries on the Contract Data

#### **16. Contractor to Construct the Works**

16.1 The Contractor shall construct and install the works in accordance with the specification and Drawings.

#### **17. The Works to be completed by the Intended Completion Date**

17.1 The Contractor may commence execution of the Works on the Start 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 Intended Completion date

#### **18. Approval by the Engineer**

18.1 The Contractor shall submit Specifications and Drawings showing the proposed Temporary works to the Engineer, who is to 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 responsibility for design of the Temporary works.

18.4 The Contractor shall obtain approval of third parties to the design of the Temporary works where required.

18.5 All Drawings prepared by the Contractors for the execution of the temporary or permanent work are subject to prior approval by the Engineer before their use.

#### **19. Safety**

19.1 The Contractor shall be responsible for the safety of all activities on the Site.

## **20. Discoveries**

- 20.1 Anything of historical or other interest or of significant value unexpectedly discovered on the site is the 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.

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

- 21.1 The Employer shall give possession of all parts of the site to the Contractor. If possession of a part is not given by the date stated in the Contract Data the Employer is deemed to have delayed the start of the relevant activities and this will be a Compensation Event.
- 21.2 If within 25% of the time limit of the project, 80% of possession of the site is not handed over to the Contractor, then contractor/ Employer may fore-close the contract. Contractor/Employer has to foreclose the work within 30 days after lapse of 25%-time limit and after 30 days foreclosure option will be closed.

## **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 plants are being manufactured/ fabricated/ assembled for the works.

## **23. Instructions**

- 23.1 The Contractor shall carry out all instructions of the Engineer pertaining to works which comply with the applicable laws where the site is located.
- 23.2 The Contractor shall permit the Employer to inspect the Contractor's accounts and records relating to the performance of the Contractor and to have them audited by auditors appointed by the Employer, if so required by the Employer.

## **24. Disputes**

- 24.1 If the Contractor is of the view 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 **Superintending Engineer, Vadodara Panchayat Irrigation Circle, Vadodara** within 14 days of the notification of the Engineer's decision. If the issue is not resolved, any party can refer the matter for conciliation within 15 days from the decision given by the Superintending Engineer (Vadodara Panchayat Irrigation Circle, Vadodara).
- 24.2
- (a) For the work up to Rs.100 Cr., if any of the parties is not satisfied with the decision of the **#Superintending Engineer (Vadodara Panchayat Irrigation Circle, Vadodara)**, both the parties have to refer to the Chief Engineer concern for the conciliation process.
  - (b) For the work more than Rs.100 Cr., if any of the parties is not satisfied with the decision of the **#Superintending Engineer (Vadodara Panchayat Irrigation Circle, Vadodara)**, both the parties have to refer to the **#Secretary, Water Resources Department, Government of Gujarat** for the conciliation process.

If the dispute is not resolved through the conciliation process, he may refer the dispute to Gujarat Public Works Contract Dispute Arbitration Tribunal. If the Contractor fails to refer a claim / dispute to the Higher Authority within 14 days of the notification of the Engineer's decision, the Contractor shall not be entitled to any additional payment/claim if he doesn't follow the above sequence in stipulated time and he should not stop the work.

**25. Procedure for Disputers**

- 25.1 The arbitration shall be conducted in accordance with the arbitration procedure stated in the Special Conditions of Contract.

**26. Deleted**

## **B. TIME CONTROL**

### **27. Programme**

- 27.1 Within the time stated in the Contract Data the Contractor shall submit to the Engineer for approval a Programme showing the general methods, arrangements orders, and timing for all the activities in the works along with monthly cash flow forecast.
- 27.2 An update of the Programme shall be a programme showing the actual progress achieved on each activity and the effect of the progress achieved on the timing of the remaining work including any changes to the sequence of the activities.
- 27.3 The Contractor shall submit to the Engineer, for approval an updated programme at intervals no longer than the period stated in the Contract data. If the Contractor does not submit an updated programme within this period, the Engineer may withhold the amount stated in the Contract data from the next payment after the date on which the overdue programme has been submitted.
- 27.4 The Engineer's approval of the programme shall not alter the Contractor's obligations. The Contractor may revise the programme and submit it to the Engineer again at any time. A revised programme is to show the effect of Variations and Compensations events.

### **28. Extension of the Intended Completion Date**

- 28.1 The Engineer shall extend the Intended Completion Date if a compensation Event occurs or a Variation is issued which makes it impossible for completion to be achieved by the Intended Completion Date without the Contractor taking steps to accelerate the remaining work and which would cause the Contractor to incur additional cost.
- 28.2 The Engineer shall decide whether and by how much to extend the Intended Completion Date within 35 days of the Contractor asking the Engineer for a decision upon the effect of a compensation event or Variation and submitting full supporting information. If the Contractor has failed to give early warning of a delay or has failed to cooperate in dealing with a delay, the delay by this failure shall not be considered in assessing the new Intended Completion Date.
- 28.3 The Engineer shall within 14 days of receiving full justification from the contractor for extension of Intended Completion Date refer to the Employer his decision. The employer shall in not more than 21 days communicate to the engineer the acceptance or otherwise of the Engineer's decision. If the employer fails to give his acceptance, the Engineer shall not grant the extension and the contractor may refer the matter under Clause 24.1

### **29. Deleted**

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

- 30.1 The Engineer may instruct the Contractor to delay the start or progress of any activity within the works.

**31. Management Meetings**

- 31.1 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.
- 31.2 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.

**32. Early Warning**

- 32.1 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.
- 32.2 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.

## C. QUALITY CONTROL

### 33. Identifying Defects/ Defect liability period

33.1 : Defect liability period: The contractor shall be responsible to make good and remedy at his own expense any defect which may develop or may be noticed before the period mentioned hereunder from the certified date of completion. The Engineer in charge shall give the contractor a notice in writing about the defects and the contractor shall make good the same within 15 days of receipt of the notice. In the case of failure on the part of the contractor, the Engineer-in-charge may rectify or remove or re-execute the work at the risk & cost of the contractor. The Engineer-in-charge shall be entitled to appropriate the whole or any part of the amount of security deposit towards the expenses, if any, Incurred by him in rectification, removal or re-execution. The Defects Liability period shall be as under....

A. For works of WRD Except Building

(a) (1) For all works costing up to Rs. 50,000 (amount put to tender), the period shall be 3 Months from the certified date of completion.

(b) (1) For WRD works likes Check Dam/ Canal / Drainage / Road Structure tender amount from RS. 50,000 to 10,00,000, the defect liability period shall be 12 months from the certified date of completion.

(2) For WRD work except likes Check Dam/ Canal / Drainage / Road Structure tender amount from RS. 50,000 to 10,00,000, the defect liability period shall be 6 months from the certified date of completion.

(c) (1) **For WRD works likes Check Dam/ Canal / Drainage / Road Structure tender amount more than RS. 10,00,000, the defect liability period shall be 3 Years from the certified date of completion.**

(2) For WRD work except likes Check Dam/ Canal / Drainage / Road Structure tender amount from RS. 10,00,000 to 1 Crore, the defect liability period shall be 12 months from the certified date of completion.

(d) (1) For all WRD works of tender amount more than RS. 1 Crore, the defect liability period shall be 3 Years from the certified date of completion

B. For Building works of WRD:-

For Building works of WRD, Follow the R&B Circular dated.03/12/2009

For original building works the defect liability period will be 4 years or elapse of 4 monsoon period following date of possession of building taken over by user agency following the certified date of completion, whichever is later.

For the purpose of deciding the monsoon period, the 30th September shall be treated as the last date.

WRD Circular No. Matas/102013/MICELL(K-1) Dated 13/12/2013

33.2 For Road works :

Free maintenance guarantee period for works of **Road/Bridge construction**

(a) For resurfacing work of road free maintenance guarantee period one year from the date of completion.

(b) In case of widening of the road/strengthening of the road/bridge, the contractor shall have to give four years free maintenance guarantee from the certified date of completion. During this period the contractor shall visit the site every six months along with the concerned Section Officer / Deputy Executive Engineer and will examine the work already carried out in this contract like road work, jungle cutting, side shoulders, side gutter, road furniture, patta etc. and will prepare Km. wise inspection report duly signed by all concerned and any defect observed shall be done within 15 days by the contractor at his risk and cost as per the direction of Engineer in charge. The contractor needs to do videography of these visits and require to submit at the time of release of FMG. If B.T. the surface during

the maintenance period of 4 years is worn out then agency shall have to provide renewal coating as per tender item as directed by the Engineer-in-charge. The amount equivalent to 5% of each running bill shall be withheld and will be released after the free maintenance guarantee period (i.e. 4 years) is over.

However, this amount shall be released against fixed deposit or bank guarantee pledged in the name of Executive Engineer after completion certificate of work is issued.

(1) The flakiness and elongation index (combined) for coarse aggregates under no circumstances shall exceed the allowable limit set forth in the relevant clause for the material in question.

(2) 2% of the amount eligible for the payment of bituminous items shall be withheld till the miscellaneous items like earthwork in embankment / cutting for side shoulders, side gutters, kilometer / indicator / guard stones, sign boards etc. are completed in all respect by the contractor. After completion of the miscellaneous items, the above said 2% withheld amount shall be released.

(Govt. of Gujarat's G.R. No.: TNC-10-2013-3(Part-3)/C, Dtd. 13/12/2013).

(3) Videography for the surface under Maintenance Guarantee is to be done as per Govt. letter No.: SSR/10/2015-16/26/C, Dtd. 26/11/15 for the work costing more than Rs. 5.00 Crore.

(4) Setting up of adequate laboratory & deployment of quality engineers.

The contractor shall have to set up the laboratory with adequate equipment. Till the setting up of adequate laboratory is completed & reported of this to the engineer (subject to due verification by engineer's representative) by contractor in writing, Rs.2,00,000/- shall be withheld. The qualified quality Engineer shall be deployed exclusively for this contract by the contractors. If quality Engineer is not deployed by contractor within one month after the date of work order, the amount equivalent to Rs.20,000 per month shall be recovered till the actual deployment of quality engineer. The amount so recovered towards the deployment of quality engineers shall not be refunded.

(5) Asphalt work will have to be cross checked as per G.R. No.: RGN/60/2006/35/C, dtd.31/05/07 before final bill is paid.

(6) Maintenance during Construction Period

During the Construction Period, the Contractor shall maintain, at his own risk and cost, the existing lane(s) of the road so that the traffic worthiness and safety thereof are at no time materially inferior as compared to their condition 10 (ten) days prior to the date of the Agreement, and shall undertake the necessary repair and maintenance works for this purpose; provided that the Contractor may, at his cost, interrupt and divert the flow



of traffic if such interruption and diversion is necessary for the efficient progress of works and conforms to Good Industry Practice; provided further that such interruption and diversion shall be undertaken by the Contractor only with the prior written approval of the Executive Engineer which approval shall not be unreasonably withheld. For the avoidance of doubt, it is agreed that the Contractor shall at all times be responsible for ensuring safe operation of the road.

- 33.3 The Engineer shall check the Contractor's work and notify the Contractor of any defects that are found. Such checking shall not affect the Contractor's responsibilities the Engineer may instruct the Contractor to search for a Defect and to uncover and test any work that the Engineer considers may have a Defect.

#### **34. Tests**

- 34.1 If the engineer instructs the Contractor to carry out a test not specified in the Specification to check whether any work has a Defect and the test shows that it does, the Contractor shall pay for the test and any samples. If there is no defect the test shall be a Compensation Event.
- 34.2 #1% of the amount of work done for works upto Rs. 10 crore of estimate cost should be deducted from R.A. Bill of the contractor for testing the quality of material workmanship. Whereas for estimated cost of works more than 10 crore, the charges for testing of quality of material workmanship shall be deducted from R.A. bill of contractor as per actual charges. ~~As Per GoG NWRWS & K Department's Circular No. PARCH/132023/401/MICELL Dated: 05/10/2023~~
- 34.3 Agency has to establish testing laboratory on site for the various test to be carried out in the work for this purpose agency shall construct a pukka laboratory building with all facility on site at location specified by the engineer in charge.

#### **35. Correction of defects**

- 35.1 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.
- 35.2 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.

#### **36. Uncorrected Defects**

- 36.1 If the Contractor has not corrected 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 pay this amount.

## **D. COST CONTROL**

### **37. Bill of Quantities**

- 37.1 The bill of Quantities shall contain items for the constructions, installation, testing and commissioning work to be done by the Contractor.
- 37.2 The bill of Quantities is used to calculate the Contract price. The Contractor is paid for the quantity of the work done at the rate in the Bill of Quantities for each item.

### **38. Change in the Quantities**

- 38.1 The Engineer shall have power to make any alterations in or addition to the original specifications , drawings, designs and instructions that may appear to him to be necessary or advisable during the progress of the work and the contractor shall be bound to carry out the work in accordance with any instruction in this connection which may be given to him in writing signed by the Engineer and such alteration shall not invalidate the contract and any additional work which the contractor may be directed to do in the manner above specified as part of the work shall be carried out by the contractor on the same conditions in all respects on which he agreed to do the main work and at the same rate as are specified in the tender for the main work.

Except that when the quantity of any item exceeds the quantity as in the tender by more than 130%, the contractor will be paid for the quantity in excess of 130%, at the rate entered in the SOR of the year during which the excess in quantity is first executed.

### **39. Variations**

- 39.1 All Variations shall be included in updated programmes produced by the Contractor.

### **40. Payments for Variations**

- 40.1 If the additional or altered work includes any class of work for which no rate is specified in this contract, then such class of work shall be carried out as under.

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

- (ii) If the rate cannot be derived in accordance with (i) above, such class of works shall be carried out at the rate entered in the Schedule of Rates of the division

for the year in which the tender was received, increased or decreased by the percentage by which the tender amount is more or less as compared to the amount arrived at the rates in the "Schedule of Rates" of the Division in the year in which the tender was received. If the Schedule of rates of the Division does not contain all the items, the percentage increase or decrease of the tender shall be calculated considering such items which were included in the "Scheduled Rates" of the division for the year and for materials consumed on such item the rate to be charged would be the basic rate taken into account for fixing the rate in S.O.R. referred to above.

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

- 40.2 If the additional or altered work, for which no rate is entered in the "Schedule of Rates" of the Division is ordered to be carried out before the rate is agreed upon, then the contractor shall within seven days of the date of receipt by him of the order to carry out the work, inform the Engineer-in-charge of the rate, which it is his intention to charge for such class of work and if the Engineer in charge does not agree to this rates, he shall by notice in writing be at liberty to cancel his order to carry out such class of work and arrange to carry it out in such manner as he may consider it advisable, provided always that if the contractor shall commence work or incur any expenditure in regard thereof before the rates shall have been determined as lastly herein before mentioned, then in such cases he shall only be entitled to be paid in respect of the work carried out or expenditure incurred by him prior to the date of the determination of the rate as aforesaid according to such rate or rates as shall be fixed by the Engineer-in-charge. In the event of the dispute, the decision of the Superintending Engineer of the Circle shall be final.

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

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

#### **41. Cash Flow Forecasts**

- 41.1 When the programme is updated, the contractor is to provide the engineer with an updated cash flow forecast.

#### **42. Payment certificates.**

- 42.1 The Contractor shall submit to the Engineer monthly statements of the estimated value of the work completed less the cumulative amount certified previously.
- 42.2 The Engineer shall check the Contractor's monthly statement within 14 days and certify the amount to be paid to the Contractor after taking in to account any credit or debit for the month in question in respect of materials for the works in the relevant amounts and under conditions set forth in sub-clause 32.3 of the Contract Data (secured Advance).
- 42.3 The value of work executed shall be determined by the Engineer.
- 42.4 The value of work executed shall comprise the value of the quantities of the items in the Bill of Quantities completed.
- 42.5 The value of work executed shall include the valuation of variations and compensation events.
- 42.6 The Engineer may exclude any item certified in a previous certificate or reduce the proportion of any item previously certified in any certificate in the light of later information

#### **43. Payments**

- 43.1 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 Engineer within 28 days of the date of each certificate.
- 43.2 Payment of GST (prevailing rates) on the amount payable under the contract to the Contractor will be made by the Employer. Hence, it is the responsibility of the contractor to pay the GST to the concerned Authority.
- 43.3 Items of the works for which no rate or price has been entered in will not be paid by the Employer and shall be deemed covered by other rates and prices in the Contract.

#### **44. Compensation events**

- 44.1 The following are compensation Events unless they are caused by the Contractor:
  - (a) The Employer does not give access to a part of the Site by the site Possession date stated in Contract data to the Contractor
- 44.2 In case of compensation event occurs and it prevents the work being completed beyond the Intended Completion Date then Authority will approve EOT with eligible contractual price escalation.

## **45. Tax**

- 45.1 The rates quoted by the Contractor must be inclusive of all taxes prevailing on due date of bid submission except GST. However, any subsequent changes in the tax structure by Government after due date of bid submission will be compensated (+/-) on availability or submission of actual documentation. Contractor will have to intimate Engineer regarding changes occurred in the tax structure after bid submission. If the contractor fails to provide such information and if any financial obligation may arise due to change in tax structure, same will be recovered from the contractor.
- 45.2 GST will be paid separately on the bills. Hence, it is the responsibility of the contractor to pay the GST to the concerned Authority.

## **46. Currencies.**

- 46.1 All payment shall be made in Indian Rupees.

## **47. Price Adjustment**

- 47.1 Contract price shall be adjusted for increase or decrease in rates and price of labour, materials, fuels and lubricants in accordance with the following principles and procedures and as per formula given in the contract data:
- (a) The price adjustment shall apply for the work done from the start date given in the contract data up to end of the initial intended completion date or extensions granted by the Engineer and shall not apply to the work carried out beyond the stipulated time for reasons attributable to the contractor.
  - (b) The price adjustment shall be determined during each month from the formula given in the contract data.
  - (c) Following expressions and meanings during to the work done during each month  
R = Total value of work done during the month. It would include the amount of secured advance granted, if any, during the month less the amount of secured advance recovered, if any during the month. It will exclude value for works executed under variations for which price adjustment will be worked separately based on the terms mutually agreed.
- 47.2 To the extent that full compensation for any rise or fall in costs to the contractor is not covered by the provisions of this or other clause in the contract, the unit rates and prices included in the contract shall be deemed to include amounts to cover the contingency of such other rise or fall in costs.

## **48. Retention**

- 48.1 The Employer shall retain from each payment due to Contractor the proportion stated in the Contract Data until Completion of the whole of the Works.

- 48.2 On Completion of the whole of the Works half the total amount retained is repaid to the Contractor and half when the Defects Liability Period has passed and the Engineer has certified that all Defects notified by the Engineer to the Contractor before the end of this period have been corrected.
- 48.3 On completion of the whole works, the contractor may substitute retention money with an “on demand” Bank guarantee.

In case, Contractor requests for refund of the Retention Money deducted by the Employer under the provision of this clause, Employer shall consider the said request of the Contractor provided that the refund hereunder shall be made in tranches of not less than 1% (One Percent) of the Contract Price and Contractor furnishes an irrevocable and unconditional Bank guarantee for an equal amount substantially in the format of Bank Guarantee for Performance Guarantee enclosed with SBD and valid up to 60 day beyond the scheduled / extended Defects Liability Period. On completion of the whole works, the contractor has however an option to submit a fresh irrevocable and unconditional Bank Guarantee for an amount equal to 5% of the total value of work executed substantially in the format of Bank Guarantee for Performance Guarantee enclosed with SBD and valid up to 60 days beyond the Defect Liability Period and yet refund the Retention Money Bank Guarantee submitted for refund of Retention Money.

#### **49. Liquidated Damages**

- 49.1 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 Intended Completion Date (for the whole works or the milestone 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 payment due to the Contractor. Payment of liquidated damages does not affect the Contractor’s liabilities.
- 49.2 If the Intended Completion Date is extended after liquidated damages have been paid, the Engineer shall correct any overpayment of liquidated damages by the Contractor by adjusting the next payment certificate. The Contractor shall not be entitled for any interest on the over payment calculated from the date of payment to the date of repayment.
- 49.3 If the contractor fails to comply with the time for completion as stipulated in the tender, then the contractor shall pay to the employer the relevant sum stated in the Contract Data as Liquidated damages for such default and not as penalty for everyday or part of day which shall elapse between relevant time for completion and the date stated in the taking over certificate of the whole of the works on the relevant section, subject to the limit stated in the contract data.

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 on from any other of his obligations and liabilities under the contract.

- 49.4 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 thereof.

## **50— Bonus**

- ~~50.1 If the contractor achieves completion of the whole of the works prior to the intended Completion Date prescribed in Contract Data the Employer shall pay to the contractor a sum stated in Contract Data as bonus for every completed month but subjected to maximum amount as stated in Contract Data; which shall elapse between the date of completion of all items of works as stipulated in the contract, including variations ordered by the Engineer and the time prescribed in Clause 17.~~

- ~~50.2 Bonus shall be paid only to works amounting to above INR 5 crore with time limit of the works is equal or more than 6 months. The bonus would be paid as under~~

% of Time Saved	% of Initial Contract Price entitled for Bonus
50 %	5%
40 %	4%
30 %	3%
20 %	2%
10 %	1%
Less than 10%	0%

## **51.— Advance Payment.**

- ~~51.1 The Employer shall make advance payment (not to be paid less than two installments except in special circumstances for which the reason to be Recorded in writing) to the Contractor of the amounts stated in the Contract Date by the date stated in the Contract Date, against provision by the Contractor of an Unconditional Bank Guarantee in a form and by a bank acceptable to the Employer in amounts and currencies equal to be at least 110% of the advance payment. The guarantee shall remain effective until the~~

~~advance payment has been repaid, but the amount of the guarantee shall be progressively reduced by the amounts repaid by the Contractor. The Mobilization advance would be deemed as interest bearing advance at an interest rate of 10 % to be compounded, quarterly.~~

~~51.2 The Contractor is to use the advance payment only to pay for Equipment, plant and Mobilization expenses required specifically for execution of the Works. The Contractor shall demonstrate that advance payment has been used in this way by supplying copies of invoices or other documents to the engineer.~~

~~51.3 The advance payment shall be repaid by deduction proportionate amount from payments otherwise due to the Contractor, following the schedule of completed percentages of the Works on a payment basis. No account shall be taken of the advance payment or its repayment in assessing valuations of work done, variations, price adjustments, Compensation Events, or Liquidated damages.~~

51.4 Deleted

## **52. Securities**

52.1 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 or surety acceptable to the Employer, and denominated in Indian Rupees. The performance Security shall be valid until a date 60 days from the date of expiry of Defects Liability Period and the additional security for unbalanced bids shall be valid until a date 28 days from the date of issue of the certificate of completion.

## **53. Deleted**

## **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 Defects Correction periods shall be remedied by the Contractor at the Contractor's cost if the loss or damages 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 The Employer shall take over the Site and the Works within seven days of the Engineer issuing a certificate of Completion.

### **57. Final Account**

- 57.1 The Contractor shall supply to the Engineer a detailed final account of the total amount that the Contractor considers payable as full and final settlement of all claims under the Contract for items before the end of the Defects Liability Period. The Engineer shall issue a Defect Liability Certificate and certify any final payment that is due to the Contractor within 56 days of receiving the Contractor's account if it is correct and complete. If it is not, the Engineer shall issue within 56 days a schedule that states the scope of the corrections or additions that are necessary. If the Final Account is still unsatisfactory after it has been resubmitted, the Engineer shall decide on the amount payable to the Contractor and issue a payment certificate, within 56 days of receiving the Contractor's revised account.
- 57.2 If reversal in characteristic of tender (L1 becoming L2) on account of excesses and savings in final account is observed, the Engineer/Employer shall be at liberty to restrict the final payment of BOQ items to the lowest amount evaluated of the bids considering the final quantities and the rates quoted including the rebates if any. Payment of variation items shall however be made at the rates approved by the Employer, within 90 days from the physical completion of work.

### **58. Operating and Maintenance Manuals**

- 58.1 If "as built" drawings and/or operating and maintenance manuals are required, the Contractor shall supply them by the dates stated in the Contract data.
- 58.2 If the Contractor does not supply the Drawings and/or manuals by the dates stated in the Contract data, or they do not receive the Engineer's approval, the Engineer shall withhold the amount stated in the Contract Data from payments due to the Contractor.

### **59. Termination**

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

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

1. The contractor stops work for 28 days when no stoppage of work is shown on the current programme and the stoppage has not been authorized by the Engineer
2. The Engineer instructs the Contractor to delay the progress of the Works and the instructions is not withdrawn within 28 days;
3. The Employer or the Contractor is made bankrupt or goes into liquidation other than for a reconstructions or amalgamation
4. A payment certified by the Engineer is not paid by the Employer to the Contractor within 56 days of the date of the Engineer's certificate
5. 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;
6. The Contractor does not maintain a security which is required;
7. The Contractor has delayed the completion of works by the number of days for which the maximum amount of liquidated damages can be paid as defined in the Contract data; and
8. If the Contractor, in the judgment of the Employer has engaged in corrupt or fraudulent practices in competing for or in executing the Contract.

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 under Sub Clause 59.2 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.

## **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 deducted 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 cost of protecting and securing the Works and less advance payment received up to the date of the certificate, less other recoveries due in terms of the contract and less taxes due to deducted at source as per applicable law.

**61. Property**

- 61.1 All materials on the Site, Plant Equipments, Temporary Works and Works are deemed to be property of the Employer, if the Contract is terminated because of a Contractor's default.

**62. Release from Performance**

- 62.1 If the Contract is frustrated by the outbreak of war or by any other event entirely outside the control of either the Employer or the Contractor the Engineer 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. SPECIAL CONDITIONS OF CONTRACT**

### **63. LABOUR**

The Contractor shall, unless otherwise provided in the Contract, make his own arrangements for the engagement of all staff and labour, local or other, and for their payment of housing, feeding and transport.

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.

### **64. COMPLIANCE WITH LABOUR REGULATIONS**

During continuance of the contract, the Contractor and his sub-contractor shall abide at all times by all existing labour enactments and rules made thereunder, regulations, notification 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 notifications that may be issued under any labour law in future either by the State or the Central Government or the local authority. Salient features of some of the major labour laws that are applicable to the 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 thereunder, 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 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/employer shall have the right to deduct any money due to the Contractor including his amount of performance security. The Employer/Engineer shall also have the 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 to time.

SALIENT FEATURES OF SOME MAJOR LABOUR AND OTHER LAWS APPLICABLE TO ESTABLISHMENTS ENGAGED IN BUILDING AND OTHER CONSTRUCTIONS 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, 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 @ 10% or 8.33% The benefits payable under the Act are :
1. Pension or family pension on retirement or death, as the case maybe.
  2. Deposit linked insurance on the death in harness of the worker.
  3. Payment of P.F. accumulation on retirement/death etc.
- D) **Maternity Benefit Act 1951**:- The Act provides for leave and some other benefits to women 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 Certificate 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 labour.
- 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 Building, Roads, Runways are scheduled employment.
- G) **Payments 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 remunerations 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 matter of transfer, training and promotions etc.
- I) **Payments 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 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 resolutions 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 (standing Orders) Act 1946 :-** It is applicable to all establishments employing 100 or more workmen (employment size reduced by some of the State 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 the same certified by the designated Authority.
- L) **Trade Unions Act 1926:-** The Act lays the procedure for registration of trade unions of workmen and employers. The Trade Unions registered under the Act have 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 process and provides for regulation of employment of children in all other occupations and processes. Employment of Child labour is prohibited in Building and Construction Industry.
- N) **Inter – State Migrant workmen’s (Regulation of Employment & Conditions of service) Act 1979:-** 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, is an establishment to which this Act becomes applicable, are required to be provided certain facilities such as housing, medical aid, traveling expenses from home upto the establishment and back, etc.
- O) **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 constructions 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 workplace etc. The Employer to whom the Act applies has to obtain a registration certificate from the Registering Officers appointed by the Government.

P) **Factories Act 1948 :-** The Act lays down the procedure for approval of 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 or more persons without the aid of power engaged in the manufacturing process.

Q) **Royalty charges-**The contractor shall pay the royalty to the competent authority as per rule. The **royalty** charges paid shall be borne by the contractor and shall not be reimbursed by the Employer.

R) **Following Pollution control Acts and amendments made thereof from time to time shall be applicable.**

1. Water (Preservation and control of Pollution) Act, 1974
2. Air (Prevention and Control of Pollution Act 1981
3. Environmental (Protection) Act 1986

The contractor must commit to adopting Environmental management plan for best energy use, waste management, the reduction of pollution as in EMS (Environmental Management system)ISO-14001- 2015

#### **65. ARBITRATION (GCC Clause 24)**

The procedure for arbitration will be as follows: -

24.1 If the Contractor is of the view 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 **Superintending Engineer** (Higher Authority) (Vadodara Panchayat Irrigation Circle, Vadodara) within 14 days of the notification of the Engineer's decision. If the issue is not resolved, any party can refer the matter for conciliation within 15 days from the decision given by the  
#Superintending Engineer.

24.2

- (a) For the work up to Rs.100 Cr., if any of the parties is not satisfied with the decision of the #Superintending Engineer (Vadodara Panchayat Irrigation Circle, Vadodara), both the parties have to refer to the #Chief Engineer concerned for the conciliation process.
- (b) For the work more than Rs.100 Cr., if any of the parties is not satisfied with the decision of the Superintending Engineer, both parties have to refer to the #Secretary, Water Resources Department, Government of Gujarat for the conciliation process.

If the dispute is not resolved through the conciliation process, contractor may refer the dispute to Gujarat Public Works Contract Dispute Arbitration Tribunal. If the Contractor fails to refer a claim / dispute to the Higher Authority within 14 days of the notification of the Engineer's decision, the Contractor shall not be entitled to any additional payment/claim if he doesn't follow the above sequence in stipulated time. However, during such period, he would not stop the work in any case.

**SECTION - 4**  
**CONTRACT DATA**



## #CONTRACT DATA

### Clause Reference With respect To section 3

**Item marked “N/A” do not apply to this Contract.**

1. The Employers is [CL.1.1]

Name: Executive Engineer, Panchayat Irrigation Division, Dahod

Address: Panchayat Irrigation Division, Jilla Panchayat Bhavan, Dahod – 389151

Name of authorized Representative (will be intimated later)

2. The Engineer is Executive Engineer, Panchayat Irrigation Division,  
Dahod

Name of Authorized Representative: Executive Engineer

3. The Defects Liability Period is 3 (Three) years from the date of completion. [CL.1.1&33]

4. The Start Date shall be 1<sup>st</sup> days for the date of issue of the Notice to proceed with the work. [CL.1.1]

5. The Intended Completion Date for the whole of the works is [CL.1.1,17&2]  
**11 (ELEVEN) Months** after start of work with the following milestones:

Milestone dates: [CL.2.2& 49.1]

Physical works to be completed Period from the start date

Project Mile Stone	Cumulative Time Limit (In Day)	Cumulative Percentage of Contract Value (Financial)
Milestone 1	50 Days	15 %
Milestone 2	115 Days	35 %
Milestone 3	230 Days	70 %
Milestone 4	330 Days	100 %

6. The Site is located at Bavka Village, Ta. Dahod Dist. Dahod [CL.1.1]

7. The name and identification number of the Contract is: [CL.1.1]

8. The works consist of Repair and maintenance Works for Bavka Minor irrigation scheme, Taluka- Dahod, Dist.: Dahod. with items as per B.O.Q. The works shall, inter alia, include the following, as Specified or as directed: [CL.1.1]

**(A) WRD Works**

Site clearance; setting – out and layout; Construction and Maintenance of all types of dams and its component, earthen dam; spillway; installation of gate; excavation and earth work, approach road, Inspection Bungalows, checkdams, bandhara, T.R., weir, barrages, Flood Protection & Anti Sea Erosion work, canal lining and structures, , CD Works, structure repairing, Jungale cutting, Desilting, etc. other WRD works.

**(B) Road Works :**

Site clearance; setting out and layout widening of **existing** carriageway and strengthening including camber corrections; construction of new road/ Parallel service road; bituminous pavements remodeling/construction of Junctions, intersections, bus bays, lay-bays; supplying and placing of drainage Channels, flumes, guard posts and guard other related items; construction/extension of cross drainage works, bridge, approaches and other related stones; protective works for roads/bridge; all aspects of quality assurance of various components of the works; rectification of The defects in the completed works during the Defects Liability Period; submission of “As- built” drawings and any other related documents; and other item of work as may be required to be carried out for completing the work in accordance with the drawings and the provisions of the contract and to ensure safety.

### **( C ) Bridge Works**

provision of foundations, piers abutments and bearing; prestressed/reinforced cement concrete superstructure; wearing coat, hand railings, expansion joints, approach slabs, drainages spouts/ downtake pipes, arrangements for fixing light posts, water mains, utilities etc; provision of suitably designed protective works; providing wing/return walls; provision of road markings, road signs etc.; all aspects of quality assurance; clearing the site and handing over the works on completion; rectification of the defects during the Defects Liability Period and submission of "As-built" drawings and other related documents; and other items of work as may be required to be carried out for completing the works in accordance with the drawings and the provisions of the contract and to Insure safety

[CL.1.1]

### **(D) Other Items**

Any Other Items as required to fulfill all contractual obligations as per the Bid documents.

[CL.2.3(9)]

10. The following documents also form part of the Contract:

\_\_\_\_\_As per clause 2-3\_\_\_\_\_

11. The law which applies to the Contract is the law of Union of India [CL.3.1]

12. The language of the Contract documents is English [CL.3.1]

13. Limit of subcontracting 25% of the Initial Contract Price [CL.7.1]

14. The Schedule of Other Contractors [CL.8]

15. The Schedule of Key Personnel As per Annex – II to Section I [CL.9]

16. The minimum insurance cover for physical property, injury and death is Rs. 5 lakhs per occurrence with the number of occurrences limited to four. After each occurrence, the contractor will pay an additional premium necessary to make insurance valid for four occurrences always. [CL.13]

17. Site Investigation report [CL.14]

18. The Site Possession dates shall be From the Date Work order issue. [CL.21]

19. The period for submission of programme for approval of the engineer shall be 21 days from the issue of Letter of Acceptance. [CL. 27.1]

20. The period between program updates will be 45 days. [CL.27.3]

21. The amount to be withheld for late submission of an updated programme shall be Rs 0.50 lakhs [CL. 27.3]

22. The following events shall also be Compensation Events [CL. 44]  
Substantially adverse ground conditions encountered during the course of execution of work not provided for in the bidding document.

(i) Removal of underground utilities detected subsequently

(ii) Significant changes 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 cause by the Contractor.

- (iv) Artesian conditions
- (v) Seepage, erosion landslide
- (vi) River training requiring protection of permanent work
- (vii) Presence of historical, archeological or religious structures, monuments interfering with the works
- (viii) Restriction of access to ground imposed by civil, judicial, or military authority

23. The currency of the Contract is Indian Rupees

[CL. 46]

24. **The formula (e) for adjustment of prices are as under:**

[CL.47]

- If any of the commodities like Cement, Steel or Bitumen are not found applicable in a work, the weight component of that commodities {i.e. 'Cement' (Pc), 'Steel' (Ps) or 'Bitumen' (Pb) as indicated in SBD for the purpose of Price Adjustment} shall be clubbed with the weight component of 'Other Material' (Pm), such that the gross % weight of the components shall remain as 100%.

R = value of work as defined in Clause 47.1 of Conditions of Contract

#### **Adjustment for labour component**

- (i) Price adjustment for increase or decrease in the cost due to labour shall be paid in accordance with the following formula:

$$V_L = 0.85 \times (P_1/100) \times R \times (L_i - L_0)/L_0$$

$V_L$  = Increase or decrease in the cost of work during the month under consideration due to changes in rates for local labour

$L_0$  = The consumer price index for industrial workers for the State on 28 days preceding the scheduled date of opening of technical Bids as published by Labour Bureau, Ministry of Labour, Government of India

$L_i$  = The consumer price index for industrial workers for the State for the month under consideration as published by the Labour Bureau, Ministry of Labour, Government of India.

$P_1$  = Percentage of labour component of the work.

#### **Adjustment for cement component.**

- (ii) Prices adjustment for increase or decrease in the cost of cement procured by the contractor

$$V_c = 0.85 \times (P_c/100) \times R \times (C_i - C_0)/C_0$$

$V_c$  = Increase or decrease in the cost of work during the month under consideration due to changes in rates for cement.

$C_0$  = The all India wholesale price index for Ordinary Portland Cement on 28 days preceding the scheduled date of opening of technical bid as published by the **Office of the Economic Adviser, Department for Promotion of Industry and Internal Trade, Ministry of Commerce & Industry.**

$C_i$  = The all India average wholesale price index for Ordinary Portland Cement for the month under consideration as published by **Office of the Economic Adviser, Department for Promotion of Industry and Internal Trade, Ministry of Commerce & Industry.**

$P_c$  = Percentage of cement component of the work

#### **Adjustment for steel component**

- (iii) Price adjustment for increase or decrease in the cost of steel procured by the contractor shall be paid in accordance with the following formula

$$V_s = 0.85 \times (P_s/100) \times R \times (S_i - S_0)/S_0$$

$V_s$  = Increase or decrease in the cost of work during the month under consideration due to changes in the rates for steel

$S_0$  = The all India wholesale price index for steel (**Mild Steel - Long Products Rebars**) on 28 days preceding the date of opening of Bids as published by the **Office of the Economic Adviser, Department for Promotion of Industry and Internal Trade, Ministry of Commerce & Industry.**

$S_i$  = The all India average wholesale price index for steel (**Mild Steel - Long Products Rebars**) for the month under consideration as published by **Office of the Economic Adviser, Department for Promotion of Industry and Internal Trade, Ministry of Commerce & Industry.**

$P_s$  = Percentage of steel component of the work

Note : For the application of this clause, the index of **Mild Steel- Long products Rebars** has been chosen to represent the steel group.

#### **Adjustments of bitumen component**

- (iv) Price adjustment for increase in the cost of bitumen shall be paid in accordance with the following formula

$$V_b = 0.85 \times (P_b/100) \times R \times (B_i - B_0)/B_0$$

$V_b$  = Increase or decrease in the cost of work during the month under consideration due to changes in rates for bitumen.

$B_0$  = The official retail price of bitumen at the IOC depot at the nearest centre on the day 28 days prior to the scheduled date of opening of technical bid.

$B_i$  = The official retail price of bitumen of IOC depot at the nearest centre for the 15<sup>th</sup> day of the month under consideration.

$P_b$  = Percentage of bitumen component of the work

### **Adjustment of POL (fuel and lubricant) component**

- (v) Price adjustment for increase or decrease in cost of POL (fuel and lubricant) shall be paid in accordance with the following formula

$$V_f = 0.85 \times (P_f/100) \times R \times (F_i - F_0)/F_0$$

$V_f$  = Increase or decrease in the cost of work during the month under consideration due to changes in rates for fuel and lubricants.

$F_0$  = The official retail price of High Speed Diesel (HSD) at the existing consumer pumps of IOC at the nearest centre on the day 28 prior to the date of opening of Bids.

$F_i$  = The official retail price of HSD at the existing consumer pumps of IOC at the nearest centre for the 15<sup>th</sup> day of the month of the under consideration.

$P_f$  = Percentage of fuel and lubricants component of the work

Note: For the application of this clause, the price of High-Speed diesel Oil has been chosen to represent the fuel and lubricants group.

### **Adjustment for Construction Machinery**

- (vi) Price adjustment for increase or decrease in the cost of plant and Machinery spare procured by the Contractor shall be paid in accordance with the following formula

$$V_p = 0.85 \times (P_p/100) \times R \times (P_i - P_0)/P_0$$

$V_p$  = Increase or decrease in the cost of work during the month under consideration due to changes in rates for plant and machinery spares

$P_0$  = The all India wholesale price index for **manufacturer of machinery for mining, quarrying and Construction** for the month under consideration as published **Office of the Economic Adviser, Department for Promotion of Industry and Internal Trade, Ministry of Commerce & Industry.**

$P_i$  = The all India average wholesale price index for **manufacturer of machinery for mining, quarrying and Construction** for the month under consideration as published **Office of the Economic Adviser, Department for Promotion of Industry and Internal Trade, Ministry of Commerce & Industry.**

$P_p$  = Percentage of plant and machinery spares component of the work.

Note: For the application of this clause, index of Heavy Machinery and parts has been chosen to represent the Plant and Machinery Spares group

## Adjustment of other materials Component

- (vii) Price adjustment for increase or decrease in cost of local materials other than cement, steel, bitumen and POL procured by the contractor shall be paid in accordance with the following formula

$$V_m = 0.85 \times (P_m/100) \times R \times (M_i - M_0)/M_0$$

$V_m$  = Increase or decrease in the cost of work during the month under consideration due to change in rates for local materials other than cement, steel, bitumen and POL.

$M_0$  = The All India wholesale price index (all commodities) on 28 days preceding the scheduled date of opening of technical Bids, as published by the **Office of the Economic Adviser, Department for Promotion of Industry and Internal Trade, Ministry of Commerce & Industry.**

$M_i$  = The All India wholesale price index (all commodities) for the month under consideration as published by the **Office of the Economic Adviser, Department for Promotion of Industry and Internal Trade, Ministry of Commerce & Industry.**

$P_m$  = Percentage of local material components (other than cement, steel, bitumen and POL) of the work.

The following percentage will govern the price adjustment for the entire contract:

1. Labour - $P_l$	24.73 %
2. Cement - $P_c$	10.98 %
3. Steel - $P_s$	11.00 %
4. Bitumen - $P_b$	00.00 %
5. POL - $P_f$	15.32 %
6. Plant & Machinery Spares $P_p$	22.97 %
7. Other Materials - $P_m$	15.00 %
	-----
Total	100 %
	-----

**Note :-** The price adjustment as per clause-47 will be decided at the time of estimation of actual work.

25. The proportion of payments retained (retention money) shall be 6% {CL. 48} from each bill subject to a maximum of 5% of final contract price.
26. Amount of Liquidated damages for delay in completion of works
- For Whole of work {CL.49}  
 $(1/2000)^{th}$  of the Initial contract price, rounded off to the nearest Thousand, per day. ~~For sectional Completion (wherever specified in item 6 of Contract data)  $(1/2000)^{th}$  of initial contract price for #5 km-Section, rounded off to the nearest thousand per day.~~

27. Maximum limit of liquidated damages 10 percent of the Initial {CL. 49}  
For delay in completion work Contract Price rounded off to  
the nearest thousand

28. ~~Amount of Bonus for early completion~~ ~~Amount of bonus for early~~  
~~completion of work shall be given~~  
~~as per CL.50 of Section 3~~

29. ~~Maximum limit of bonus for early~~ **5 percent** of the Contract {CL. 50}  
~~Completion of work~~ ~~Price~~

30. ~~The amount of the advance payment are: {CL. 51 & 52}~~

~~#Nature of Advances~~ ~~Amount (Rs.)~~ **Conditions to**  
**Be fulfilled**

i ~~Mobilization~~ ~~10% of the contract~~ ~~On submission of unconditional~~  
~~Price~~ ~~Bank Guarantee. (to be drawn~~  
~~before the end of 20% of the~~  
~~contract period). The contractor~~  
~~may furnish four bank guarantees~~  
~~of 2.5 % of each valid for the full~~  
~~period.~~

ii ~~Equipment~~ ~~90% for new and 50% of~~ ~~After equipment is brought to site~~  
~~depreciated value for old~~ ~~(provided the Engineer is~~  
~~equipment. Total amount~~ ~~satisfied That the equipment is~~  
~~will be subject to a~~ ~~required for performance of the~~  
~~maximum of 5% of the~~ ~~contract) and on submission of~~  
~~Contract Price~~ ~~unconditional Bank Guarantee for~~  
~~amount of advance~~

iii ~~Secured~~ **Deleted**  
~~Advance for~~  
~~Non-persish~~  
~~able material~~  
~~Brought to site~~

~~(The advance payment will be paid to the Contractor no later than 28 days after~~  
~~fulfillment of the above conditions).~~

31. **Repayment of advance payment for mobilization and equipment** {CL. 51.3}

~~The advance loan shall be repaid with percentage deduction from the interim~~  
~~payments certified by the Engineer under the Contract. Deduction shall commence~~  
~~in the next Interim Payment Certificate following that in which the~~



~~total of all such payments to the Contractor has reached not less than 20 percent of the Contract Price or 6 (six) months from the date of payment of first installment of advance, whichever period concludes earlier, and shall be made at the rate of 20 percent **(collectively for both Mobilization Advance and Equipment Advance)** of the amounts of all Interim Payment Certificate until such time as the loan has been repaid, always provided that the loan shall be completely repaid prior to the expiry of the original time for completion pursuant to Clause 17 and 28.~~

32. Deleted

33. The securities shall be for the following minimum amounts equivalent {CL. 52}

As a percentage of the Contract Price:

Performance Security for 5 percent of contract price plus Rs. .... (to be decided after evaluation of the bid) as additional security in terms of ITB Clause 29.5

The standard form of Performance security acceptable to the Employer shall be an unconditional Bank Guarantee of the type as presented in Section 8 of the Bidding Documents.

34. The Schedule of Operating and maintenance Manuals.....N/A. {CL. 58}

35. The date by which “as- built” drawings (in scale as directed) in 2 sets {CL. 58} are required within 28 days of the issue of certificate of completion of the whole or section of the work, as the case may be.

36. The amount to be withheld for failing to supply “as built” drawings {CL. 58} by the Date required is Rs 0.50 Lakhs.

37. The following events shall also be fundamentals breach of contract: {CL.59.2}  
“The Contractor has contravened Sub- clause 7.1 and Clause 9 of GCC”

38. The percentage to apply the value of the work not completed representing {CL 60}  
the Employer’s additional cost for completing the Works shall be 20 per cent.

Executive Engineer

**SECTION - 5**  
**TECHNICAL SPECIFICATION**  
**(Attached Separately In Annexure - 1)**

**SECTION - 6**  
**FORM OF BID**

## FORM OF BID

Description of the Works:

-----  
-----  
-----

BID

To :

Address :

1. We offer to execute the Works described above and remedy any defects therein in conformity with the conditions of Contract, specification, drawings, Bill of Quantities and Addenda for the sum (s) of

\_\_\_\_\_  
\_\_\_\_\_  
(----- )

2. We undertake, if our Bid is accepted, to commence the Works as soon as is reasonably possible after the receipt of the Engineer's notice to commence, and to complete the whole of the Works in the Contract within the time stated in the document.
3. We agree to abide by this Bid for the period of 120 Days from the date fixed for receiving the same, and it shall remain binding upon it and may be accepted at any time before the expiration of that period.
4. Unless and until a formal Agreement is prepared and executed this Bid, together with your written acceptance thereof, shall constitute a binding contract between us.
5. We understand that you are not bound to accept the lowest or any tender you may receive.

Dated this----- day of----- 20

Signature ----- in the capacity of-----

----- duly authorized to sign bids for and on behalf of-----

-----

\_\_\_\_\_  
(in block capitals or typed)

Address

---

---

Witness

---

---

Address

---

---

Occupation

---

---

Executive Engineer

**SECTION - 7**

**BILL OF QUANTITIES**

**(Attached Separately In Annexure - 2)**

## BILL OF QUANTITIES

### Preamble

1. The bill of Quantities shall be read in conjunction with the Instructions to Bidder, Conditions of Contract, Technical Specifications and Drawings.
2. The quantities given in the Bill of Quantities are estimated and provisional, and are given to provide a common basis for bidding. The basis of payment will be the actual quantities of work ordered and carried out, as measured by the Contractor and verified by the Engineer and valued at the rates and prices tendered in the priced Bill of Quantities, where applicable, and otherwise at such rates and prices as the Engineer may fix within the terms of the Contract.
3. The rates and prices tendered in the priced Bill of Quantities shall, except in so far as it is otherwise provided under the Contract, include all constructional plant, layout, supervision, materials, erection, maintenance, insurance, profit, taxes and duties, together with all general risks, liabilities and obligations set out or implied in the Contract.
4. The rates and prices shall be quoted entirely in Indian Currency.
5. A rate or prices shall be entered against each item in the Bill Quantities, whether quantities are stated or not. The cost of Items against which Contractor has failed to enter a rate or price shall be deemed to be covered by other rates and prices entered in the Bill of Quantities (in case of Item rate contract).
6. The whole cost of complying with the provisions of the Contract shall be included in the items provided in the priced Bill of Quantities, and where no Items are provided the cost shall be deemed to be distributed among the rates and prices entered for the related items of Work.
7. General direction and descriptions of work and materials are not necessarily repeated or summarized in the Bill of Quantities. References to the relevant sections of the contract documentation shall be made before entering rates or prices against each item in the Bill of Quantities.
8. The method of completed work of payment shall be in accordance with the specification for Road and Bridge works. For building works specifications for building are to be followed.
9. Errors will be corrected by the Employer for any arithmetic errors pursuant to **Clause 29** of the Instructions to Bidder.
10. Rock is defined as all materials which, in the opinion of the Engineer, required blasting, or the use of metal wedges and sledgehammers, or the use of compressed air drilling for its removal, and which cannot be extracted by ripping with a tractor of at least 150 kw with a single rear mounted heavy duty ripper.

## BILL OF QUANTITIES

### (A) Percentage Rate Tender (Up to INR 50 Cr.)

Item No	Description of Item (with brief specification and reference to book of specifications)	Quantity	Unit	Rate In figures	Amount
	<b>Attached Separately In Annexure - 2</b>				

I/We am/are willing to carry out the work at.....% above/below percent(Should be written in figures and words) of the estimated rate mentioned above. Amount of my /our tender works out as under.

Estimated amount put to tender

Estimated amount put to tender

Deduct.....% below

Add.....% Above

Net

Net

In words

In words

### (B) — For Item Rate Tender (For above INR 50 Cr.):

Item No	Description of Item (with brief specification and reference to book of specifications)	Quantity	Unit	Rate		Amount
				In-figures	In-Words	

(A) Total Tendered Amount

(B) Rebate on above tendered amount (if any) % (in figure) .....

(in words).....

(C) Net Tendered Amount (A - B) (in figure) .....

(in words).....

#

- 1 The Contractor shall exhibit a board with brief details of work as directed by the Engineer-In-Charge for which no extra payment shall be made.
- 2 The labour cess will be deducted as per prevailing rules i.e. 1% of the work done.
- 3 GST and Income tax TDS will be deducted at a source while making payments of bills
- 4 In all R.C.C. Items in Rate Analysis Standard Cement Consumption has been taken as per Govt. G.R. NO.: MIS102010/17/K1 Dated:30/07/2018 as stated in S.O.R. therefore in R.C.C. items where there is a change as per actual mix design the cost of difference of cement consumption have been deducted from the rate of original item at the rate of input rate mentioned in all the tender.

Executive Engineer



**SECTION - 8**

**SECURITIES AND OTHER FORMS**

## **BID SECURITY (BANK GUARANTEE)**

WHEREAS, ----- (name of Bidder) (hereinafter called the "The Bidder") has submitted his bid Dated ----- (Date) for the construction of ----- (Name of Contractor hereinafter called "the Bid")

KNOW ALL PEOPLE by these presents that We -----  
(name of Bank) of----- (name of country) having our  
registered office at ----- ( hereinafter called  
"the bank") are bound unto ----- (name of Employer)  
(hereinafter called "The Employer") in the sum of ----- \*  
for which payment well and truly to be made to the said Employer the Bank itself, his  
successors and assigns by these presents.

SEALED with the Common Seal of the said Bank this ----- day of----- 20

THE CONDITIONS of these obligations are:

(1) If after Bid opening the Bidder withdraws his bid during the period of Bid validity  
specified in the Form of Bid;

**Or**

(2) If the Bidder has been notified of the acceptance of his bid by the Employer  
during the period of Bid Validity:

A Fails or refuses to execute the Form of Agreement in accordance with the  
Instructions to Bidders, if required; or

B. Fails or refuse to furnish the Performance Security, in accordance with the  
Instructions to Bidders; or

C. does not accept the correction of the Bid Price pursuant to Clause 27  
(Correction of Errors)

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

This Guarantee will remain in force up to and including the date ----- \*\*  
days after the deadline for submission of Bids as such the deadline is stated in the  
Instructions to Bidders or as it may be extended by the Employer, notice of which  
extension (s) to the Bank is hereby waived. Any demand in respect of this  
guarantee should reach the Bank not later than the above date

DATE ----- SIGNATURE-----

WITNESS ----- SEAL -----

---

(Signature, name and address)

\* The Bidder should insert the amount of the guarantee in words and figures  
denominated in Indian Rupees. This figure should be the same as shown in  
Clause 16.1(Bid Security) of the Instructions to Bidders.

**\*\*45 days** after the **end of the validity period** of the Bid. Date should be inserted  
by the Employer before the Bidding documents are issued.

## PERFORMANCE SECURITY

TO,

----- (Name of Employer)

----- (Address of Employer)

-----

WHEREAS ----- (name and address of contractor) (hereafter called "the Contractor") has undertaken, in pursuance of Contracts No. ----- dates ----- 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 obligation in accordance with the Contract.

AND WHEREAS we have agreed to give the Contractors 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 types and proportions of currencies in which the Contract prices 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 aforesaid 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 is with the demand.

We further agree that no change or addition to or other modification of the terms of the Contract to of the Works to be performed thereunder or of any of the Contract documents which may be made between your and the Contractor shall in any way release us from any liability under this guarantee, and we hereby waive notice of any such charge, addition or modifications.

This guarantee shall be valid until 60 days from the date of expiring of the Defect Liabilities period.

Signature and Seal of the guarantor -----

Name of Bank -----

Address -----

Date -----

---

\*An amount shall be inserted by the Guarantor, representing the percentage the Contract price specified in the Contract denominated in Indian Rupees.

## ADDITIONAL PERFORMANCE SECURITY

[Clause 34.1. (A)]

TO,

----- (Name of Employer)

----- (Address of Employer)

-----

WHEREAS ----- (Name and address of contractor) (hereafter called "The Contractor") has undertaken, in pursuance of Contracts No. ----- dates ----- 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 obligation in accordance with the Contract.

AND WHEREAS we have agreed to give the Contractors 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 types and proportions of currencies in which the Contract prices 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 aforesaid 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 is with the demand

We further agree that no change or addition to or other modification of the terms of the Contract to of the Works to be performed thereunder or of any of the Contract documents which may be made between your and the Contractor shall in any way release us from any liability under this guarantee, and we hereby waive notice of any such charge, addition or modifications.

This guarantee shall be valid until **28 days** from the project completion date.

Signature and Seal of the guarantor -----

Name of Bank -----

Address -----

Date -----

## BANK GUARANTEE FOR ADVANCE PAYMENT

TO,

\_\_\_\_\_ (Name of Employer)

\_\_\_\_\_ (Address of Employer)

\_\_\_\_\_ (Name of Contractor)

Gentlemen:

In accordance with the provisions of the Conditions of Contract, sub-clause 51.1 ("Advance Payment") of the above mentioned Contract, \_\_\_\_\_ (name and address of Contractor) (hereinafter called "the Contractor") shall deposit with \_\_\_\_\_ (name of Employer) a bank guarantee his proper and faithful performance under the said Clause of the Contract in an amount of \_\_\_\_\_ (amount of Guarantee)\* \_\_\_\_\_ in words).

We, the \_\_\_\_\_ (bank of financial institution), as instructed by the Contractor, agree unconditionally and irrevocably to guarantee as primary obligator and not as Surety merely, the payment to \_\_\_\_\_ (name of Employer) on his first demand without whatsoever right of obligation on our part and without his first claim to the Contractor, in the amount not exceeding \_\_\_\_\_ (amount of guarantee)\* \_\_\_\_\_ (in words)

We further agree that no change or addition to or other modifications of the terms of the Contractor or Works to be performed thereunder or of any of the Contract documents which may be made between \_\_\_\_\_ (name of Employer) 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 modifications.

This guarantee shall remain valid and in full effect from the date of the advance payment under the Contract until \_\_\_\_\_ (name of employer) receives full repayment of the same amount from the contractor.

YOUR'S TRULY

Signature and Seal \_\_\_\_\_

Name of Bank/ Financial Institution \_\_\_\_\_

Address \_\_\_\_\_ Date \_\_\_\_\_

\* An amount shall be inserted by that Bank or Financial Institution representing the amount of the Advance Payment, and denominated in Indian Rupees.

**Letter of Acceptance**  
(Letter head 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\* is hereby accepted by our agency.

You are requested to furnish performance security, in the form detailed in para 34.1 of ITB for an amount equivalent to Rs. \_\_\_\_\_ within **10 days** of the receipt of this letter of acceptance up to beyond **60 days** from the date of expiry of defects Liability period i.e. up to \_\_\_\_\_ and the Additional Performance Security for an amount equivalent to Rs. \_\_\_\_\_ shall be valid beyond 28 (twenty-eight) days of Project Completion Date i.e. up to \_\_\_\_\_ and sign the contract, failing which action as stated in Para 34.3 of ITB will be taken.

Yours Faithfully

Authorized Signature  
Name and title of Signatory  
Name of Employer

---

\* Delete "Corrected and" or and modified if only one of these actions applies. Delete as corrected and modified in accordance with the Instructions to Bidders, if corrections or modifications have not been affected.

**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 requisite security in ITB Clause 34.1 and  
signing of the Contract for the construction of\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_at a bid Price of Rs.

\_\_\_\_\_.

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)



## AGREEMENT FORM

This agreement, made on the \_\_\_\_\_ day of \_\_\_\_\_ between \_\_\_\_\_ (name and address of Employer) (Hereinafter called "the Employer") 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 cost of Rs.

\_\_\_\_\_

### NOW THIS AGREEMENT WITNESSETH 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 construed as part of this Agreement.
2. In Consideration of the payment to be made by the Employer to the contractor as hereinafter mentioned, the Contractor hereby covenants with the Employer to executive and complete the works and remedy any defects therein in conformity in all aspects with the provisions of the contracts.
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 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 ready and construed as part of this Agreement viz
  - i ) letter of Acceptance
  - ii ) Notice to proceed with the works:
  - iii ) Contractor's Bid

- iv )      Conditions of contract: General and Special
- v )       Contract Data
- vi)       Additional conditions
- vii )     Drawings
- viii )    Bill of Quantities and
- ix )      Any other documents listed in the Contract  
data as forming part of the Contract.

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

The Common seal of \_\_\_\_\_  
Was hereunto affixed in the presence of :

Signed, sealed and Delivered by the said \_\_\_\_\_

\_\_\_\_\_

In the presence of

Binding signature of Employer \_\_\_\_\_

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

**UNDERTAKING**  
**(For Investment)**

I, the undersigned do hereby undertake that our firm M/s  
..... would invest a minimum cash up  
to **25%** of the value of the work during implementation of the contract.

\_\_\_\_\_  
(Signed by an Authorized officer of the firm)

\_\_\_\_\_  
Title of officer

\_\_\_\_\_  
Name of firm

\_\_\_\_\_  
DATE

## **UNDERTAKING**

**(For Validity)**

I, the undersigned do hereby undertake that our firm M/s .....  
..... agree to abide by this bid for a period 165 days for date fixed  
for receiving the same and it shall be binding on us and may be accepted at any time before  
the expiration of that period.

\_\_\_\_\_  
(Signed by an Authorized officer of the firm)

\_\_\_\_\_  
Title of officer

\_\_\_\_\_  
Name of firm

\_\_\_\_\_  
DATE

Executive Engineer

**SECTION - 9**

**DRAWINGS**

**(Attached Separately In Annexure - 3)**

**SECTION - 10**  
**DOCUMENTS TO BE FURNISHED BY BIDDER**

**Documents Submit By Bidder along with tender documents**  
**(Also Upload along online during Bid Submission)**

Sr. No.	Name of Documents.	Reference Clause.	Reference Format Page No.
1	Bid Document Fee/Tender Fee	As per NIT	-
2	Bid Security / EMD or Valid EMD Exemption Certificate or in terms of Bank guarantee (valid 165 days from the date of bid submission) of Appropriate Class of Registration of Approved Contractors	As per Table of IFB Refer clause no. 16 for provision of Bank guarantee	-
3	Registration Certificate of Appropriate Class	As per NIT	-
4	GST Number and Pan card	As per NIT	-
5	A solvency certificate of an 25% of the Tender Amount of Scheduled Bank or Nationalized Bank or Bank Approved for Government business	As per NIT	-
6	Copy of Partnership Deed or Memorandum as well as Articles of Association	As per NIT	-
7	Power of Attorney (if Applicable)	As per NIT	-
8	Last Five Financial Year IT Return.	As per NIT	-
9	Undertaking for Engaging Technical Staff & Machineries	As per NIT	96
10	Information regarding any litigation in which the applicant is involved	As per NIT	97
11	Last 5-Years Turn Over (year wise) for Civil Engineering Works certified by CA (for Bid Capacity Evaluation)	As per ITB Clause no 4.7 Bid Capacity	98
	<b>OR</b> Details of civil engineering works completed in last 5 financial year		99
12	Details of “works on hand” and “works tendered by bidder, found lowest (11) & works likely to be awarded (for Bid Capacity Evaluation)	As per ITB Clause no 4.7 Bid Capacity	100
13	Undertaking on statement of compliance of clause 3.2	-	101
14	Affidavit	-	102
15	Form of Bid	-	76
16	Undertaking for bid Validity	-	92

## **UNDERTAKING FOR ENGAGING TECHNICAL STAFF & MACHINERIES**

I/We.....

Age.....

Business (Name of Firm)  
..... Address

Hereby declare, that if our offer for the work of

.....

.....

would accepted by the competent authority & Awarded to us, I/We will engage & employ the technical staff and machineries on site of work, required to complete the work successfully within time limit.

Signature of Bidder

Place:- .....

Date:- .....



### **INFORMATION ON LITIGATION HISTORY**

<b>Other Party (ies)</b>	<b>Employer</b>	<b>Cause of Dispute</b>	<b>Amount Involved</b>	<b>Remarks showing Present Status</b>

DATE:

SIGNATURE OF BIDDER

**Notes:**

1. Describe Company's history of litigation or arbitration from contract executed in the last ten years or currently under execution. Please indicate for each case the year, name of employer, cause of litigation, matter in dispute, disputed amount, and whether the award was for or against the company.
2. Please add any further information that you may consider to be relevant to the evaluation of your application. If you wish to attach other documents, please list below:

### **DETAILS OF LAST FIVE YEAR'S CIVIL ENGINEERING WORKS TURNOVER**

1	Name of Firm		
2	Name of Partner/ Director		
3	Turnover for the Last Five Years, the Contract Receipts of Civil Engineering works.		
Sr. No.	Year	Multiplying Factor	Annual Turnover (Rs in Lakhs)
(1)	2020-2021	1.61	
(2)	2021-2022	1.46	
(3)	2022-2023	1.33	
(4)	2023-2024	1.21	
(5)	2024-2025	1.10	
(6)	2025-2026 (Base year)	1.00	

Signature

(Stamp of Chartered Accountant)

Unique Document Identification  
Number: -

**DETAILS OF CIVIL ENGINEERING WORKS COMPLETED IN LAST 5 FINANCIAL YEAR**

<b>Project Name</b>	<b>Name of the Employer</b>	<b>Description of work</b>	<b>Contract No.</b>	<b>Value of contract (Rs. Crore)</b>	<b>Date of issue of work order</b>	<b>Stipulated period of completion</b>	<b>Actual date of completion*</b>	<b>Remark explaining reasons for delay &amp; work Completed</b>
<b>[1]</b>	<b>[2]</b>	<b>[3]</b>	<b>[4]</b>	<b>[5]</b>	<b>[6]</b>	<b>[7]</b>	<b>[8]</b>	<b>[9]</b>
1								
2								
3								

DATE:

SIGNATURE OF BIDDER

**Notes:**

1. Bidder shall also attach completion certificate (preferably in form-3A) for all the works listed in above table.

**DETAILS OF “WORKS ON HAND” AND “WORKS TENDERED BY BIDDER, FOUND LOWEST (L1) & WORKS LIKELY TO BE AWARDED”**

Sr. No.	Name of Work	Place	PART- I Work on Hand					PART-II Works tendered by bidder, found lowest (L1) & Works likely to be awarded				Remarks
			Tendered amount Rs, in Lakh	Date of issue of Work order	Stipulated period of completion (date)	Cost of work remaining to be executed as on the preceding month to the bid invitation month. Rs, in Lakh	Cost of work remaining to be executed During the time limit of an invited bid Rs. In Lakh	Tender Cost Rs. In Lakh	Time limit of work In Months	Date when decision is expected for award of work	Cost of work to be executed during the time limit of the invited bid. Rs, in Lakh	
[1]	[2a]	[2b]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[11]	[12]	[13]
1												
2												
3												

DATE:

SIGNATURE OF BIDDER

**Notes:**

1. For Part-I, the bidder shall furnish necessary certificates/documents from the concerned department.
2. In Part-II, the bidder shall furnish information for the other tenders wherein bidder's offer is found L1.

### **UNDERTAKING ON STATEMENT OF COMPLIANCE OF CLAUSE 3.2**

I/We.....Age.....

Business (Name of Firm) .....

Address .....

Hereby declare, that for the work of .....

.....

I/We (Bidder) is neither associated, nor has been associated, directly or indirectly, with the consultant or any other entity that has prepared the design, specifications, and other documents for the Project or being proposed as Project Manager for the Contract. A firm that has been engaged by the Employer to provide consulting services for the preparation or supervision of the works, and any of its affiliates, shall not be eligible to bid.

Signature of Bidder

Place:-.....

Date:-.....

## AFFIDAVIT

(Notarized affidavit on 300 Rs Stamp Paper)

**Name of Work:** Repair and maintenance Works for Bavka Minor irrigation scheme,  
Taluka-Dahod, Dist.: Dahod

1. I, the undersigned, do hereby certify that all the statements made in the required attachments are true and correct.
2. The undersigned also hereby certifies that neither our firm M/s. \_\_\_\_\_  
\_\_\_\_\_ have not abandoned any work of Government of Gujarat/Government of India/any Board or Corporation under Government of Gujarat/Government of India nor any contract awarded to us for such works have been rescinded, during last five years prior to the date of this bid.
3. The undersigned hereby authorize(s) and request (s) any bank, person, firm or corporation to furnish pertinent information deemed necessary and requested by the Department to verify this statement or regarding any (our) competence and general reputation.
4. The Undersigned understands and agrees that further qualifying information may be requested, and agrees to furnish any such information at the request of the Department/ Project implementing agency.

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

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

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

\_\_\_\_\_  
Date

**Letter of transmittal signed by authorized signatory**  
**(MODEL AUTHORISATION LETTER TO BE PROVIDED BY THE AUTHORISED**  
**SIGNATORY OF THE COMPANY/FIRM/OTHER ASSOCIATION OF PERSONS, ETC. ON ITS**  
**LETTER HEAD)**

**TO BE PROVIDE AFTER ISSUE OF WORK ORDER**

I/We..... do hereby authorize  
Mr./Ms..... whose signature is set out below,  
to represent me/us in connection with obtaining for the work of  
..... He/she is duly authorized to sign all necessary  
correspondence in this regard on our behalf His/her explanations / statements will be  
binding on me/us without exception.

SPECIMEN SIGNATURE OF AUTHORISED  
SIGNATORY

(Signature of Authorizing Authority)

Name & Designation (with seal)

Place:

Date:

Executive Engineer

**ANNEXURE - 1**

**TECHNICAL SPECIFICATIONS**



## **TECHNICAL SPECIFICATIONS**

### **INDEX**

<b>Sr. No.</b>	<b>Particulars</b>
1	<b>Chapter-I:</b> Work and Site Condition
2	<b>Chapter-II:</b> Special Condition
3	<b>Chapter-III:</b> Standard General Technical Specifications
4	<b>Chapter-IV:</b> Specification of Principal Materials
5	<b>Chapter-V:</b> General Specification of Concrete
6	<b>Chapter-VI:</b> General Specification of Reinforcement
7	<b>Chapter-VII:</b> Clearing the site & Excavation for Foundation including blasting
8	<b>Chapter-VII:</b> General Specification of Back Filling
9	<b>Chapter-IX:</b> General Specification of Earthwork & Envelopes
10	<b>Chapter-X:</b> Care & Diversion of River Including Dewatering
11	<b>Chapter-XI:</b> General Specifications of Structural Steel
12	<b>Chapter-XII:</b> Item Wise Detailed Technical Specification

## **CHAPTER-I**

### **WORK & SITE CONDITION**

## **WORK AND SITE CONDITION**

### **INDEX**

<b>Sr. No.</b>	<b>Particulars</b>
1	Introduction
2	Location
3	Communication
4	Brief Description of work
5	Labour
6	Housing
7	Water Supply
8	Drainage
9	Camp Regulations
10	Medical Aid
11	Power Supply
12	Roads
13	Post, Telegraphs & Telephone
14	Bank Facility
15	Supply of Petrol & Diesel
16	Materials

## **WORK AND SITE CONDITION**

### **1.00 INTRODUCTION: -**

#### **I. GENERAL FEATURES OF THE PROJECT**

**Repair and maintenance Works for Bavka Minor irrigation scheme, Taluka-Dahod, Dist.: Dahod.**

### **2.00 LOCATION:-**

The proposed site of M.I. Scheme is situated as below: -

The proposed project site is situated near village Bavka. The nearest railway station is Dahod.

### **3.00 COMMUNICATION: -**

The nearest city & town is **Dahod** is a taluka place of Dahod district. Nearest villages are connected through VRB & SH with district and taluka place.

### **4.00 General**

#### **4.1 Proposed work consists of following: -**

**Repair and maintenance Works for Bavka Minor irrigation scheme, Taluka- Dahod, Dist.: Dahod.**

- I. This work includes Steel, Excavation, Earth Work, Stone Pitching and cement concrete work in as per grade, Steel for various component of etc.

#### **II. PRINCIPAL DETAILS OF WORK:**

Works to be performed for the various items included in Bill of Quantities.

The above information is only a general outline and does not in any way limit, the performance of all work and supply of plant, machinery, all labour and materials necessary for completing the works as shown in the approved working drawing and mentioned in the specification.

No extra payment or claim on account of any additions or alteration in working drawing shall be admissible.

### **5.00 LABOUR:**

Availability is good except showing and harvesting period. However, there may be shortage of skilled labour like masons, carpenters' operators, mechanics etc. However, the contractors shall have to make his own inquiry in this regard and quote his rates.

### **6.00 HOUSING:**

Area being highly rural, there is no local housing arrangement available and contractor will have to make his own arrangements for his staff and labour etc. in the area as may be available on rental basis.

**7.00 WATER SUPPLY:**

The contractor shall have to make his own arrangements of water supply for this work. Fresh use of available water for work will be allowed free of cost to the contractor from the river length flowing in the construction areas and area transferred to Narmada Water Resources, W.S. & K. Department. Contractor shall have to make his own arrangement for Pumping, purification; storage tanks, pipe line etc. for the said purpose at his own cost.

**8.00 DRAINAGE:**

Suitable and adequate arrangement shall have to be made by the contractor for drainage of water around his colony and work spots. The contractor shall also have to install and maintain at his own cost suitable drainage system to dispose off sewage & solid waste from his colony. The labour colony layout shall be got approved from the Engineer-in-charge.

**9.0 CAMP REGULATIONS:**

The contractor shall be responsible for maintaining law and order in his camp and on his work, and shall employ such officers, watchman or other persons as required, unauthorized or undesirable persons shall be excluded from the camp and the work. If in the opinion (which shall not be questioned) of the Engineer-in-charge any employee or agent of the contractor misbehaves and/or causes obstructions in the proper execution or otherwise makes himself undesirable, the contractor shall on receipt of the instruction to do so remove him from the premises.

**10.00 MEDICAL AID:**

There is no dispensary on Project Site. However, there is a Government Hospital at Taluka Head Quarter. The Services of this Hospital will be available to contractor's staff and labour on payment of requisite charges as may be required to be paid by the agency at his risk & cost.

**11.00 POWER SUPPLY:**

Power supply shall be arranged by the contractor at their own cost. No power supply is guaranteed by the department.

**12.00 ROADS:**

The contractor shall construct and maintain the inspection roads and quarries roads for all purposes required during construction at his own cost. There will however be no charge for any reasonable use of any road constructed by Government at site of work. At present site is only approachable during fair weather.

**13.00 POST, TELEGRAPHS & TELEPHONE:**

Post office is available at taluka head quarter. Contractor shall make their own arrangements for telephone if required.

**14.00 BANK FACILITY:**

Branches of Nationalized Bank and other Schedule Banks are available at Taluka head quarter.

**15.00 SUPPLY OF PETROL & DIESEL:**

There is no petrol pump near Dam site. However, Petrol & Diesel will be available from Taluka Head Quarter.

**16.00 MATERIALS: - (Quarry details are shown for guidance purpose only)**

**(a) WATER:**

Water is scarily available in Dam vicinity area in summer season. Hence, contractor shall have to make his own arrangement and inquiry regarding this at his own cost.

**(b) SAND:**

Good quality natural sand will be used. However, sand of required quantity may not be available in reasonable lead. The contractor should arrange to obtain the sand of approved quality from any lead. No extra claim shall be admissible for extra lead.

**(c) COARSE AGGREGATE (CRUSHED METAL):**

The black stone crushed metal for concrete work should be procured by contractor from surrounded quarries. However coarse aggregate of required size & quantity may not be available in reasonable lead, the contractor should arrange to obtain the coarse aggregate of required size & of approved quality from any lead. No extra claim shall be admissible for extra lead.

**(d) STONE:**

The good quality black stone hard stone to be used in pitching / Masonry work. The contractor shall have to make his own inquiries regarding availability of above materials and other materials for work and accordingly he should quote the rates. If the materials of required standard are not available from the specified quarries, no extra lead will be payable by the department. Contractor should make his own arrangement to bring all quality materials from any lead without any extra cost to the Department.

Signature of Contractor

Executive Engineer

**CHAPTER-II**  
**SPECIAL CONDITION**

## **SPECIAL CONDITIONS**

### **INDEX**

<b>Sr. No.</b>	<b>Particulars</b>
1	Accuracy of Line, Level & Grades
2	Testing of Materials and works
3	<del>Material mentioned in Schedule-A</del>
4	Recovery of hard rock available from excavation
5	Loans of Government's Tools, Plant & Machinery
6	Assistance in Procurement of Properties, Permits, Import License, Exchange Facilities etc.
7	Security Measures
8	Applicability of Specifications
9	Change in Design & Drawings
10	Dewatering & Diversion as and where Required
11	Application of Publication
12	Inspection of work by third party
13	Working Drawing & Final Drawing



## **SPECIAL CONDITIONS**

### **1.0) ACCURACY OF LINES, LEVELS AND GRADES:**

The various works shall be done true to the line, levels, and grade. The periodical checking of these works by the government staff shall not absolve the contractor of his responsibility regarding the accuracy of lines, levels, and grades. In case of any deviation or discrepancy in line, level or grade at the meeting faces, the contractor shall have to make good the discrepancy at his own cost and without any extra compensation for the additional work involved. Whenever such discrepancy is found to arise at the junction of works of different contractors, the responsibility to set right such discrepancy lies with contractors concerned. The engineer in charge shall further have been unquestioned right if need to be rectify the discrepancies and recover the cost from the contractor or contractors according to proportion as he may consider reasonable.

### **2.0) TESTING OF MATERIALS AND WORKS:**

2.1 All materials before being incorporated in the work shall be inspected visual & by common field tests according to Table-2 of GERI guidelines for Quality Control & Quality Assistance Vol.1,2002 and if necessary tested before being approved by the Engineer Any work on which such materials are used without prior inspection (and when necessary prior testing) and without approval or written permission of the Engineer- in -charge is liable to be considered as unauthorized, defective and not acceptable. Any additional test required to be carried out at any stage of the work as per instruction of Engineer - in -charge etc./ C.E (Q.C) / E.E (Q.C.) / D.E.E.(Q.C.) shall be carried out at department's cost, however sample test results are failed then retesting charges shall be borne by the contractor, but if sample test results are found ok, the Cost of testing charges of material shall be borne by the department.

2.2 In all other cases, the cost of the testing shall be borne by the government as per government's NWRWS&K Dept's Gujrati circular No-PRCH/1097/ 1397/ (11)/PA. FA/K-1(MICELL)Dt.12/01/2013. The contractor shall, however, supply all material required for tests and also make good at his cost with materials, mixes, core holes and similar for other materials as may be directed by and to the satisfaction of the engineer in charge.

An authorized representative of the contractor shall have to remain present at the time when the sample or cores etc. are taken & shall be authenticated the facts, if so required. When the contractor's agent fails to remain present at aforesaid time, the sample or cores etc., taken by the engineer in charge or his representative shall be considered to be authentic. The contractor will, however, be informed about the details of such sample and cores etc. that have been taken.

2.3 The materials, mixes and cores etc. shall be tested at field laboratory / GERI / other government approved laboratory and the results given by them shall be considered correct and authentic. The contractor shall be given access to all operational tests that may be carried out as aforesaid, so that, he may satisfy himself regarding the procedure and methods adopted. It shall than be contractor's responsibility to carry out the finished item of work to the standard based on the laboratory design and test.

2.4 The method of sampling and testing and procedures and standard shall be as laid by respective IS code of practice and GERI manual / as mentioned in the tender.

2.5 (a) DESIGN MIX (DMC) OF CONCRETE:

Concrete mix design of stipulated or designated grades of concrete shall be carried out only at nearest GERI laboratory. All materials required shall be supplied, loaded, carted and unloaded at GERI Laboratory by contractor at his own cost. For M-10 mix design from Govt. approved laboratory shall be acceptable.

(b). NOMINAL MIX DESIGN (NMC) OF CONCRETE:

No mix design is necessary for nominal mix concrete. Nominal mix shall be carried out as per table mention in the regional S.O. R- 2023-24. Page no-68.

GRADE OF CONCRETE	MSA IN mm	TOTAL QUANTITY OF DRY AGGREGATE (COARSE+FINE) BY MASS PER 50Kg OF CEMENT	WEIGHT OF COARSE AGGREGATE	WEIGHT OF FINE AGGREGATE	Cement	WATER-CEMENT RATIO
1	2	3	4	5	6	7
M-10	20	480Kg	320Kg	160Kg	50Kg	NOT MORE THAN 0.68
	40	480Kg	343Kg	137Kg	50Kg	
	80	480Kg	343Kg	137Kg	50Kg	
M-15	20	330Kg	220Kg	110Kg	50Kg	NOT MORE THAN 0.64
	40	330Kg	235Kg	95Kg	50Kg	
	80	330Kg	235Kg	95Kg	50Kg	
M-20	20	250Kg	166Kg	84Kg	50Kg	NOT MORE THAN 0.60
	40	250Kg	178Kg	72Kg	50Kg	
	80	250Kg	178Kg	72Kg	50Kg	

Preliminary test cubes of size 15x15x15cms shall be casted and tested for 7 days and 28 days, well before starting of actual work at departments own field laboratory / Govt. Approved laboratory at the cost of department.

2.6 The materials, mixes, cores etc. shall be tested day to day or periodically at the department's field laboratory set up at the site of work or nearby regional or district level GERI laboratory or Engineering/Polytechnic colleges in Gujarat or government approved (R&B, IRRIGATION Deptts. etc.) private laboratories where facility of testing is available as per BIS rules & regulation or Government approved private institutes and the results given there by shall be considered correct and authentic. Out of total number of such tests, 80% tests will be carried out in site laboratory,

10% in Government approved laboratories and 10% in GERI laboratories. However minimum one test of all type of tests shall have to be carried out in GERI laboratories only. The choice of testing laboratory where test to be carried out shall on sole discretion of Engineer in charge. If there are any dispute regarding test results, GERI / NSIC / Govt. Engineering College, test results shall be final and binding to all. If test results of sample does not comply relevant BIS code further investigation shall be carried out as per BIS: 456-2000 or relevant BIS code of practice prior to rejection of work. The contractor shall be given access to all operations of tests that may be carried out as aforesaid so that he may satisfy himself regarding the procedure and methods adopted. It shall then be contractor's responsibility to carry out the finished items the standards based on the laboratory design and tests.

Site laboratories tests will be carried out by qualified Engineer of the contractor whom I Card is given by the Executive Engineer and in the presence of Section Office / Dy. Executive Engineer in charge of the work.

80% of site tests will not be carried out at one time but will be related to the progress of work and consumption of materials. Prescribed Registers for recording details and results of tests will be maintained on site of work. The tests which are not done in GERI laboratories e.g. electrometric bearing etc. will be carried out in the laboratory consented by the Executive Engineer.

One percentage of estimated cost of work put to tender for this work will be deducted from the Running Bills of contractors for testing of materials and workmanship. (G.R. B&C No. TNC-1085-(4)-C, dated 10-5-85)

2.7 The day to day and periodical tests to be carried out on materials, mixes, cores and placed concrete, mortar etc. shall be specified by the Engineer-in-charge from time to time and the contractor shall allow all facilities and co-operation toward collection of samples, transportation up to any laboratories, all labour for collecting samples, casting, testing of cubes shall be supplied by contractor without any extra payment.

- 2.8 Contractor shall have to establish the field laboratory at site as per the instruction of engineer in charge. The necessary equipment shall be kept duly calibrated in the field laboratory for the required Field test for concrete, FA, CA and Field soil testing for earth work. Contractor shall have to construct pucca underground curing water tank of minimum size 2.0 x 2.0 x 0.60 mt (or size as directed as per size of the project) at nearby site of work for curing of cubes as per Engineer's instructions. No extra payment shall be made for this to the contractor.
- 2.9 It shall be the responsibility of the contractor to provide clean water to fill the curing tank & maintain full water level in curing tank periodically and also maintenance of leak proof curing tank throughout the work without any extra payment for this.
- 2.10 Contractor shall have to provide sufficient 15 cm cube mould and skilled labours for laboratory and field tests of works and materials for activity such as:
- (i) Cleaning, fitting and unfitting of molds, oiling etc.
  - (ii) Carting of molds and placement in to curing tank.
  - (iii) Transporting the cubes from site of work to field laboratory for testing.
  - (iv) Helping in cube testing on compressive machine etc. All facilities for carrying out field test on various materials, mixes and cores shall be provided by contractor. No extra payment for the above work shall be made to the contractor.
- 2.11 The method of sampling and testing procedures and standard shall be as laid down by the Engineer-in-charge for respective items.

### **~~3.0 MATERIALS MENTIONED IN SCHEDULE "A":~~**

- ~~3.1 It shall be noted that, owing to difficulty in obtaining certain materials in the open market, the government has undertaken to supply materials specified in the SCHEDULE 'A' of the tender form at the rate stated therein, the contractor shall not have right to claim compensation for delay, if any. The contractor is there for required to keep in touch with the day-to-day position of supply of materials and to adjust the progress of the work, so that their labour may not remain idle. No monetary claim what so ever shall be entertained by the government on account of delay in the supply of materials. **Useable hard rock available from dismantling existing pitching at site of work will be issued at rates mentioned in schedule-A.**~~

### **4.0 RECOVERY OF HARD ROCK AVAILABLE FROM EXCAVATION:**

- (1) As per Govt. of Gujarat N.W.R.W.S. and Kalpasar Dept. Order No. MI Cell /102010 /17 / (2) K-1, Dt.21/01/2014, for the hard rock, which is excavated from the work will be allotted to the agency. The **amount will be recovered at the rate Rs. 211.00 per Cum excluding GST.** In addition, necessary royalty for these materials has to be paid by the agency as per prevailing rules and regulation to the Industries & Mines Dept. according to classification of materials. The quantity will be calculated as

per instruction of Engineer-In-Charge. This fact should be kept in mind while quoting the tender rates of these items.

**Recovery of hard rock shall not be made for excavation in hard rock by boring rigs or any other such special equipment utilized for excavation of diaphragm walls.**

**(2) OTHER MATERIALS:**

Other materials required for the work shall be procured by the contractor. The specifications mentioned in the chapter of MATERIAL SECTION shall be applicable.

***The selected material for required quantity of earth work for respective item of work shall be brought from outside borrow area including all lead and lift, the contractor makes his own arrangement for obtaining materials from outside borrow area required without any extra cost, as borrow area is not available nearby the site of work due to forest land in vicinity. Also, contractor shall have to make his own arrangements for necessary land required for camp and plant & machinery installation without any extra cost.***

**~~5.0 LOAN OF GOVERNMENT FOR TOOLS & PLANTS AND MACHINARIES:~~**

~~The machinery and tools & plants as and where available with the department shall be supplied on hire as per rules and regulations and as per the provisions contained in Government PWD GR No. MCN / 167 / 97, Part iv / h, dated 01-10-1980 and as amended from time to time. It must be also noted that the machineries or equipments justified for the use in the work and available with the department will be given on hire. No claim for delay in procurements of such machineries or equipment shall be entertained. At present no machineries or tools and plants are available with the departments.~~

**6.0 ASSISTANCE IN PROCUREMENT OF PROPERTIES, PERMITS, IMPORT LICENCE, EXCHANGE FACILITIES ETC.**

Generally, it shall not be realized in the normal course by the department for providing assistance in purchase of Tools & Plants and Machineries required for the execution of work, contracted for. However, the engineer in charge, on request by the contractor shall assist in the procurement of necessary import license, exchange facilities etc. for importing necessary plants & machineries, which is not locally available and engineer in charge deemed it in the interest of work and its progress. The government shall not however, be responsible for non-availability of any of the above facilities or delay. The contractor's application for import license etc. will be scrutinized by the engineer in charge regarding the responsibility of the government etc. and recommendations will be made as deemed fit. The decision of engineer in charge in this regard shall be final and no claim either in cost or delay in time will be admissible.

## **7.0 SECURITY MEASURES:**

In view of the strategic importance of all the project and installations, security restriction may be imposed by the engineer in charge as per directions of the security authorities and the contractor shall abide by, to implement all such instructions scrupulously. In case a system of identity cards with photos is introduced, then the contractor shall have to provide the same to his personal at his cost. The identity cards shall be duly sign by engineer in charge. The contractor shall also keep informed regarding all visitors and obtain permits for their visitors. No authorized visitors will be allowed on site of work.

## **8.0 APPLICABILITY OF SPECIFICATIONS:**

Considering the common general item required in executive of irrigation project, general subject wise specifications has been drawn and provide separately with the tender. This provision suitably provides requirements of execution of each component of work in general, consistent with the present practice of the scope of work & more of execution and standards to be observed etc. for the work. To avoid descriptive matter, suitable reference for the relevant IS (BIS) code or otherwise is also specified. The whole idea is to guide the tenderer regarding the execution of work, so as to base his rates accordingly. The general subject wise specifications are further supplemented in separate chapter to cover the item wise specification of work as per the Bill of Quantities of the tender. These item wise specifications shall cover the applicable provision of the general specification, considering the item description as per Bill of Quantities. Over and above this, the specific requirement of each item such as applicable lead and lift, proportion of concrete & mortar mix, description about the execution of the item in detail and other applicable aspects will be covered in detail/item wise specification. Intending tenderers are there for requested to read the tender papers on above lines and quote their rates.

## **9.0 CHANGE IN DESIGN AND DRAWINGS:**

The drawings attached with tender documents are at present available data. However, during execution of work any change in design and drawing that may be warranted on account of strata met with or the materials that may be available or any reasons shall not vitiate the contract and no extra payment shall be made to the contractor. The variation in quantities under the relevant items on account of above changes shall be paid only as per the Clause 38 (Page No. 50) of Section 3 Conditions of Contract of SBD.

#### **10.0 DEWATERING AND DIVERSION AS AND WHERE NEEDED:**

If, there is no separately provision for dewatering, diversion of water and construction of temporary diversion road during construction in the fair weather as well as in the monsoon, the rates of respective item of works quoted by the contractor shall be consider inclusive of dewatering and diversion as and where needed with maintaining it during construction. In such condition no extra payment shall be made for dewatering & diversion of water, road diversion etc. Also, no payment shall be made for any part of earth work of materials washed away or damaged during monsoon or other period and it shall have to be made good by the contractor at his own cost. It is the responsibility of the contractor to make good, or repair any government property, materials to be utilized for the work or completed part of present work damaged during the construction period. If there is a separate item for care and diversion in the tender, then general technical specification for "care and diversion "shall be applicable.

#### **11.0 APPLICABLE PUBLICATIONS:**

All methods or procedure for execution of different items of work shall confirm to the INDIAN STANDARD (IS) now renamed as BUERO OF INDIAN STANDARD (BIS) Specifications. The latest addition shall be followed. Some of the important IS publications are listed below. The provisions of these IS specifications shall be applicable.

<b>IS OR BIS CODE NO</b>	<b>VERSION</b>	<b>SUBJECT OF CODE</b>
<b>EXCAVATION AND EARTH WORK</b>		
2720 Part-I	Latest	Method of test for soil-particle size and shape
2720 Part-III	Latest	Determination of water contents, dry density relation using light compaction.
2720 Part-IV	Latest	Grain size analysis
2720 Part-5	Latest	Determination of liquid and plastic limit
1498	Latest	Classification and identification of soil for general engineering purposes
2720-Part-III / sec-1&-2	Latest	Determination of Sp. Gravity
9429	Latest	Drainage system for earth and Rock fill dams
3764	Latest	Safety code for excavation work
<b>CONCRETE WORK</b>		
269	Latest	Specification for OPC cement
12269	Latest	Specification for 53 grade OPC cement
1489 Part-1 & 2	Latest	Specification for 53 grade PPC cement
432	Latest	Specification for MS & medium tensile steel bars

1786	Latest	Specification for HYSD bars
280	Latest	Specification for Binding wires
2336 Part I to VIII	Latest	Method of various tests for aggregate
383	Latest	Coarse and fine aggregate from natural sources for concrete
10262	Latest	Concrete mix designs
456	Latest	Plain & Reinforced concrete
457	Latest	Plain & Reinforced concrete for Dams & other massive structures
3873	Latest	Laying in situ cement concrete lining For canal
<b>9556</b>	<b>Latest</b>	<b>Construction of diaphragm walls.</b>
<b>14334</b>	<b>Latest</b>	<b>Cost. Of diaphragms for under-seepage control.</b>
<b>MASONRY WORK</b>		
2116	Latest	Sand for masonry mortar
1121	Latest	Testing for stone-Comp. Strength
1126	Latest	Testing for stone-Soundness
1124	Latest	Testing for stone-Water absorption
1526	Latest	Sand for plastering work.

**IS OR BIS CODE NO  
OTHERS:**

IS OR BIS CODE NO	VERSION	SUBJECT OF CODE
15068	Latest	PVC Water stop.
4985	Latest	PVC Pipes
2266	Latest	Wire Rope
11855	Latest	Rubber seal

IS OR BIS CODE NO	VERSION	SUBJECT OF CODE
458	Latest	Specification for pre-cast concrete pipes (With and without reinforcement)
3597	Latest	Methods of test for concrete pipes.
5382	Latest	Specification for rubber sealing rings for gas mains, water mains and sewers
516	Latest	Method of test for strength of concrete
783	Latest	Code of practice for laying of concrete pipes

**12.0 INSPECTION OF WORK BY PROJECT MANAGEMENT CONSULTANCY:**

All the conditions and scope of work of project management consultancy inspection shall apply and shall be binding to the contractor if there is a provision for the same.

**13.0 WORKING DRAWING & FINAL DRAWING :-**

Initially working drawing shall be prepared & made by contractor at his own cost under instruction of Engineer. Final drawing shall be prepared in Auto CAD



computerized drawing with C.D. for which amount of **Rs.3,00,000.00 (Rs. Three Lac only)** shall be withheld till finalized the work.

Signature of Contractor

Executive Engineer

### **CHAPTER-III**

## **STANDARD GENERAL TECHNICAL SPECIFICATIONS**

### **CHAPTER-III**

#### **: STANDARD GENERAL TECHNICAL SPECIFICATIONS:**

- 1.1 All the items occurring in the work and as found necessary during actual execution shall be carried out in workman like manner as per specifications below and as per written orders of the Engineer-in-charge.
- 1.2 A work order book as prescribed by the Engineer-in-charge shall be maintained on the site of work and the contractor shall carryout field compliance properly.
- 1.3 The contractor shall engage authorized representative who shall be responsible and competent for managing the work. He shall take orders from the Engineer-in-charge and shall be responsible for carrying out the same.
- 1.4 Quantities specified in the tender may vary at the time of actual execution and the contractor shall have not to claim for compensation on account such variation.
- 1.5 No trees shall be cut without permission of Engineer-in-charge.
- 1.6 Diversion for roads, if necessary, shall be provided and maintained during the currency of the contract without any extra cost to the Department.
- 1.7 The work shall be executed strictly in accordance with plans & specifications. Only the best materials and sound construction shall be executed in a through workman like manner.
- 1.8 The drawing prepared and trial pits taken are for general guidance and indication and changes either minor or maajor are likely to take place. No claim for extra payment shall be made by the contractor for such changes.
- 1.9 The quantities in the Bill of Quantities are only estimate quantities and during execution they may increase or decrease. Any claim put forward for this variation in quantity shall not be entertained.
- 1.10 The rejected materials shall be removed from the site within 24 hours. If they are not removed within this period, the same will be removed at the contractor's risk and cost by the Department.
- 1.11 The work is an important work, and this fact shall be constantly borne in mind by the contractors and his workers. Works not specified above shall be carried out according to P.W.D. Handbook or according to instructions of the Executive Engineer.
- 1.12 The work requires constant attention for line, levels, and workmanship and hence the contractor shall have to keep the experienced technical staff on the work. The contractor has to supply the necessary materials and labour for the line and levels work at his own cost.

- 1.13 The contractor unless otherwise specified and providing in the contract shall pay all duties, tolls, quarry fees, royalties and taxes on all materials and articles they may use. The rate quoted by the contractor shall be considered inclusive of all such duties, fees, royalties, taxes etc.
- 1.14 In the specification "as directed / approved" shall be taken to mean "as directed / approved "by the Engineer - in - Charge.
- 1.15 Wherever a reference to any India Standard appears in the specifications, it shall be taken to mean as reference to the latest edition of the same in force on date of agreement.
- 1.16 In "Mode of Measurement " in the specifications, wherever a dispute arises in the absence of specification of a particular point or aspect, the provision on these particular points or aspect in the relevant Indian Standard shall be referred to.
- 1.17 All measurement and computations, unless otherwise specified, shall be carried out nearest to the following limits: -
- |     |                                  |              |
|-----|----------------------------------|--------------|
| (1) | Length, Width and Depth (Height) | 0.01 Meter.  |
| (2) | Areas                            | 0.01 Sq. Mt. |
| (3) | Cubic Contents (Except Wood)     | 0.01 Cumt.   |
| (4) | Cubic Contents (Woodwork)        | 0.001 Cumt.  |
- In recording dimensions of work in measurement book the sequence of length, width and height (depth) or thickness shall be followed.
- 1.18 The distance with constitutes lead shall be determined along the shortest practical route and not necessarily the rout actually taken. The decision of the Engineer - in - Charge in this regard shall be taken as final.
- 1.19 Where no lead is specified, it shall mean "all leads ".
- 1.20 ~~Lift shall be measured as per current practice for relevant item under direction or decision by Engineer in charge.~~
- 1.21 Definite particulars covered in the items of work, though not mentioned or include in it, specifications shall be deemed to be included therein.
- 1.22 Reference to specifications of materials as made in the detailed specification of the items of work is in the form of a designation containing the number of the specification of the material and prefix "M" i.e. "M-1 "etc.
- 1.23 Approval to the samples of various materials given by the Engineer-in-charge shall not absolve the contractor from the responsibility of replacing defective material brought on site or materials used in the work found defective at a later date. The contractor shall have no claim to any payment or compensation whatsoever on account of any such materials being rejected by the Engineer - in - Charge.
- 1.24 The contract rate of the item of work shall be for the work completed in all respects.
- 1.25 No collections of materials shall be made before it is got approved from the Engineer - in - charge.

- 1.26 Collection of approved materials shall be done at site of work in a systematic manner. Materials shall be stored in such a manner as to prevent damage, deterioration or intrusion of foreign matter and to ensure the preservation of their quality and fitness for the work.
- 1.27 Materials if and when rejected by the Engineer-in-charge, shall be immediately removed from the site of work.
- 1.28 No materials shall be stored prior to, during and after execution of a structure in such a way as to cause or lead to damage or overloading of various components of the structure.
- 1.29 All works shall be carried out in a workman like manner as per the best technique for the particular item.
- 1.30 All tools, templates, machinery and equipment for correct execution of the work as well as for check line, levels, alignment of the works during execution shall be kept in sufficient number and in good working condition on the site of work.
- 1.31 The contractors shall be responsible for observing the rules and regulations imposed under the "Mine and Minerals Act "and such other laws and rules prescribed by Govt. from time to time.
- 1.32 All necessary safety measures and precaution (including these laid down in the various relevant Indian Standards) shall be taken to ensure the safety of men, materials and machinery on the works and also of the work itself.
- 1.33 Approval to any of the executed item for the work does not in any way relieved the contractor of his responsibility for the correctness, soundness, strength of the structure as per the drawings and the specifications.

Signature of Contractor

Executive Engineer

**CHAPTER-IV**  
**MATERIAL SECTION**  
**SPECIFICATION OF PRINCIPAL MATERIALS**

## **CHAPTER-IV**

### **SPECIFICATION OF PRINCIPAL MATERIALS**

The following specifications are only for the principal materials of construction which are included in the details specifications of items and indicated the requirements of qualities of materials. They are given as guide and neither includes all the materials of construction nor exhibits all their desirable qualities. This should be supplemented by detailed specifications as per relevant IS Code unless otherwise not mentioned. The rate of all items is inclusive of all materials inclusive of all lifts and leads for the material unless otherwise specified in detailed specifications.

#### **M-1 WATER:**

The water to be used shall be potable water, clean & free from objectionable quantities of silt, organic matters alkali, salts and other injurious materials and shall be as per I, S. 456:2000. Water sample shall be tested in Government or Government approved laboratories, once before starting of work and then starting of new working season.

Permissible limit for some of the important parameters are as under.

	<b>TEST</b>	<b>PERMISSIBLE LIMIT AS PER IS-456-2000</b>
1	Organic solids	200 mg. per liters (max.)
2	Inorganic solids	3000 mg. per liters (max.)
3	Sulplates (as So <sub>2</sub> )	400 mg. per liters (max)
4	Chlorides (as Cl)	2000 mg./lit. for PCC. And 500 mg.lit.for RCC
5	Suspended Matter	2000 mg. per liters (max.)
6	Ph Value	Not less than 6

#### **M-2 CEMENT:**

Cement shall be ORDINARY PORTLAND CEMENT (OPC) of grade 53 confirming to IS-12269:2015 OR PORTLAND POZZOLANA CEMENT (PPC) of grade 53 only confirming to IS-1489:1991 (Part-1) or (Part-2). The cement shall be used OPC 53 grade and Portland Pozzolana Cement (PPC) of grade 53 but any of the above and the type selected should be appropriate for the intended use.

The contractor shall have to make his own arrangement to procure the cement bearing I.S.I. mark directly from the major cement manufacturing plants having installed capacity of one LACES tones per annum or its authorized dealers only. The contractor shall arrange to cart, load and unload the same to the site of work at his own cost. The cement brought to site shall be tested in Government or government approved laboratory as per provision in IS-12269.

The cement bags shall be neatly stacked in a orderly manner so as to afford easy access and count in a damp proof condition. If the consumption of cement exceeds 25.00 MT., then the cement shall be stored in tin shed godown or in a pucca godown, one feet above the ground, so as cement can be prevented from atmospheric effect. Deteriorated cement shall not be allowed to use.

The testing of the cement shall be done for each lot / consignment received on site. The frequency of the test shall be as under.

Quantity of Consignment	No. of Test Specimen
50 M.T.	1
100 M.T.	2
200 M.T.	3
300 M.T.	4
500 M.T.	5
800 M.T.	6
1300 M.T.	7
For each larger consignment	8

All physical tests required as per IS - 4031 (Part 1 to 6) – 1988 shall be carried out as per frequency mentioned in the table above. While the chemical test shall be carried out as per IS-4032-7986 one for ten physical test samples.

Each consignment shall be stacked separately and shall be used on the basis of first cum first used. The cement shall be used after testing only. Cement older than 90 days shall not be allowed to use.

The cement lot failed in testing shall be removed immediately from the site. A day-to-day account of cement received & used on the work together with the particulars of the work and quantity of the work and quantity of the work in which it was used, shall be maintained separately by the representative of the department, and shall be signed at the end of the day's work, both by the department's representative and the contractor.

### **M-3 SAND (FINE AGGREGATE):**

All fine aggregate shall be natural river sand and shall confirm to IS-383 -1970. Sand shall be of natural river sand having F.M. from 2.1 to 3.2 for all concrete works. It shall be clean, well graded, hard, durable and strong and free from injurious amount of dust, clay, silt, kankar nodules, soft or flaky partices, shale, alkali, salts, organic matter, loam, mica or other deleterious materials.

Grading of the fine aggregate (sand) shall be as per Table – A given below. (IS-383- page No. 11 table-4)



**TABLE - A**

IS Sieve designation	PERCENTAGE PASSING FOR			
	Grading Zone -I	Grading Zone -II	Grading Zone -III	Grading Zone -IV
10 mm.	100	100	100	100
4.75 mm.	90-100	90-100	90-100	90-100
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
300 microns.	5-20	8-30	12-40	15-50
150 microns.	0-10	0-10	0-10	0-15

Sand of grading zone - iv shall not be used for concrete work.

Limits of various deleterious materials in fine aggregate shall be as per mention below.

**TABLE - B**

Sr. No.	DELETERIOUS MATERIAL	Limit (% by weight maximum)	REMARKS
1	Coal and Lignite	1.00	IS-383-1970-& IS-2386 (part-II)1963
2	Clay lumps	1.00	IS-383-1970-& IS-2386 (part-II)1963
3	Material finer than 75 micron IS sieve (Silt)	3.00	IS-383-1970-& IS-2386 (part-I)1963
4	Soft Fragment	-	IS-383-1970-& IS-2386 (part-II)1963
5	Shale	1.00	IS-383-1970-& IS-2386 (part-II)1963
6	Total % of all deleterious materials (except mica)	5.00	

Sand for masonry mortar and plastering work shall only be used after screening through proper number screen and shall confirm to IS-2116 for masonry mortar and to IS-1526 for plaster work.

**STORAGE:**

The fine aggregate should be stacked carefully on a clean and hard surface so that it should not be get mixed up with deleterious foreign materials, Segregation of heavier particles by sliding down may be not stacking in high conical heaps.

**TEST:**

The particulars of tests and frequency shall be as mention below.

**TABLE - C**

Sr. No.	PARTICULARS OF TEST	FREQUENCY	REMARKS
1	Gradation and F.M.	One test per 150 Cum of concrete/masonry work	IS-383-1970- & IS-2386-1963
2	Sp. Gravity and Water Absorption	Once for new quarry/change in source.	IS-383-1970- & IS-2386-1963
3	Silt Content	One test per 150 Cum of concrete/masonry work	IS-383-1970- & IS-2386-1963
4	Alkali aggregate reactivity	Once for new quarry/change in source.	IS-383-1970- & IS-2386-1963

**M-4 COARSE AGGREGATE:**

The coarse aggregate for the use of making concrete and other purpose shall be of black stone crushed metal. It shall be clean, hard, durable & free from alkalis and other deleterious substance. The coarse aggregate shall be well grade and generally be cubical in shape. The gradation shall give a dense & water tight concrete of specified strength and consistency. The actual gradation shall be as indicated by the laboratory study.

**GRADING:**

The grading of the coarse aggregate shall be as per Table – A given below (IS-383:1970 Page No. 9 table - 2).

**TABLE - A**

IS Sieve designation	% Passing for graded aggregate of nominal size.			
	40 mm.	20 mm.	16 mm.	12.5 mm.
80 mm.	100	-	-	-
63 mm.	-	-	-	-
40 mm.	95 to 100	100	-	-
20 mm.	30 to 70	95 to 100	100	100
16 mm.	-	-	90 to 100	-
12.5 mm.	-	---	-	90 to 100
10 mm.	10 to 35	25 to 55	30 to 70	40 to 85
4.75 mm.	0 to 5	0 to 10	0 to 10	0 to 10
2.36 mm.	-	-	-	-

**SIZE OF AGGREGATE:**

The size of coarse aggregate for mass concrete shall be as Table – B given below (IS-383-Page No.-10 table – 3).

**TABLE – B**

CLASS	SIZE	IS Sieve Designation	% Passing
Very large	150 to 80 mm.	150 mm.	90 to 100
		80 mm.	0 to 10
Large	80 to 40 mm.	80 mm.	90 to 100
		40 mm.	0 to 10
Medium	40 to 20 mm	40 mm	90 to 100
		20 mm.	0 to 10
Small	20 to 4.75 mm	20 mm.	90 to 100
		4.75 mm.	0 to 10
		2.36 mm.	0 to 2

The nominal maximum size of coarse aggregate shall not be greater than one fourth of the minimum thickness of the member for PCC work, In case of RCC members maximum size of coarse aggregate shall be such so as concrete can easily place in the members without honey combing. It can be determined as follow.

(i) One fourth of the minimum thickness of the members. (ii) The minimum clear distance between main bars minus 5 mm. (iii) The minimum cover to the reinforcement minus 5 mm. whichever is smaller.

The minimum and maximum size of the aggregate shall be between 4.75 mm. to 80 mm.

#### **DELETERIOUS MATERIALS:**

Deleterious material as described and its acceptance criteria for coarse aggregate shall be as per IS-383-1970.

#### **TESTING:**

The material subjected to tests for gradation, flakiness and elongation, abrasion value, soundness crushing/ impact value, and deleterious materials etc. as per IS-383. Following is the acceptance limit.

- i) Flakiness and elongation : 30 % maximum.
- ii) Abrasion value. : 40 % maximum.
- iii) Soundness. : 12 % loss with Na<sub>2</sub>SO<sub>4</sub> and 18 % loss with MgSO<sub>4</sub>
- iv) Crushing value. : 45 % for concrete and 30 % for wearing surface.
- v) % of deleterious material. : 5 %
- vi) Sp. Gravity. : 2.5 Minimum.
- vii) Water absorption : 1.5 % maximum.

**FREQUENCY OF TESTING:**

The particulars of tests and its frequency shall be as mention below.

Sr. No.	PARTICULARS OF TEST	FREQUENCY	REMARKS.
1	Gradation	One test per 150 cum. Of concrete work.	IS-383-1970 & IS-2386-1963
2	Sp. Gravity and Water absorption	Once for new quarry/ change in source.	IS-383-1970 & IS-2386-1963
3	Flakiness and elongation.	Once for new quarry/ change in source.	IS-383-1970 & IS-2386-1963
4	Alkali aggregate reactivity	Once for new quarry/ change in source.	IS-383-1970 & IS-2386-1963
5	Impact value.	Once for new quarry/ change in source.	IS-383-1970 & IS-2386-1963

**STORAGE:**

The aggregate of different size shall be stacked or batched or stored separately and handle in such a manner as to prevent intermixing of different size of aggregates. No foreign materials shall be allowed to be mixed up with the aggregates.

**M-5 STONE (BLACK STONE RUBBLE):**

The stone shall be of good quality hard stone. The stone shall be hard, sound, Durable and free from defect like cavities, cracks, sand holes, flaws, injurious veins, patches of loose or soft materials etc. & weathered portion & other structural defects to affect their soundness and strength. The stone with round surface shall not be used. The source of the stone shall be got approved from the engineer in charges well before carting the same to site, the contractor shall have to arrange to cart, load, unload, stack the same to the site of work at his own cost from specified lead.

Weathered skin maximum up to 2 mm. thickness shall be allowed on one face of the stone only and shall not be more than 33 % of total number of stone used.

Stone to be used for masonry, shall confirm to IS-8605 for quality. Sample of stone from new quarries or available rubble shall be tested for specific gravity, compressive strength, water absorption and soundness for once to ensure suitability of stones for masonry. The water absorption of stone shall not exceed limit of 5 % of dry weight after being kept in water for 24 hours and shall be in accordance with IS-1124. Compressive strength shall not be less than 200 kg/cm<sup>2</sup> for stones to be use in masonry.

Stone to be used for pitching, launching apron and such other application, shall be tested for specific gravity, water absorption, soundness/durability and watering test for once. Stone shall be tested in government or government approved laboratories.

**FREQUENCY OF TESTING:**

The sample of the stone shall be tested once before starting of the work for new quarry or change in source of supply or in case of doubt.

**M-6 HIGH YIELD STRENGTH DEFORMED (H. Y. S. D.) STEEL BARS:**

The H.Y.S.D. steel shall be procured by the contractor and grade of steel shall be Fe-415(minimum). The contractor shall make suitable arrangement for storage of the steel at the site. In any circumstances steel produced by rerolling mills shall not be allowed to use. The steel shall be either cold twisted or hot rolled or thermo mechanically treated and shall confirm to IS-1786-2008. The steel shall be free from loose mill scale, rust oil, grease, or any other harmful matter.

The contractor shall have to procure steel bars directly from manufacturers having BIS certification or its authorized dealer. The contractor shall have to produce original voucher / bill (Retail invoice or Tax invoice) for the same along with physical and chemical test report whenever asked by engineer in charge for the same.

The mechanical properties of the steel shall be as mention below.

**TABLE – A (IS-1786-2008)**

STRENGTH GRADE & DESIGNATIO N	MECHANICAL PROPERTIES			BEND TEST		REBEND TEST	
	YIELD STRES S (YS)	TENSILE STRENGT H (TS)	ELONGATIO N % ON GUAGE LENGTH (EL)	Up to & incl. 20mm. dia.	Over 20mm. dia	Up to & incl. 10mm. dia	Over 10mm. dia.
	N/mm2	N/mm2		☞	☞	☞	☞
1	2	3	4	5	6	7	8
Fe415	415	10 % more than the actual Ys but not less than 485 N/mm2	14.5	Mandr el Dia=3 mm	Mandr el Dia=4 mm	Mandr el Dia=5 mm	Mandr el Dia=7 mm
Fe500	500	8 % more than the actual Ys but not less than 545 N/mm2	12	Mandr el Dia=4 mm	Mandr el Dia=5 mm	Mandr el Dia=7 mm	Mandr el Dia=8 mm

**NOTE:** The sample shall be considered to have passed in the bend test if there is no transverse crack in the bend portion.  
The sample shall be considered to have passed in the rebend test if there is no fracture in the bent portion.  
The chemical composition of the steel shall be as mention below:

**TABLE – B (IS-1786-2008)**

CONSITITUNT	PERCENTAGE MAXIMUM			PERMISSIBLE VARIATION.
	Fe415	Fe500	Fe550	% Max.
Carbon	0.3	0.3	0.3	0.02
Sulphur	0.06	0.055	0.055	0.005
Phosphorus	0.06	0.055	0.05	0.005
Sulphur& Phosphorus	0.11	0.105	0.1	0.01

**TESTING:**

Testing of steel shall be done for each size of bars at the frequency mention in table – C below or less of steel in government or government approved laboratory, to known the physical properties of steel bars, like nominal mass, 0.2 percentage proof stress / yield stress, Elongation percentage, Tensile strength, Bend and Rebend test. And chemical test shall be done one for every ten physical test sample.

**TABLE – C (Table – 5 page-17 of IS – 1786)**

FREQUENCY FOR NOMINAL MALSS, TENSILE, BEND & REBEND TESTS.		
NOMINAL SIZE in mm	QUANTITY.	
	For Casts/Beats below 100 TONNES	For casts/Beats over 100 TONNES.
Under 10 mm	One sample from each 25 tones or part thereof.	One sample from each 40 tones or part thereof.
10 mm. to 16 mm. inclusive	One sample from each 35 tones or part thereof.	One sample from each 45 tones or part thereof.
Over 16 mm.	One sample from each 25 tones or part thereof.	One sample from each 50 tones or part thereof.

**MEASUREMENT:**

For the purpose of payment, the bar shall be measured correct up to 10 mm. in length. Unit weight of bars shall be computed as per weight given in IS-1786-2008. Specifications for Indian steel or at the rate specified below.

**TABLE - D (Table-1 Page-11 of IS 1786)**

BAR DIA In mm.	UNIT WEIGHT Kg. /Rmt.	BAR DIA In mm.	UNIT WEIGHT Kg. /Rmt.
6	0.222	22	2.98
8	0.395	25	3.85
10	0.617	28	4.83
12	0.888	32	6.31
16	1.58	36	7.99
18	2.00	40	9.85
20	2.47	50	15.42

**M-7 THERMO MECHANICALLY TREATED (TMT) H.Y.S.D. STEEL:**

The thermo mechanically treated, popularly known as TMT H.Y.S.D. steel shall conform to IS-1786. The steel shall be procured by the contractor and grade of steel shall be Fe415 (minimum). The contractor shall make suitable arrangement for storage of the steel at site. In any circumstances steel produced by re-rolling mills shall not be allowed to use. The steel shall be free from loose mill scale, rust oil, grease, or any other harmful matter. The contractor shall have to procure steel bars directly from manufacturers having BIS certification or its authorized dealer. The contractor shall have to produce original voucher / bill (Retail invoice or Tax Invoice).

For the same along with physical and chemical test report whenever asked by engineer in charge for the same.

The mechanical properties of the steel shall be as mentioned below.

**TABLE – A (IS-1786-2008)**

STRENGTH & DESIGNATION	MECHANICAL PROPERTIES			BEND TEST		REBEND TEST	
	YIELD STRESS (YS)	TENSILE STRENGTH (TS)	ELONGATION % ON GAUGE LENGTH (EL)	Up to & incl. 20mm. dia.	Over 20mm. dia	Up to & incl. 10mm. dia	Over 10mm. dia.
	N/mm <sup>2</sup>	N/mm <sup>2</sup>		☺	☺	☺	☺
1	2	3	4	5	6	7	8
Fe415	415	10 % more than the actual Ys but not less than 485 N/mm <sup>2</sup>	14.5	Mandrel Dia=3 mm	Mandrel Dia=4 mm	Mandrel Dia=5 mm	Mandrel Dia=7 mm
Fe500	500	8 % more than the actual Ys but not less than 545 N/mm <sup>2</sup>	12	Mandrel Dia=4 mm	Mandrel Dia=5 mm	Mandrel Dia=7 mm	Mandrel Dia=8 mm

NOTE: The sample shall be considered to have passed the bend test if there is no transverse crack in the bent portion. The sample shall be considered to have passed in the rebend test if there is no fracture in the bent portion.

The chemical composition of the steel shall be as mentioned below.

<b>TABLE-B (IS-1786-2008)</b>				
CONSTITUENT	PERCENTAGE MAXIMUM			PERMISSIBLE VARIATION
	Fe 415	Fe 500	Fe550	% max
Carbon	0.3	0.3	0.3	0.02
Sulphur	0.06	0.055	0.055	0.005
Phosphorus	0.06	0.055	0.05	0.005
Sulphur & phosphorus	0.11	0.105	0.1	0.01

#### TESTING:

Testing of steel shall be done for each of bars at the frequency mention in table-C below or less of steel in government or government approved laboratory to known the physical properties of steel bars, like nominal mass, 0.2 percentage proof stress/yield stress, Elongation percentage, Tensile strength, Bend and Rebend test. And chemical test shall be done one for every ten physical test sample.

#### TESTING CHARGES:

The testing charges shall be recovered from the contractor.

<b>TABLE-C (Table-5, Page-17 of IS-1786)</b>		
FREQUENCY FOR NOMINAL MASS, TENSILE BEND AND REBEND TESTS		
NOMINAL SIZE IN mm	QUANTITY	
	FOR CASTS/BEATS BELOW 100 TONNES	FOR CASTS/BEATS OVER 100 TONNES
Under 10 mm	One sample from each 25 tones or part thereof	One sample from each 40 tones or part thereof
10mm to 16 mm inclusive	One sample from each 35 tones or part thereof	One sample from each 45 tones or part thereof
Over 16mm	One sample from each 45 tones or part thereof	One sample from each 50 tones or part thereof

**MEASUREMENT:**

For the purpose of payment, the bar shall be measured correct up to 10mm in length

Unit weight of bars shall be computed as per weight given in IS-1786-2008.

Specification for Indian steel or at the rate specified below:

<b>TABLE-D (Table-1, Page-11 of IS-1786)</b>			
BAR DIA.	UNIT WEIGHT	BAR DIA.	UNIT WEIGHT
In mm	Kg / Rmt.	In mm	Kg / Rmt.
6	0.222	22	2.98
8	0.365	25	3.85
10	0.617	28	4.83
12	0.888	32	6.31
16	1.58	36	7.99
18	2.00	40	9.85
20	2.47	50	15.42

**M-8 BINDING WIRE:**

The binding wire for tying reinforcement shall be of soft & annealed mild steel confirming to IS-280. The diameter of wire shall be of 1.63mm or 1.22mm (16 or 18 gauge). the use of black wire shall be permitted for binding reinforcement bars. It shall be free from rust, oil paint, grease, loose mill scale or any other undesirable coating which may prevent adhesion of cement mortar.

**M-9 MILD STEEL (M.S.) BARS:**

The steel shall be procured by the contractor. The contractor shall make suitable arrangement for storage of the steel at site. In any circumstances steel produced by re-rolling mills will not be allowed to use.

The steel shall be confirmed to IS-432 (Part-1):1982. The steel shall be free from loose mill scale, rust oil, grease or any other harmful matter.

The contractor shall have to procure steel bars directly from manufacturers having BIS certification or its authorized dealer. The contractor shall have to produced original voucher/bill (Retail invoice or Tax invoice) for the same along with physical and chemical test report whenever asked by engineer in charge for the same.



**TESTING:**

Testing of steel shall be done for each size of bars and one sample for 40.00 M.T. or less of steel in government or government approved laboratory, to know the physical properties of steel bars, like nominal mass, 0.2 percentage proof stress / yield stress, Elongation percentage. Tensile strength, Bend and Rebend test. And chemical test shall be done one for every ten physical test sample.

**MEASUREMENT:**

For the purpose of payment, the bar shall be measured correct up to 10 mm. in length and payment shall be made in kg. or in M.T. basis, and unit weight of bars shall be computed as per weight given in IS-1786-2008 specification for Indian steel or at the rate specified below.

**TABLE - A (Table-1 page-11 of IS – 1786)**

BAR DIA. In mm.	UNIT WEIGHT Kg. / Rmt.	BAR DIA. In mm.	UNIT WEIGHT Kg. / Rmt
6	0.222	22	2.98
8	0.395	25	3.85
10	0.617	28	4.83
12	0.888	32	6.31
16	1.58	36	7.99
18	2.00	40	9.85
20	2.47	50	15.42

**M-10 PVC Pipe**

- i. Material - The material shall comply with the threshold limits of the catalysts, polymerization inhibitors, emulsifying agents, suspension agents, chain-transfer agents and miscellaneous additives as prescribed in IS 10148.
- ii. In case auxiliary items, that is, plasticizers, stabilizers, lubricants and other additives are used in PVC compounds for food-packaging applications it shall comply with the threshold limits as prescribed in IS 10148.

**Monomer Content**

- i. Residual Vinyl Chloride Monomer (RVCM) Content - The RVCM content of PVC suspension resin -used for the manufacture shall not exceed 5 ppm, when tested as prescribed in Appendix A.
- ii. The RVCM contenting the PVC containers/film used for food-packaging shall not exceed 1 ppm when tested as prescribed in Appendix A.
- iii. Migration of RVCM into Foodstuffs - The migration of RVCM into foodstuffs being packed shall not exceed 10 ppb when tested as prescribed in Annex D.

**REQUIREMENTS**

- i. **Material-** The material shall comply with the threshold limits of the catalysts, polymerization inhibitors, emulsifying agents, suspension agents, chain-transfer

agents, miscellaneous additives, auxiliary items, that is, plasticizers, stabilizers, lubricants and other additives, as prescribed in IS: 10148-1982

- ii. **Pigments and Colourants** - In- case the coloured material is used for food-packaging applications, it shall comply with the list and limits of the pigments and colourants prescribed in IS: 9833-198

### **Monomer Content**

- i. **Vinyl Chloride Monomer** - The vinyl chloride monomer content of PVC suspension resin used for the manufacture shall not exceed 5 ppm, when tested as prescribed in Appendix A.
- ii. The vinyl chloride monomer content (VCM) in the PVC containers/film used for packaging shall not exceed 1 ppm, when tested as prescribed in Appendix A.
- iii. The residual migration of VCM into foodstuffs being packed shall not exceed 10 ppm.

### **M-11 Galvanized Iron Pipes and Fittings**

Galvanized iron pipe shall be of the medium duty type and of required diameter and shall comply with IS: 1239.

### **M-12 Structural Steel**

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

### **M-13 Paints**

#### **• Oil Paints: -**

Oil paints shall be of the specified colour and shade, and as approved. The ready mixed paints shall only be used.

However, if ready mixed paint or specified shade or tint is not available white ready mixed paint with approved strainer will be allowed. In such a case, the contractor shall ensure that the shade of the paint so allowed shall be uniform.

All the paints shall need with the following general requirements.

1. Paint shall not show excessive setting in a freshly opened full can and shall easily be re-dispersed with paddle to a smooth homogeneous state. The paint shall show no curdling, livening, caking or co lour separation and shall be free from lumps and skins.

2. The paint as received shall brush easily, possess good levelling properties, and show no running or sagging tendencies.
3. The paint shall not skin within 48 hours in three quarters filled closed container.
4. The paint shall dry to a smooth uniform finish free from roughness, grit unevenness and other imperfections.

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

- **Enamel Paints: -**

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

**M-14 Gates:**

- The Gates shall be fabricated from best quality M.S. shaft, Plate, Angle, Channels as per details drawing supplied or as per instruction of Engineer-in-charge. The iron rod and nut shall be of cast iron. It shall be of heavy duty.
- All the component like guide channel, Frame angle, Gate leaf platform plate, channel (RSJ) etc. fabricated steel shall be well painted with two coats of red oxide.
- The steel used for gate fabrication is from OEM and rerolling steel is not permissible.
- Angles shall be of ISI marked steel only.

**M-15 Bricks:**

- The bricks shall be hand or machine moulded and made from suitable soils and kiln burnt. They shall be free from cracks and nodules of free lime. They shall have smooth rectangular faces with sharp corners and shall be of uniform colour. The bricks shall be moulded with a frog of 100 mm x 40mm and 10mm to 20mm deep on one of its flat sides. The bricks shall not break when dropped on the ground from a height of 600 mm.
- The size of modular bricks shall be 190 mm x 90 mm x 90 mm.
- The size of conventional bricks shall be as under 225 x 110 x 75 mm.
- Only bricks of one standard size shall be used on one work. The following tolerances shall be permitted in the conventional size adopted in a particular work.
- Length: 3.00 mm
- Width :1.50 mm
- Height: 1.50 mm

- The crushing strength of the bricks shall not be less than 35 Kg. /Sq. Cm. The average water absorption shall not be more than 20% by weight. Necessary tests for crushing strength and water absorption etc. shall be carried out as per I.S. 3495 (Part I to IV)

Signature of Contractor

Executive Engineer

**CHAPTER – V**  
**GENERAL SPECIFICATION OF CONCRETE**

## **CHAPTER-V**

### **GENERAL SPECIFICATION OF CONCRETE**

#### **1.0) MATERIALS:**

1.1) CEMENT

1.2) WATER

1.3) FINE AGGREGATE (SAND)

1.4) COARSE AGGREGATE

#### **2.0) SCOPE OF WORK:**

The work covered by this chapter consists of furnishing all materials, equipment and labour for the manufacturing, transporting, placing, finishing and curing of concrete in the structure included in these specifications and performing all the functions necessary and ancillary to the work. The item of concrete may be split up into several items according to the grade of concrete to be used and its location and shall be measured and paid for accordingly. The general specifications described hereafter shall; however, be relevantly apply to all concrete items.

#### **3.0) COMPOSITION:**

Concrete shall be composed of cement, fine aggregate (natural sand), coarse aggregate, water & admixture (if asked) well mixed in proportion & brought to the proper consistency. The design mix or nominal mix proportions shall be adjusted to produce a durable and workable concrete suitable for specified conditions of placement and design strength.

#### **4.0) PREPARATION FOR PLACING CONCRETE:**

Specification laid down in IS-457 shall be applicable. Generally, no concrete shall be placed until all form works, installation to parts to be embedded and preparation of surface involved in the placing have been approved. Method of depositing the concrete shall be subject to approval. All surface of forms and embedded materials that have become encrusted with dried mortar or grout and from the concrete previously place, shall be cleaned. The foundation bed and sides shall be carefully cleaned stiff brooms, picks, jets of water and air applied at high velocity or other effective means, followed by thorough washing. Before placing of concrete, water shall be removed from depositions and foundation surface shall be left uniformly damp. All that surfaces shall then be coated with mortar about 2cms thick in case of rock surface and cement slurry in case of concrete/masonry surface.

#### **5.0) PLACING OF CONCRETE:**

Specification laid down in IS-457 shall be applicable. Placing of concrete shall only be undertaken in presence of authorized representative of engineer in charge. Contractor shall have to inform department well in advance and in writing, so that necessary inspection,

before placing concrete can be taken over and only after approval of engineer in charge, placing of concrete can be done. The concrete shall be deposited as nearly as practicable in its final position to avoid rehandling. The concrete shall be placed and compacted before initial setting of concrete commences and should not be subsequently disturbed. Method of placing should be such as to preclude segregation. Care should be taken to avoid displacement of reinforcement or movement of formwork. As a general guidance, the maximum permissible free fall of concrete may be taken as 1.50mt.

#### 6.0) CLASSIFICATION:

For all items of concrete in any portion of the structure or its associated works, shall be of nominal mix or design mix as specified in specification of item or as decided by engineer in charge as per provision made in IS-456 Page No-23 cluse-9.3. The cement concrete works to be carried out are classified in grades as mentioned in item of work. Following table is provided for general guidance to the contractor. There may be change in criteria like water cement ratio, slump, aggregate size, and proportion etc., for which contractor is bound to carry outwork without claiming any extra cost. The cement level mention in the Table:- AA, given below are tentative and for general guidance only. The design mix or nominal mix for different grade of concrete to be used will be furnished by the department.

**TABLE: - AA**

SR. NO.	GRADE OF CONCRETE	MSA	Min.Avg. Comp. Strength of 3-Specimen AT FIELD ON 15X15X15 cms CUBE	Min.Avg. Comp. Strength Of 3-Specimen AT LAB. ON 15X15X15 CMS. PRELIMINARY TEST CUBE	MIN. CEMENT LEVEL REQ. AS PER IS PCC/RCC	CEMENT LEVEL CONSIDER IN THE RATE PCC/RCC	MAX. W/C RATIO PCC /RCC	REMARKS
1	2	3	4	5	6	7	8	9
		mm	kg/cm <sup>2</sup> at 28 days	kg/cm <sup>2</sup> at 28 days	kg/cum	kg/cum		
1	<b>M-15</b>	<b>20</b>	<b>150</b>	<b>208</b>	<b>240</b>	<b>300</b>	<b>0.60</b>	
2	<b>M-15</b>	<b>40</b>	<b>150</b>	<b>208</b>	<b>240</b>	<b>280</b>	<b>0.60</b>	
3	<b>M-10 Nominal Design Mix Concrete</b>	<b>40</b>	<b>100</b>	<b>158</b>	<b>Not available</b>	<b>205</b>	<b>0.60</b>	
4	<b>M-20 SPILLWAY SKIN CONCRETE</b>	20	245	266	250	360	0.5	FOR P.C.C SEVERE TO VERY SEVERE & FOR R.C.C MILD EXPOSURE CONDITION <b>FOR</b>
					300	360	0.55	
		40	245	266	220	330	0.5	
					<b>270</b>	<b>330</b>	<b>0.55</b>	
		80	245	266	N.A.	310	-	
5	<b>M-20 TREMMIE CONCRETE FOR DIAPHRAGMW ALL</b>	20	245	266	300	440	0.6	FOR P.C.C EXTREME & FOR R.C.C MODERATE EXPOSURE CONDITION <b>FOR</b>
					-	382	-	
		40	245	266	290	382	0.45	
					-	-	-	
		80	245	266	N.A.	-	-	
6	<b>M-25</b>	<b>20</b>	<b>250</b>	<b>316</b>	<b>300</b>	<b>380</b>	<b>0.5</b>	
7	<b>M-25</b>	<b>40</b>	<b>243</b>	<b>270</b>	<b>270</b>	<b>360</b>	<b>0.55</b>	FOR P.C.C EXTREME & FOR R.C.C MODERATE EXPOSURE CONDITION <b>FOR</b>

#### NOTES:(Conditions)

- 1 Concrete works classified as above shall be designed with reference to the field strength shown in above table. Other requirements shall have to be adjusted to obtain this strength in each case incl. cement level indicated in above table.
- 2 Compressive strength mention in column no-4 is characteristic compressive strength given in table-2, based on clause No.-15.1.1, Page-29 of IS-2000. And it is the average characteristic compressive strength of three specimens.
- 3 Compressive strengths mentioned in column no-5 is based on para-9.2.2 (page no-22) of IS-456-2000 (The target mean strength of conc. Mix should be equal to the characteristic strength plus 1.65 times the std. deviation.). Standard deviation of 3.5 is taken for M-10 & M-15, 4.0 is for M-20 as per IS-456, Page-23, Table-8.
- 4 The test result of the sample shall be the average of the strength of three specimens. The individual variation should not be more than (+) or (-)15 percentage of the average.
- 5 The characteristic strength compliance requirement mentioned in column No-4 & target mean strength mentioned in column No-5, are based on 'GOOD QUALITY CONTROL' and MODERATE exposure condition.
- 6 For every one kg of cement required to be reduced than that of stated in column No-7 of Table-AA in each case based on approved laboratory design mix / nominal mix, **the recovery shall be made at Rs. 5.445 per kg of cement excluding GST.** And for every one kg of cement required to be added than that of stated in column No-7 of Table-AA, in each case based on approved laboratory design mix / nominal mix, NO EXTRA payment shall be made.
- 7 Curing period shall be 21 days (min.) for O.P.C. /P.P.C. cement.
- 8 Above details are primarily given for the guidance of contractor while quoting their tender rate and is only informative for the general requirement of concrete.

#### 7.0) ACCEPTANCE CRITERIA:

- i) COMPRESSIVE STRENGTH: The concrete shall be deemed to comply with the strength requirements when both the following conditions are met.
  - a) The mean strength determined from any group of four consecutive test results compiles with the appropriate limits in col-2 of Table-11 given on Page No-30 of IS-456-2000.
  - b) Any individual test results comply with the appropriate limits in col-3 of Table-11 given on Page No-30 of IS-456-2000.

#### 8.0) PROPORTIONS FOR NOMINAL MIX CONCRETE:

The proportion of materials for nominal mix concrete shall be in accordance with IS - 456 -2000, Page NO-23, Table-9, given in following table:



GRADE OF CONCRETE	TOTAL QUANTITY OF DRY AGGREGATE BY MASS PER 50Kg OF CEMENT TO BE TAKEN AS THE SUM OF THE INDIVIDUAL MASSES OF FINE AND COARSE AGGREGATE, (IN Kg) Max	PROPORTION OF FINE AGGREGATE TO COARSE AGGREGATE (BY MASS)	QUANTITY OF WATER PER 50Kg OF CEMENT, Max
1	2	3	4
M-10	480	GENERALLY, 1:2 BUT SUBJECT TO AN UPPER LIMIT OF 1:1.5 AND A LOWER OF 1:2.5	34
M-15	330		32
M-20	250		30

NOTE: The proportion of the fine to coarse aggregate should be adjusted from upper limit to lower limit progressively as the grading of fine aggregates becomes finer and the maximum size of coarse aggregate becomes larger. Graded coarse aggregate shall be used.

Example:

For an average grading of fine aggregate (that is Zone-II of Table-4 of IS-383), the proportions shall be 1:1.5, 1:2 and 1:2.5 for maximum size of aggregates 10mm, 20mm and 40mm respectively.

Nominal mix shall be carried out at field laboratory or in government / Govt. Approved laboratory, in case of field laboratory facility not available. In such case, the charges of the same shall be borne by the department.

The details are further tabulated in the table below.

GRADE OF CONCRETE	MSA IN mm	TOTAL QUANTITY OF DRY AGGREGATE (COARSE+FINE) BY MASS PER 50Kg OF CEMENT	WEIGHT OF COARSE AGGREGATE	WEIGHT OF FINE AGGREGATE	Cement	WATER-CEMENT RATIO
1	2	3	4	5	6	7
M-10	20	480Kg	320Kg	160Kg	50Kg	NOT MORE THAN 0.68
	40	480Kg	343Kg	137Kg	50Kg	
	80	480Kg	343Kg	137Kg	50Kg	
M-15	20	330Kg	220Kg	110Kg	50Kg	NOT MORE THAN 0.64
	40	330Kg	235Kg	95Kg	50Kg	
	80	330Kg	235Kg	95Kg	50Kg	
M-20	20	250Kg	166Kg	84Kg	50Kg	NOT MORE THAN 0.60
	40	250Kg	178Kg	72Kg	50Kg	
	80	250Kg	178Kg	72Kg	50Kg	

- NOTE: 1) FINE AGGREGATE(SAND) SHALL CONFIRM TO ZONE-II OF TABLE-4 OF IS-383(FM).
- 2) GRADED COARSE AGGREGATE SHALL BE USED. FOLLOWING DATA ARE FOR GENERAL GUIDANCE ONLY.

MSA	PROPORTION OF COARSE AGGREGATE IN %			
in mm	4.75-10mm	10-20mm	20-40mm	40-80mm
1	2	3	4	5
80mm	10	15	35	40
40mm	15	35	50	-
20mm	40	60	-	-

3) PRELIMINARY TEST CUBES OF SIZE 15X15X15cms SHALL BE CASTED AND TESTED FOR 7 DAYS AND 28 DAYS WELL BEFORE STARTING OF ACTUAL WORK.

4) MIX DESIGN IS NOT NECESSARY FOR NOMINAL MIX.

**9.0) DESIGN MIX CONCRETE:**

The design mix shall be designed to produce the grade of concrete having the required workability and a characteristic strength and target mean strength not less than appropriate values given in table-AA column-4 & 5 respectively. Mix design done earlier not prior to one year may be considered adequate for later work provided there is no change in source and quality of the materials. The design mix shall be carried out in Govt. laboratory (GERI) / Govt. Approved laboratory.

**10.0) FORMS FOR CONCRETE:**

IS-457 shall be applicable.

i) GENERAL:

The forms for concrete work shall have sufficient strength and rigidity to hold and to withstand the pressure of fresh concrete during compaction, incl. live load and shaped to the required line within the tolerance specified. The tolerances specified are for finished concrete surface and not for the forms. For further details regarding design, details, etc reference may be made to IS-14687. As far as possible; the forms shall be of steel material. The supports shall be so arranged to keep the maximum deflection within 1/360 of the span. Suitable devices shall be used to hold corners, adjacent ends of panels of other forms together in accurate alignment, during compaction of concrete by vibrator or other means. The forms and their joints shall be tight enough to prevent loss of mortar or water from concrete while vibrating. The contractor shall prepare detail design and drawings for the execution of formwork, centering, support system and temporary works as per IS requirement and shall have to submit well in advance for approval to the engineer in charge. The contractor shall be responsible and liable to pay all claims and compensation arising from any loss or damage to life and property due to any deficiency, failure of centering or the temporary works.

ii) FORM SHEATHING OR LINING:

In general, forms for permanently exposed surface shall consist of or shall be lined with steel plate metal or with water resistant plywood or wooden sheathing of lining shall be so treated or coated that there will be no chemical deterioration of formed concrete surface. The forms shall be able to withstand restorations caused by placement and vibration of concrete and the workmanship used in the form construction shall be

such that formed surface after being treated will confirm to the requirement of these specifications.

iii) **ABSORPTIVE FORM LINING:**

Absorptive form lining, where directed to be used, shall be of the type and quality approved by the engineer in charge. The form lining shall be highly absorptive to air and water and through its absorptive capacity shall be able to eliminate voids, pits and common defects from concrete and without damage to the surface. The lining itself and treatment employed in its manufacture shall neither discolour the concrete nor interfere with normal chemical reaction of the cement. Specification laid down in IS-457 shall be applicable for absorptive form lining.

iv) **FORM TIE:**

Embedded metal rods used for holding the forms shall remain embedded and shall terminate not less than 30mm for MSA-40mm and 50mm for MSA-80mm clear of the formed faces of concrete. Embedded wire ties for holding forms shall only be permitted. Specifications laid down in IS-457 shall be applicable.

v) **CLEANING AND TREATMENT OF FORMWORK:**

Surface of forms shall be kept free from encrustations, mortar, sawdust, chippings etc that would contaminate the concrete. The surface of formwork in contact with the concrete shall be cleaned and treated with form release agent approved by engineer in charge. Release agents should be applied so as to provide a thin uniform coating to the forms without coating the reinforcement.

vi) **ERRECTION OF FORMS:**

Where forms for continuous surface are placed in successive units, the forms shall fit tightly over the complete surface, so as to prevent leakage of mortar from the concrete and to maintain accurate alignment of the surface. Forming of block joints to the concrete portion shall be done carefully to ensure smooth joints and avoid sharp deviation, projections or edges and particulars attention shall be paid in setting and tightening the forms to ensure that the contraction joint's surfaces are in accurate alignment & plumbs. Specifications laid down in IS-457 shall be applicable.

vii) **REMOVAL OF FORMS:**

In general specifications laid down in IS-457 and IS-456-2000 shall be applicable. However stripping time will be decided by engineer in charge based on minimum strength to be attained by the concrete for safe removal of forms.

a) Concrete not subject to appreciable bending or direct stress or not reliant on forms for vertical supports. (Vertical face): 24 Hrs after final setting or not liable to injury due to form removal.

b) Concrete subject to appreciable bending & direct stress & partially reliant on forms for vertical support:

i) Vertical surfaces, unloaded columns, walls etc: 3 days.

ii) Galleries, arches, loaded columns and walls etc. : 10 days.

iii) Roof of floor slabs, walkways, platforms etc: 20 days

iv) Heavily reinforced beams, bridge deck slabs and girder and other heavy sections: 30 to 38 days or as instructed by engineer in charge.

**11.0) COMPACTION:**

Concrete shall be thoroughly compacted and fully worked around the reinforcement, around embedded fixtures and into corners of the formwork. Concrete shall be compacted using mechanical vibrators, over vibration and under vibration of concrete should be avoided.

**12.0) FINISHES AND FINISHING:**

Specification laid down in IS-456 & IS-457 shall be applicable.

**13.0) CONCRETING FOR R.C.C.:**

Concreting for R.C.C. Shall be applicable as per concern IS code considering amendments there in. It shall also apply general specification of concrete for diaphragm appended here with.

**14.0) CURING AND PROTECTION:**

Concrete shall be protected against injury until final acceptance. Unhardened concrete shall be protected from heavy rains and flowing water. No fire or excessive load shall be permitted near or indirect contact with the concrete at any time Concrete shall be kept continuously moist for 21 days or as instructed by engineer in charge Curing compound can be utilized for vertical and sloping surface. If curing compound is to be used, it shall be of approved quality and shall be tested in the laboratory, at the cost of the contractor.

**15.0) REPAIRS TO CONCRETE:**

Repairing of concrete shall be carried out at contractors cost by skilled workers. All imperfections of the concrete surface shall be corrected to obtain the surface of concrete that confirm to the Repairs of imperfection in concrete shall be completed with- in 24 hrs. After removal of forms. Concrete with excessive surface depression or suppression, honeycombed, fractured or other- wise defective concrete shall be removed and redone at contractor's cost. Specification laid down in IS-457 shall be applicable.

**16.0) BATCHING AND MIXING EQUIPMENTS:**

All ingredients of the concrete should be used by mass only except water. Batching shall be done either by automatic computerized/electronic weigh batcher or by mechanical weigh batcher attached with concrete mixer each size of aggregate & sand shall be weighed separately. The equipment and its operation shall at all times be subject to the approval of the engineer in charge. Calibration of weigh batching shall be done periodically. Steel measuring boxes of adjustable bottom shall only be allowed in special circumstances, for very small quantity of concrete and subjected to prior written permission of engineer in charge.

**17.0) MIXING:**

Specification laid down in IS-457 shall be applicable. The mixing of concrete shall be done in a batch mixer of such approved type as will ensure the homogeneous mixing of ingredients. The ingredients shall be fed into the mixer simultaneously. A small portion (5 to 10%) of water be fed first and remaining water shall be added uniformly and simultaneously when all other materials are in the mixer. Mixing time shall be generally 2 minutes or as instructed by the engineer in charge.

**18.0) HANDLING AND CONVEYING:**

Specification laid down in IS-457 shall be applicable. The handling and conveying of concrete from the mixer to the place of final deposit shall be done as rapidly as practicable and without any objectionable separation or loss of ingredients. Whenever the length of haul from the mixing plant to the place of deposit is such that the concrete unduly compacted or segregates, suitable agitator's type conveying system shall be used. Where, concrete is being conveyed on chutes or on belts, the free fall or drop shall be limited to 1.50mt unless otherwise permitted. Concrete shall be placed within 30 minutes after mixing and by method which will prevent segregation and loss of ingredients. The distance between the mixer and place of concreting and also mode of transport of concrete shall be subject to the prior approval.

**19.0) DEPOSITING CONCRETE UNDER WATER:**

Specification laid down in IS-457 shall be applicable. Concrete shall not be deposited under water, if it is practicable to dewater the area and place the concrete in a regular manner. If it is found necessary to deposit any concrete under water, the method, equipment, materials and mix shall first be approved by the engineer in charge. Concrete shall not be placed in running water.

**20.0) QUALITY CONTROL RELATED:**

Contractor shall have to provide skilled laborer's, materials and facilities for all type of field and laboratory, quality control tests, transporting materials and c.c. cubes from field to laboratories shall have to be carried out by the contractors. No extra payment shall be made for this. The specifications laid down in relevant IS shall be applicable for method of taking test samples, method of testing and test equipments etc.

i) **COMPRESSIVE STRENGTH TEST AND FREQUENCY OF TEST:**

The concrete for test specimens for compressive strength shall be collected at random. The compressive strength test of concrete shall be conducted on 150x150x150mm size cubes. The frequency of test sample shall be as per IS-457 for massive structures and components like dams and its related works, canal structures, bridges, and other massive structures. Generally, not less than one set of samples (six cubes) shall be taken from approximately each 380 cum or part of it per day per shift per mixer for plain concrete and from 190 cum or part of it per day per shift per mixer for R.C. concrete for massive structures as per IS-457. For non-massive structures, building and its related works, canal lining etc, frequency of test shall be as per IS-456-2000.as shown in the table-DD below.

TABLE –DD AS PER IS-456-2000

QTY OF CONC. IN THE WORK	No OF SAMPLE(SET) FOR TEST
1-5 CUM	1
6-15 CUM	2
16-30 CUM	3
31-50 CUM	4
51 AND ABOVE	4+1FOR EACH ADDITIONAL 50CUM OR PART THEREOF

NOTE: At least one sample shall be taken from each shift, where concrete is produced at continuous production unit, such as RMC plant. or as instructed by engineer in charge. The 28 days field and laboratory average compressive strength shall not be less than that mention in table-AA above.

i) **SLUMP TEST:**

In order to test the consistency of the mixed concrete, slump test shall be taken as per IS-1199-2018

ii) **PRELIMINARY TEST:**

During the progress of work, preliminary tests shall be conducted periodically by the contractor apart from the field tests, to ascertain the 7 day and 28-day laboratory compressive strength.

iii) **OTHER TEST:**

Additional tests, if deemed necessary for concrete to determining unit weight & air content, will also be carried out by the contractor in government approved lab/GERI. The frequency of all the tests mentioned above shall depend on the nature of job & will be decided by the engineer in charge. The contractor shall have to provide all necessary facilities and materials etc. for these tests. No extra payment shall be made for these.

iv) **ACCESS TO TESTING:**

The contractor or his representative shall have access to and to associate with sampling and tests of trial mixes, and other field and laboratory tests. It shall be the responsibility of the contractor to associate himself with the work of test in govt. lab. And in the field and shall have to sign record. It shall be responsibility of the contractor to obtain on work, the concrete of quality density and strength corresponding to laboratory designs.

v) **CHECK TESTS FOR EQUIPMENTS:**

The contractor shall provide standard test, weigh and other necessary equipment required for checking the performance of each scale or other measuring device. The test shall be made in presence of representative of engineer in charge and frequency of such tests shall be in general fortnightly or as decided by the engineer in charge.

vi) **RECORD OF CONCRETING OPERATIONS:**

A systematic joint record in the form approved by the engineer in charge shall be maintained to record the details regarding weighing, number of mixes of concrete, rejected mixes and locations at which concrete is used.

**21.0) ANCHOR IN CONCRETE:**

Anchor bolts, rods, structural shapes, plate & bearing required in connection with installation of gates etc. and other apparatus of the same shall be supplied free of cost by department and shall be placed, erected and embedded in concrete by the contractor for which no extra shall be made to facilitate first stage and second stage concrete. Due care shall be taken to obtain well finished surface after removal of forms, eliminating the necessity of subsequent repairs The responsibility to maintain level and position of embedded parts during and after concreting and removal of centering shall rest with contractor. Full co - operation for the embedment of main anchorage for gate, horizontal and vertical girders, bottom and side seal girders, track plants, guide rails etc. and hoisting mechanism inclusive of the shaft arrangement, hoist platform etc. shall be extended by the contractor.

**22.0) UNACCEPTABLE WORK:**

All defective concreting work including but not limited to defects arising out of honey comb without claiming any extra payment. Acceptance criteria will be in accordance with provisions of IS-456 and IS-457

Signature of Contractor

Executive Engineer

**CHAPTER-VI**  
**GENERAL SPECIFICATION OF REINFORCEMENT**



## **CHAPTER - VI**

### **GENERAL SPECIFICATION FOR REINFORCEMENT WORK**

#### **1.0) MATERIALS:**

- 1.1) M. S. BARS
- 1.2) TMT BARS
- 1.3) BINDING WIRES

#### **2.0) SCOPE OF WORK:**

Scope of work shall include supplying all materials and labour for cutting, bending, binding, reinforcement, dowels, anchor, etc. Required quantity of steel shall be procured by the contractor at his own cost.

#### **3.0) REINFORCEMENT WORK:**

Steel reinforcement bars shall be placed in position where concreting is to be done, after cutting & bending as shown in the drawing or as directed. Steel bars shall be cleaned of objectionable foreign substances like rust, scale, dirt, grease, oil, etc. before placing in position by means of bolts in concrete blocks, metallic chairs, rangers, spacers or other suitable devices at sufficient close intervals as directed so they will neither sag between support nor be displaced during the placing of concrete nor by any operations of work. Special care shall be exercised to prevent any disturbance of the reinforcement, after being placed in position and it shall be maintained in clean condition until it is completely embedded in concrete to prevent further damage to the concrete or unsightly rust stain on exposed concrete surface. Reinforcement shall not be straightened or bent in manner that will injure or weaken the material. Bars with kinks or bend not shown in the drawings shall not be used. Bars shall be bent to the shapes and dimensions shown in the drawings or as directed, using a bar bender, operated by hand or power. The radius for bends along the edge of bar shall not be less than 4 times the diameter of the bar. Heating of bars to facilitate bending will not be permitted, except for large diameter of bars. The reinforcement available from rejected concrete shall not be used. Reinforcement may be fixed in position by means of anchor rods, supporting and hanger, rods as approved by the engineer. In difficult locations, tack welding of bars at isolated spots may be permitted to keep these bars in position.

#### **4.0) COVERS:**

Concrete cover to the reinforcement shown in drawing or as directed shall be maintained by providing cement mortar (1:2) blocks of same w/c ratio as the concrete to be used in the particular work. Sufficient concrete cover shall be provided to

protect reinforcement from erosion and shall be as shown in the drawing or as directed. But it shall not be less than 5cms and more than 10cms, depends upon type of structures and exposure condition.

**5.0) BINDING:**

Wire for tying reinforcement shall confirm to specifications of materials. All reinforcement bars shall be tied securely by binding wires, so as to transfer the stresses easily. All main bars and distribution bars shall be tied with each crossing, so that spacing of bars remains accurate and cannot displaced during concreting operation.

**6.0) SPLICING / DEVELOPMENT LENGTH.:**

Bar splices as indicated in the drawing or as specified by the engineer shall only be allowed. The lapped ends shall be placed to ensure full bond on each bar. The development length shall be calculated as per clause no-26.2.1 page no-42 & clause no-26.2.5.1 page no-45 of IS-456-2000.for tension bars/main steel. And for distribution bars/temp. reinforcement bars/skin reinforcement bars, it shall be 30 times the diameter of bars. Laps splices shall not be used for bars larger than 36 mm, for larger diameters, bars may be welded in cases where welding is not practicable, lapping of bars larger than 36 mm may be permitted, in which case additional spirals should be provided around the lapped bars. The bars to be spliced shall be lap or butt welded by electric welding in the manner specified without loss of strength. Suitable means shall be provided for holding the bars accurately in position during the welding process Welded joints shall be paid in terms of length of bar equal to 40 times the diameter of the bars. The welded joints shall be staggered as directed. Three percent of the welded joints shall be tested for the tensile strength. Splicing shall not be done in the region of maximum bending moment & splicing of adjacent bars shall be avoided as far as possible. Also splices shall be suitable staggered.

**7.0) INSPECTION BEFORE CONCRETE:**

No concreting shall be started unless the reinforcement as laid finally checked and recorded by engineer in charge or by his representative.

**8.0) ANCHOR BARS:**

Anchor bars and rods are required in connection with installation of gates, etc. shall be supplied by the contractor or by department, as per tender provision, shall be placed in the concrete as shown in the drawing or as directed. No extra payment shall be made for placing of anchor rods.

**9.0) DOWEL BARS:**

Dowel bars as required for anchoring concrete face to the masonry shall be placed on masonry as shown in the drawing or as directed and included under reinforcement work.

**10.0) TESTING:**

Testing of steel shall be done for each size of bars as per provision mentioned in specification of materials in government or government approved laboratory.

Signature of Contractor

Executive Engineer

**CHAPTER-VII**  
**GENERAL SPECIFICATION OF EXCAVATION,**  
**CLEARING THE SITE AND**  
**EXCAVATION FOR**  
**FOUNDATION INCLUDING BLASTING**

**CHAPTER-VII**  
**CLEARING THE SITE AND EXCAVATION**  
**FOR FOUNDATION INCLUDING BLASTING**

**1.0) SCOPE OF WORK:**

The work to be done under this specification shall consist of clearing the site, excavation in different type of strata as mentioned in item of works and disposal of excavated material within lead and lift mention in the item of works. The scope of work also incl. of furnishing all tools, plants and labour and materials required to carry out excavation and maintaining the slope of excavated trenches by way of artificial manner (strutting) also, if required so.

**2.0) CLEARING THE SITE:**

The item of clearing site as given below shall be considered as included in the excavation and shall not be paid for separately, if there is no separate item of work for this in the tender.

**REMOVAL OF RUBBISH:**

The area to be occupied under the work shall be made free from rubbish and shall be cleared of all rocks, stumps, decayed timbers, bush and all other objectionable materials.

**DISPOSAL OF WASTE MATERIAL FROM SITE CLEARANCE:**

Waste materials decided as such by the engineer, obtain from clearing the site, shall be burnt or removed as directed by the engineer.

**REMOVAL OF LOOSE ROCK ETC.:**

Before any work of excavation is taken up, all loose rocks semidetached rock in or close to the area to be excavated, that is liable to fall or otherwise endanger the work or workmen shall be stripped. The methods employed shall be such as will not shatter or render unsuitable and therefore make unsafe the ground that was original sound or safe. Any material not requiring removal as contemplated herein, but which may latter become loosened or unsuitable shall be promptly and satisfactorily removed the cost of such clearing shall be deemed to have been incl. in the rate of different item of excavation.

**3.0) CLASSIFICATIONS:**

The work under excavation shall be divided into item as under.

**(A) EXCAVATION IN OVERBURDEN:**

This shall include all excavation in strata other than soft and hard rocks such as soil, clay sand soft murrum kantar, hard murrum and boulders or mixture of above strata through boring rig for diaphragm. Hard murrum and boulders shall include all kinds of disintegrated rock or shale or indurated sand or conglomerate interspersed with boulders less than 0.70 cubic meter and larger than 0.03 cubic mt. which do not need blasting and can be removed by pick bar and shovel.

**(B) EXCAVATION IN SOFT ROCK:**

This shall include all excavation in strata soft rocks through boring rig for diaphragm which can removed with a pick bar and shovel by little more force & efforts or with special equipments required but which do not come under the category of hard murrum and boulders.

**(C) EXCAVATION IN HARD ROCK:**

This shall include all excavation in rock occurring in masses, which can be best removed by blasting but it also includes excavation through boring rig for diaphragm. This shall also include rock required to be removed by chiseling rock breaker etc. when blasting is not permitted.

**4.0) PAY LINE:**

The pay line shall be sloping as 1:1 (H: V) in overburden, 0.50:1 (H: V) in soft rock and 0.25:1 (H: V) in hard rock as the case as per the item of work.

a) When actual depth of foundation is taken lower than proposed foundation levels, the pay line shall be the line starting from the limiting lines of structure at actual foundation level & sloping at the rate specified above.

b) When actual depth of foundation is taken above than proposed foundation levels, the pay line shall be the line confirmed to appropriate slopes excavated on the basis of width required for proposed foundation levels but ending at the level of actual foundation.

c) No payment shall be made for work done beyond the specified pay line, mentioned above.

d) The contractor shall, however, be permitted to excavate at flatter slopes in the interest of stability and safety of work without any extra cost if site condition permit so.

e) In the event of actual line of excavation being steeper than that specified under pay line above, payment shall be made for actual line of excavation only.

f) Over cut beyond specified pay line of excavation carried out by the contractor for any purpose or reasons, unless at the specified direction of engineer in charge, shall be at the expense of the contractor. Refilling required of such unauthorized

excavation with suitable materials, as directed by the engineer shall also be done by the contractor at his expense.

**5.0) SHORING AND STRUTTING:**

Any shoring and strutting that may be required during excavation and progress of work shall be deemed to be covered in the rate quoted for the respective item of work.

**6.0) SLIPS: GOVERNMENT NOT RESPONSIBLE:**

The contractor shall be bound to take necessary precautions to avoid any slips. But if any slip occurs on account of any reasons, no claims shall be entertained for such slips and their consequences, and the excavation shall be properly restored to stability for design & drawings of diaphragm.

**7.0) DISPOSAL OF EXCAVATED MATERIALS:**

The excavated material shall be disposed of within specified lead and lift mentioned in the respective item of work and manner as directed by engineer. Any useful materials what's so ever, shall be stacked separately and in the manner, as directed by engineer-in-charge. The directions of engineer in charge shall be binding in respect of location and manner for disposing off the waste and stack of useful materials within specified lead and lift mentioned in the respective item of work. The contractor shall however, use such of the stones, obtained from excavation in masonry work / pitching / road metal / rock fill etc as engineer in charge deemed fit for the use. The sorting /stacking of useful excavated materials is a must and inclusive in the quoted rates for the item of excavation. After sorting of useful materials is done, the rest of the materials which are declared not useful shall be disposed of in the areas on the downstream. Waste shall be levelled and trimmed to a reasonable regular line and level.

**8.0) FINAL FINISHED SURFACE OF FOUNDATION:**

After rough excavation through boring rig for diaphragm to the required depth is completed, scaling & trimming of all loosen rock shall be carried out by chisels and wedges or by suitable equipments. All weathered or partly decomposed pieces of rock remaining in foundations, shall be removed. Areas of low bearing capacity, steep, inclined seams, faults & crushed zones in an otherwise good foundation, if permitted to be kept, shall be cleaned off to a stuffiest depth before starting masonry or concrete. Where seams, joints, cavities, or other defect are found in an otherwise satisfactory foundation, such defects shall be corrected by excavation of open trenches to the lines, depth and dimensions as directed by the engineer in charge. The surface shall be rough, free from steps, angle and the edges of benches shall be chamfered approximately at 45 degrees. While preparing the foundation, it will be

seen that neither along the length of the dam nor across shall the foundation have slopes exceeding angle of internal friction on rock and masonry. The finally finished foundation surface shall be tested by striking with a 7/8-pound hammer. If any loose portion of foundation is revealed by a hollow sound, the same shall be removed by wedging, chiseling etc. till a good clear ringing sound (for the case of hard rock strata) is obtained from the rock or as decided by engineer in charge.

#### **9.0) ~~BLASTING:~~**

~~In conducting blasting operations, proper precautions shall be taken for the protection of persons, the work and property. All prevailing government laws and rules relating to the design and location of magazine, transport and handling of explosives & other measures enacted for prevention of accidents shall be strictly observed. Warning signals shall be prominently displayed on all magazines. Similar proper warning signals shall be given before actual blasting.~~

##### **1) ~~STORING OF EXPLOSIVE:~~**

~~Explosives shall be stored in a safe place and at a safe distance from the work and under the special care of watchman as per rules, so that in case of accidents no damage occurs to other part of the work. Explosive detonators and fuses shall be stored separately. No objections certificate from the District Magistrate or Inspector of Explosives, Gujarat, shall be obtained by the contractor as required.~~

##### **2) ~~RESTRICTION ON BLASTING:~~**

- ~~a. No blasting which may disturb or endanger the stability, safety or quality of the foundation shall be permitted.~~
- ~~b. Blasting within 15 mt. of masonry work in progress or a permanent structure, shall not be permitted.~~
- ~~c. Progressive blasting shall be limited to the one third of the total remaining depth of excavation.~~
- ~~d. blasting limit shall be 30 mt for heavy blasting & 15 mt for light blasting with shallow holes.~~
- ~~e. No large scale blasting operation shall be resorted to when the foundation excavation reaches the last 0.75 to 1.0 mt. Only small charges, preferably of small size gelatin/black gun powered may be allowed, so as to prevent shattering of the foundation.~~
- ~~f. In order to have periodic review, it would be almost necessary to excavate the foundation in limit depth or one meter after three meter excavation from the surface after three meter excavation from the surface use of ammonium nitrate must be dispensed with.~~



#### **10.0) RULES FOR BLASTING OPERATIONS:**

##### **a. GENERAL:**

The contractor shall acquaint himself with all the prevailing laws and rules & regulations concerning storing, handling and the use of explosives. All such laws, regulations & rules etc. as in force from time to time shall be binding upon the contractor.

##### **b. MATERIALS:**

i) All materials such as explosives, detonators, fuses, tamping, materials etc. that are proposed to be used in the blasting operations shall have prior approval of the engineer in charge.

ii) Black powder and safe explosive shall be used wherever possible. Explosive with nitroglycerin shall be used only under exceptional circumstances & where the above explosives are ineffective.

iii) The use of fuse with only one protective coat is prohibited.

##### **c. PERSONAL:**

i) Excavation by blasting will be permitted only under personal supervision of competent and licensed persons and trained workmen.

ii) All supervisors and workmen in charge of makeup, handling, storage and blasting work shall be adequately insured by the contractors.

iii) The storage shall be in charge of very reliable persons. The contractor shall have to produce a security for the person in charge of the explosives if and as required by the civil authorities of the district.

iv) The contractor shall make sure that his supervisors and workmen are fully conversant with all the rules to be observed in storing, handling, and use of explosives. It shall be ensured that the supervisor in charge is thoroughly acquainted with all the details.

##### **d. PROCUREMENT:**

i) The contractor will be the sole responsible for procurement of explosive.

ii) The contractor shall, if required by him, build a magazine or bring portable one for storing the explosive.

iii) A careful & day to day account of the use of explosive shall be kept by the contractor in an approved register and approved manner.

iv) The magazine shall at all times be kept scrupulously clean. All the rules and regulations under explosive law for magazine management, maintenance, handling and safety shall be followed.

v) Notice shall be hung near the store prohibiting entrance of unauthorized persons.

**e. USE OF EXPLOSIVE:**

For the transport of explosives and detonators, closed and strong container made of soft materials such as timber, copper, lather etc. and like materials shall be used confirming the latest provision under handling, transportation and use of explosive rules and regulations. Latest provisions under explosive rules and regulations shall be followed for the use of explosives.

**f. CHARGING OF HOLES:**

- i) The work of charging shall not commence before all the drilling work at the site is completed and the supervisor has satisfied himself to that effect by actual inspection.
- ii) While charging open lamps shall be kept away. For charging with powered explosives, naked flame shall not be allowed.
- iii) Only wooden tamping rods without any kind of metal on them shall be allowed to be used.
- iv) Bore holes must be of such a size that the cartridges can easily pass down them.
- v) Only one cartridge shall be inserted at a time and gently pressed into the hole with the tamping rod. The sand, clay or other tamping material used for filling the holes completely shall not be tamped too hard.

**g. BLASTING:**

Blasting shall only be carried out during fixed hours of the daytime after prior written approval of engineer in charge.

- ii) The site of blasting shall be prominently demarcated by red danger flags. A siren with a range of one km radius shall be utilized for warning. All the labours work immediately get safe shelters.
- iii) All the roads and footpaths etc. leading to blasting shall be detached.
- vi) Blasting shall be carried out in such a way, so as not to disturbed the banks of the canals & its structures, Dam structures, other surrounding structures etc.

**11.0) ELECTRICAL FIRING:**

- i) Only the supervisor in charge shall keep the key of the firing apparatus.
- ii) Special apparatus shall be used as the source of current for blasting.
- iii) All the detonations shall be checked before use.
- iv) For blasting in one series, only detonators of the same manufacture and of the same group of electrical resistance shall be used.
- v) Such of the electric lines, shall be removed from the site.
- vi) The use of earth as a return line shall not be permitted.
- vii) The firing cable shall have a proper insulation cover.
- viii) Before firing, the circuit shall be checked by a suitable apparatus.
- ix) After firing, the source of current shall be cut off before any persons are Allowed to leave the shelter.
- x) During storms, charging with electrical detonators shall be suspended.

#### **~~12.0) PRECAUTIONS AFTER BLASTING:~~**

- ~~i) After the blast, the supervisor shall carefully inspect the work and satisfy himself that all charges have exploded.~~
- ~~ii) For underground work, the workmen shall only be allowed to go to face after toxic gases got evacuated.~~

#### **~~13.0) MISFIRING:~~**

- ~~i) If it is suspected that part of the blast has failed to fire or is delayed, sufficient time shall be allowed to lapse before entering the danger zone.~~
- ~~ii) Neither drilling near the holes that have misfired, nor redrilling the hole shall be permitted.~~
- ~~iii) The supervisor of the blasting operation shall have to report to the office regarding all cases of misfire, the cause of misfire and steps taken in connection therewith.~~

#### **~~14.0 LIGHT AND CONTROLLED BLASTING:~~**

~~Where heavy or wet blasting operations are prohibited or are not practicable, excavation in hard rock / bhat rock strata shall only be carried out using light and controlled blasting technique under strict supervision of expertise persons and department. All the specifications and precautions mentioned above shall be applicable for here also.~~

#### **~~15.0 EXCAVATION BY USING MECHANICAL HAMMER / ROCK BREAKER/ PNEUMETIC DRILLS:~~**

~~Where heavy or wet blasting and light & controlled blasting operations are prohibited or are not practicable, excavation in hard rock/bhat rock strata shall only be carried out by using mechanical hammer / rock breaker or pneumatic drills or by manual chiseling using crowbars, pickaxes etc. for the excavation of diaphragm.~~

#### **~~16.0 RECOVER OF HARD ROCK AVAILABLE FROM EXCAVATION:~~**

~~As per Govt. of Gujarat N.W.R.W.S. and Kalpsar Dept. Order No. MI Cell /102010 /17 /(2) K-1, Dt.21/01/2014, for the hard rock, which is excavated from the work will be allotted to the agency. The amount will be recovered at the rate Rs. 211.00 per Cum excluding GST. In addition, necessary royalty for these materials has to be paid by the agency as per prevailing rules and regulation to the Industries & Mines Dept. according to classification of materials.~~

~~The quantity will calculate as per instruction of engineer In Charge. This fact should be kept in mind while quoting the tender rates of these items.~~

~~**No recovery shall be made for hard rock for excavation in hard rock through boring rig for diaphragm wall purpose only.**~~

Signature of Contractor

Executive Engineer

## **CHAPTER - VIII**

### **GENERAL SPECIFICATION OF BACK FILLING**

## **CHAPTER-VIII**

### **GENERAL SPECIFICATION OF BACK FILLING**

#### **1.0 BACK FILLING THE TRENCHES:**

Back fill is defined as excavation refilled up to the ground line by embankment material which is required to be placed in the excavation space after the structure is built up above the normal ground level. All back fill shall be carefully brought to the line and grades as shown or as directed.

All back filling shall be compacted around the structure by means of rollers of mechanical, pneumatic and/or hand tampers including requisite watering. This back fill shall be either of the excavated stuff or from borrow areas of selected soil specified as under:

#### **2.0 EXCAVATED STUFF:**

Back fill, with excavated stuff in the foundation trenches and other works, wing wall, training walls, etc. when not filled up by concrete shall be filled up by heavy rubble as per drawing and as per direction of Engineer-in-charge shall be filled up by impervious type of soil free from other deleterious materials obtained from excavation. It shall be back filled and compacted as shown on the drawing or as directed by the engineer. The rubble shall be used from excavated materials as per the instruction of Engineer In charge.

#### **3.0 FROM BORROW AREA:**

In the case, when back fill quantities are not met with which are not available from compulsory excavations of work, shall be obtained from the designated borrow areas. The depth of cut in all parts of borrow areas shall be limited to designated depth only. Borrow areas shall be cleaned and stripped by the contractor at his own cost to a depth necessary to obtain materials of desired quality.

All borrow areas shall be operated with certain amount of regularity having regard to convenience of the work during execution and to the safety and appearance of the work after its completion. Decision of engineer in charge will be final.

Temporarily road leading to and from the borrow areas to site of work shall be constructed and maintained by the contractor at his cost for which no payment shall be made.

The contractor is expected to have his own assessment and inquiries carried out before tendering for the work. No claims shall be entertained in future due to lack of conformity between the nature of the materials actually met with during construction and that indicated in borrow area plan. If, suitable is brought from other places by the contractor for his own conveniences, no extra payment shall be made.

Signature of Contractor

Executive Engineer

**CHAPTER - IX**  
**GENERAL SPECIFICATION OF**  
**EARTHWORK & ENVELOPES**

## **CHAPTER - IX**

### **GENERAL TECHNICAL SPECIFICATION FOR EARTH WORK & ENVELOPES**

#### **1.0) PREPARATION OF WORK AREA:**

- i) **CLEANING THE SITE:** Cleaning and grabbing shall be done in work area & borrow area as directed by engineer in charge. The site should be cleared of all trees, stumps, roots, bush, rubbish and all other objectionable matters. All such materials shall be removed from the site or burnt as directed so as not to interfere with the construction operation and shall be disposed of as directed by engineer in charge. All trees shall be cut down to at least 0.6 mt below ground level. The department will indicate the specific areas which need to be cleared up and decision of the engineer in charge in this connection shall be final and binding to the contractor. The measurements and payment shall be made as mentioned in the detailed technical specification of clearing the site of work. If there is no separate item for clearing the site, then rate of respective items for striping, earth work etc shall be considered inclusive of clearing the site and no extra payment shall be made for clearing the site of work.
- ii) **STRIPPING:** The entire area of embankment from u/s to d/s toe, continuous with the area of embankment as shown in the drawing, shall be stripped to a sufficient depth (max. up to 30 cms) as directed to remove unsuitable materials as mentioned in the detail technical specification of respective item of stripping. The stripping shall be carried out in far enough in advance of the other items of works to ensure that no undesirable materials get mixed up with approved embankment materials and to allow for inspection and measurement. The payment for stripping shall be done as per respective item of work.

#### **2.0) BORROW AREAS:**

##### **GENERAL:**

- i) Materials required for embankment or C.O.T. or back fill which are not available from compulsory excavations of work or deepening area of MIS, shall be obtained from the designated borrow areas.
- ii) The depth of cut in all parts of borrow areas shall be limited to design depth only. Borrow areas shall be cleaned and stripped by the contractor, at his own cost to a depth necessary to obtain materials of desired quality. As no borrow area available nearby site of work due to forest land, the contractor has to make own arrangement for necessary borrow area for required quantity of selected materials as per items of work including all lead & lift without any extra cost.

- iii) All borrow areas shall be operated with certain amount of regularity having regard to convenience of the work during execution and to the safety and appearance of the work after its completion. Decision of engineer in charge will be final.
- iv) Temporarily road leading to & from the borrow areas to site of work shall be constructed and maintained by the contractor at his own cost for which no payment shall be made.
- v) The contractor is expected to have his own assessment and inquiries carried out before tendering for the work. No claims shall be entertained in future due to lack of conformity between the nature of the materials met with during construction and that indicated in area plan. If, suitable is brought from other places by the contractor for his own convenience, no extra payment shall be made.

**PREPARATION OF BORROW AREA:**

All areas required for borrowing earth for embankment shall be cleaned of all trees and stumps roots, bushes, rubbish, and other objectionable materials. Particular care shall be taken to execute all organic matter from the material to be placed in the embankment. All cleared materials shall completely burn to ashes. The cleared areas shall be maintained free from vegetation growth during the progress of the work.

**STRIPPING:**

Borrow areas shall be stripped as required (maximum unto 30cms) of top unsuitable soil, clods and any other materials which are unsuitable for the purposes. No extra payment shall made for the clearing and stripping done for the borrow area.

**3.0) EMBANKMENT GENERAL:**

For the purpose of these specifications the terms "EMBANKMENT" incl. all portions of the embankment as follows.

- i) The earth fills designated as core/heating impervious zone in earth dam. The earth fill designated as shell/casing/semi pervious zone/gravel fill in earth dam.
- ii) The inclined/horizontal sand filter in earth dam.
- iii) Selected surfacing on the dam embankment or elsewhere.
- iv) Canal bank embankment/Road bank embankment.
- v) Backfill behind the structure.

Placement of fill within zones shall be performed in an orderly sequence and in an efficient and workman like manner, so as to produce within each zone, fills having such quality of density, strength and permeability as will ensure the highest practicable degree of stability and performance of the whole dam/canal



embankment. No bushes, roots, seeds or other perishable or unsuitable materials shall be placed in embankment.

**4.0) PREPARATION OF FOUNDATION:**

Foundation preparation shall be performed subsequent to stripping and excavation, if any. No portion of the embankment should be started until the foundation for that section has been suitably prepared and approved. Masonry surface of the back of retaining wall/training wall/ side wall/cut off wall etc. against which the fill is to be placed, shall be cleaned and coated with bentonite slurry, moisture prior to placing the earth fill.

**5.0) FOUNDATION ON PERVIOUS LAYERS OF EARTH DAM:**

Earth foundation for fills shall be scarified and loosened by means plough, ripper or other methods to the satisfaction of engineer in charge. After removal of roots or other debris turned up, the fill shall be compacted by the required number of passes of compaction equipment. If necessary, as directed by the engineer in charge, the surface shall be allowed to dry or alternatively be moisture prior to the placement of fill to create satisfactory bond between the foundation and fill materials.

**6.0) EARTH FILL MATERIALS FOR EARTH DAM:**

The materials for respective zones of the embankment shall be obtained from designated borrow area. In general, all materials from a particular borrow area shall be mixture of materials obtained for the full depth of the cut. *The selected material for required quantity of earth work for respective item of work shall be brought from outside borrow area including all lead and lift, the contractor makes his own arrangement for obtaining such borrow area required without any extra cost, as borrow area is not available nearby the site of work due to forest land in vicinity.*

**7.0) CHANGE OF ZONING IN EARTH DAM:**

There may be modifications in zoning on account of availability of excavated stuff from the foundation. The contractor shall have to carry out the work as per modified zones for locations and situations as directed for which no claim will be entertained.

**8.0) PLACING EARTH FILL:**

The distribution and gradation of the material throughout earth fill shall be as shown in the drawing or as directed. The fill shall be free from loose pockets, or layers of material differing substantially in texture or gradation from the surrounding material. The combined excavation and placing operations shall be such that the materials, when compacted in the earth fill, will be blended sufficiently to produce the desire degree of compaction for stability. Care shall be taken to ensure that materials are

not so placed as will be conducive to the formation of intermittent relatively impervious blanket in the shell zones, which will interfere with satisfactory drainage in E. DAM. No stones, cobbles or rock fragments having dimensions of more than 10 cms shall be placed. Such materials shall be removed before rolling and compaction.

**9.0) DRESSING OF SLOPES:**

The outer slopes of the embankment shall be neatly dressed to line as the placing of fill progresses. Compaction shall extend over the full width of the embankment and the material in the slopes shall be compacted as far the rest of the structure. For E. DAM, to ensure proper compaction at the outer edge, the fill shall be kept 50 cms wider than true width and the outer edges dressed to true width and slope after compaction. This additional width shall not be measured for payment. Any materials that are lost by weathering, local damages, wash out, rain cuts causing erosion on slopes etc. shall be made good with the same degree of back filling and compaction until final acceptance of work, without extra cost to department.

**10.0) FILTER: -**

**10.1** The filter as approved by competent authorities should be laid horizontally in the dam seat and inclined abutting the hearting core as shown on the drawing. The number of layers in the filter and thickness of each layer shall be as specified. It shall be seen that filter should be raised simultaneously with the other adjacent zones. The filter zone should not be less than 30 cm in depth in any case. Care must be taken to ensure that the filter zone material does not get mixed up with the material of adjacent zones and spoiled. Before rolling it should be clear of objectionable materials.

**10.2 MATERIALS: -**

The filter materials shall consist of clear, sound and well graded sand and gravel and/or crushed rock. The material shall be free from debris, wood, vegetable matter and other deleterious matter. The gradation of each filter layer shall meet the requirement as directed by the laboratory. The silt content should be restricted up to 3% as per I.S. 383 - 1970.

**11.0) ROCKFILL IN ENVELOPE:**

**11.1** Rock fill shall consist of sound, durable and well graded broken rocks, obtained from approved excavations for the work and/or from approved quarries. The materials shall range in size from 2.5 cm to 60 cm. However, no truck load shall contain more than 15 P.C. by volume for rock fragment smaller than 7.5-centimeter size and shall not exceed 25 P.C. of the total. All bushes, roots, or other perishable

material shall be removed from rock fill during spreading and shall be transported to disposal area.

**11.2** The placing of rock fill shall be directed to obtain a stable, well graded and free draining fill. The rock fill shall be constructed in such a way that the smaller rock fragment is placed adjacent to the filter or embankment and the large rock fragment near the outer edge of the fill in form of rock toe.

**11.3** The rock fill shall be dumped, spread, and roughly leveled in layers not greater than 60 cm in thickness (loose) in order to maintain a reasonable uniform surface and ensure that compacted fill will be suitable and will not contain any large voids.

**11.4** Contamination of the rock with finer material from any other zones shall be avoided. Accumulation of soil caused by contamination shall be removed while being placed. The rock fill shall be wetted with water jets on the construction surface with pressure sufficient to penetrate the full thickness of layers and wet all the surfaces of rock pieces. The volume of water used shall be about 40% of the volume of rock or as directed. Each layer of the rock- fill as laid shall be compacted with about 6 passes of 5 to 10 tons vibratory roller.

**11.5** Rock fill shall not be dumped directly against any concrete /masonry structure or rock face but shall be dumped a short distance away and pushed in a horizontal direction against the structure by bulldozer or in a similar manner as directed.

**12.0) ROCK FILL IN TOE OF EMBANKMENT (ROCK TOE): -**

The size, quality of materials and method of carrying out the work shall be as specified in Para 10.20 above, except that necessary hand packing of stones adjacent to the filter materials, and on outer slopes shall be required to be done as shown on drawing. Special precautions shall have to be taken as per the direction of the Engineer-in-Charge for the construction of contact zones. The work includes hand packing on face work as directed.

**13.0) GRADED FILTER UNDERNEATH RIPRAP WORK TOE-DRAINS AND SLOPING FACE OF ROCK TOE:**

**13.1** Graded filter shall be constructed underneath the riprap on the upstream slopes of embankment and in the D/S slope of the rock toe separating it from the earth fill and also between the rock fill and the casing zone, sand filter etc.

**13.2** Filter blankets shall be constructed to specify thickness measured normal to the slope. The filter under the pitching on the upstream riprap and rock toe shall be constructed in at least two different layers or as directed by the Engineer-in-Charge. The graded filter between the rock fill and casing zone in the transition between masonry and earth dams and between the core and downstream shell shall closely follow the levels of the embankment in the area. The finest material of

the filter shall be placed adjacent to the material to be protected and the coarser layer of filter shall be placed adjacent to the riprap or rock fill. Such base filter material shall be clean, sound, natural or well graded sand, gravel or screened rock fragments, or hand broken metal (100mm to 150mm size) as approved by the Engineer.

- 13.3** Filter materials shall consist of layers graded in size from fine to coarse as shown in the drawing or as directed. The fine materials shall be laid next to the earth work to be followed by the layers of progressively coarser materials, so as to form a graded filter. Fine Materials shall consist of coarse sand passing through a 1/8" square mesh sieve. After this, shall be laid fine gravel or crushed rock (in case natural gravel is not available) of approved gradation which is expected to be detailed by screening the material retained on 1/8" mesh but passing through 3/4" to 1" diagonal mesh sieve. Coarser materials shall consist of all the materials retained 3/4" to 1" diagonal mesh sieve, the maximum size being limited to 3" in all. the filter material should satisfy the standard filter criteria. In general, the inclined filter shall consist of 50% coarse sand near the I.P. zone and 50 % sand and gravel or crushed metal (graded) as directed. In case of horizontal filter, it shall consist of pure gravel or crushed metal as directed, followed by transition layers on top and bottom of horizontal filter. The base filter material shall be laid in layers not exceeding 15 cm to 25 cm thickness (loose) saturated with water and shall be lightly rolled by a light roller (weighing about 2 tonnes) as specified, else manual compaction arrangements shall be done as directed.

**14.0 RIPRAP WORK ON THE UPSTREAM SLOPES OF EMBANKMENT:**

- 14.1** Riprap shall be hand packed on the U/s slope of the dam embankment. The thickness of the riprap layer shall be as indicated in the drawing. The thickness shall be measured normal to the slope of the embankment. To determine the thickness of the riprap, only exposed rock of specified size or largest shall be considered. The tolerance on the nominal thickness of riprap enforced on the performed profile shall be  $\pm 10$  percent (I.S. 8237 - 1976).

The riprap material shall consist of the most durable rock fragments of approved quality, selected from excavation for permanent construction or other sources. The individual rock fragment shall be dense, solid and resistant to abrasion and shall be free from cracks, seams, shale particles, conglomerate blend and other defects that would tend to increase unduly their susceptibility to destruction by water and weathering action. The shape of the individual rock fragment shall be angular. The fragments having thickness less than 50 percent of their

maximum dimension shall not be used as riprap. No stone shall weigh less than 25 kg or as directed by Engineer-in-charge. The stone shall be placed on edge with its broad base down and face normal to the slope with necessary hand-packing in workman like manner. Rock fragments and spalls shall be tightly driven into the interstices to wedge the riprap in place and close direct opening to the underlying surface. The stones shall be laid in a compact manner being at the bottom of the slope. The item of riprap (pitching) works as specified items in different thickness for upstream and down slopes as per approved drawing do not include or provide separate payment for the base graded filter to be provided in each case. Headers shall be provided and fixed normally at the rate shown in drawings or as directed to penetrate fully across the riprap and are also inclusive in the rate of the item. Necessary field dressing and trimming of slopes, removing excess materials on slopes etc. will have to be attended to as directed without any extra charges.

- 14.2** Riprap shall be placed simultaneously with the fill so that a minimum of break down will occur during placing and spreading etc.

**15.0 LEADS AND LIFTS:**

All work conditions shall be executed as per leads and lifts specified under the different items and detailed specifications. Where the items of earth work specify "Prescribed or specific lead" the same shall be taken as the lead involved in carrying out the earthwork in the various zones from the borrow areas demarcated and annexed to the tender. The lead, provided for all embankment work is up to all lead and all lifts, unless specified otherwise. If due to some reasons it becomes necessary to borrow earth from areas outside the designated boundaries prescribed, the contractor shall be bound to do so. In such cases, the contractor shall have to operate the additional borrow area beyond the leads mentioned in the items as directed by the Engineer-in-charge and he shall not be paid any extra for leads and lift.

In case of other items of embankment like sand filter, Riprap, rock-toe, toe drain, surface drainage work items etc. contractor has to make his own arrangement about lead for the materials. If approved quality of materials is not met within specified lead and lift mentioned in the specification for execute the items of tender, the contractor shall borrow the materials from any lead and lift for complete the items without any extra cost to the Govt. i.e., Rate shall be quoted considering all lead and lift for complete the items.

**Signature of Contractor**

**Executive Engineer**

**CHAPTER-X**

**CARE & DIVERSION OF RIVER INCLUDING DEWATERING**

## **CHAPTER-X**

### **CARE & DIVERSION OF RIVER INCLUDING DEWATERING**

#### **1.0 GENERAL:**

The care & diversion of river / creek including dewatering shall be considered inclusive in the respective items of work, if there is not separately provision for this (C & D) in the tender and required C&D works are of minor nature.

- 1.1 The area under all permanent and the adjoining areas, if necessary, shall be maintained free from water.
- 1.2 The contractor shall design, construct & maintain necessary diversion & other temporary protective works and make provisions for diversion of the river/creek flows & furnish maintain & operate all necessary pumping and dredging plants, for dewatering the various parts of the works and maintain the foundations and required area of construction site as free from water as required.
- 1.3 The contractor shall pump all water from the site of work and shall keep the foundations free of water while excavation, grouting, concreting or placing of masonry are in progress or as otherwise required for completing the work and shall be entitled to no claims or damages on account of or by reasons of any amount of due to water leaking through, under or around the coffer dam, diversion channel and other diversion works. During the monsoon season / high tide period, the work in the river / creek portion shall be closed & the floods shall be allowed to pass over to the partly constructed concrete/masonry portion only and under no circumstances such flow shall over flank the other parts of the work which liable to damage in such condition.
- 1.4 The care & diversion of river / creek work shall have to be reckoned and provided for any eventualities like unseasonable rains / floods /unprecedented high tide etc.
- 1.5 Preliminary thought has been given to the diversion works and it is visualized that a diversion challenge to gather with the u/s and d/s coffer dams may be required to divert the flow of vonkala/river/creek. The diversion is likely to be required for a period of construction depending upon the progress of work. The above statement is purely for general guidance only and any inference and conclusion reached by the tenderer is solely at his risk and responsibility.
- 1.6 The contractor will be free to suggest alternative arrangement which is considered suitable and safe and not likely to obstruct or delay the progress which may be approved at the discretion of the engineer in charge. The contractor shall not be entitle to any extra claims on this account. In such case contactor should submit his

plans with detailed drawing within four months of the work order for approval of engineer in charge.

- 1.7 The contractor shall fully satisfy himself about quantum of flow to be tackled and about the adequacy, efficiency and safety of the care and diversion arrangement to be adopted by him. The engineer in charge shall, however, have right to enlarge or strengthen the diversion arrangements if he so consider in the interest of work. All such additions, modifications etc directed by the engineer shall be promptly executed by the contractor and the same shall be deemed to be part of care and diversion arrangement and included in the rate quoted by the contractor.
- 1.8 In case of the diversion arrangement getting washed out or largely damaged, the same shall be immediately repaired and reclaimed by the contractor at his own cost. Necessary pumping of water, removal of silt etc. shall also be attended promptly so as to cause the least delay in the progress of the work. No claim shall be entertained on this account.
- 1.9 The contractor shall construct the diversion arrangement in such a way that no damage is caused to the permanent or temporary structure. If such damage is caused due to the flood water, either during monsoon or in the post monsoon, the same shall be made good at the contractor's cost.
- 1.10 Approval of the plans for the diversion for the diversion works by the engineer shall not relieve the contractor from the responsibility for the adequacy thereof and pumping plant or from furnishing all equipments, layout, materials necessary for dewatering the required area of construction including foundation and keep the work areas free of water and all items necessary within the scope of this contract.
- 1.11 After having served their purpose, the cofferdam/temporary bulk heads etc. shall be removed to the extent directed by the engineer from time to time. The removal of the temporary works, bulkheads, etc. shall be so arranged as not to damage the permanent works. Any damage resulting from these operations shall be made good by the contractor to the satisfaction of the engineer. Any reasonable inflow of water from the works in other reaches shall be diverted by the contractor as part and partial of the item without any extra claim.
- 1.12 In the case of dam construction, the item also includes maintaining, pumping out and keeping the galleries dry from all from the gallery sump accumulated due to seepage drilling or grouting or any other cause during the construction period and till all other works are finally handed over to the government.



## **2.0 DISPOSAL OF EXCAVATED STUFF:**

The materials available from the excavation of diversion channel shall be disposed off as under. Rubble considered as useful by engineer in charge for the work, shall be sorted out, transported, and stacked at the locations within the construction area as directed by engineer in charge and shall not be allowed to use for coffer dam. The remaining material of excavation can be used for construction of coffer dam free of charge. Such of the materials in excess over required in the construction of coffer dams, if found suitable, shall be transported, and stacked or used for permanent structure as directed by engineer in charge. No separate payment shall, however, be made of the excavation of diversion channel. The material obtained from the dismantling of coffer dam shall be suitably disposed of as under. The material not found useful shall be disposed of in nearby area as directed. The material found suitable by engineer in charge shall be carted and deposited as and were directed in the permanent structure of work and shall be paid under relevant item of deposition of excavated stuff.

Signature of Contractor

Executive Engineer

**CHAPTER-XI**  
**GENERAL SPECIFICATION OF STRUCTURAL STEEL**

## **CHAPTER - XI**

### **GENERAL SPECIFICATION OF STRUCTURAL STEEL**

#### **3.1 Structural Steel Work**

##### **3.1.1 Applicable Codes and Specifications**

The supply, fabrication, erection and painting of structural steel works shall comply with the following specifications, standards and codes unless otherwise specified herein. All standards, specifications and codes of practices referred to herein shall be the latest editions including all applicable official amendments and revisions.

IS : 808	<del>Dimensions for Hot Rolled Steel sections</del>
IS : 814	<del>Covered Electrodes for Manual Metal Arc Welding of Carbon and Carbon Manganese Steel</del>
IS : 800	Code of Practice for General Construction in Steel
IS : 801	<del>Code of Practice for Use of Cold Formed Light Gauge Steel Structural Members in General Building Construction</del>
IS : 806	<del>Code of Practice for Use of Steel Tubes in General Building Construction</del>
IS : 7205	<del>Safety Code for Erection of Structural Steel Work</del>
IS : 7215	<del>Tolerances for Fabrication of Steel Structures</del>
IS : 4000	High Strength Bolts in Steel Structure — Code of Practice
AISC	Specifications for Design, Fabrication and Erection of Buildings
IS : 1161	<del>Steel Tubes for structural purposes</del>
IS:102	Ready Mixed paint, Brushing, Red Lead, Non-setting, Priming
IS:110	Ready Mixed paint, brushing, grey filler for enamels for use over primers

IS:117	Ready Mixed paint, Brushing, Finishing, Exterior Semi gloss for general purposes, to Indian Standard colours
IS:158	Ready Mixed paint, Brushing, Bituminous, Black, Lead free, Acid, Alkali and heat resisting
IS:159	Ready Mixed paint, Brushing, Acid resisting for protection against acid fumes, colour as required
<del>IS:344</del>	<del>Black Japan, Types A, B and C</del>
<del>IS:2339</del>	<del>Specification for Aluminium paint for general purposes, in Dual container</del>
IS:2932	Enamel, synthetic, exterior, (a) undercoating, (b) finishing - Specification
IS:2933	Specification for enamel, exterior, (a) undercoating, (b) finishing
<del>IS:5905</del>	<del>Sprayed aluminium and zinc coatings on Iron and Steel</del>
<del>IS:6005</del>	<del>Code of practice for phosphating of Iron and Steel</del>
IS:9862	Specification for ready mixed paint, brushing, bituminous, black, lead free, acid, alkali, water & chlorine resisting
<del>IS:13183</del>	<del>Aluminium paint, Heat resistant – Specification</del>
<del>SIS-05-5900</del>	<del>(Swedish Standard)</del>
<del>IS : 1239</del>	<del>Mild steel tubes, tubulars and other Wrought steel fittings</del>
	<del>Part 1 — Mild steel tubes</del>
	<del>Part 2 — Mild steel tubulars and other wrought steel pipe fittings</del>
<del>IS : 1363</del>	<del>Hexagon Head Bolts, Screws and Nuts of product Grade C</del>
<del>(Parts 1 to 3)</del>	<del>(Size range M5 to M64)</del>
<del>IS : 1367 (All parts)</del>	<del>Technical Supply Conditions for Threaded Steel Fasteners</del>
<del>IS : 1852</del>	<del>Rolling and Cutting Tolerances for Hot Rolled Steel Products</del>
<del>IS : 1977</del>	<del>Low tensile Structural Steel – Specification</del>
<del>IS : 2062-2011</del>	<del>Hot rolled medium and high tensile structural steel Specification</del>

IS : 2074	Ready Mixed Paint, Air drying, Red Oxide Zinc Chrome and Priming - Specification
<del>IS : 3502</del>	<del>Steel Chequered Plates — Specification</del>
<del>IS : 3757</del>	<del>Specification for High Strength Structural Bolts</del>
<del>IS : 5369</del>	<del>General Requirements for Plain Washers and Lock Washers</del>
<del>IS : 5372</del>	<del>Taper Washers for Channels (ISMC)</del>
<del>IS : 5374</del>	<del>Taper Washers for I Beams (ISMB)</del>
<del>IS : 6610</del>	<del>Specification for Heavy Washers for Steel Structures</del>
<del>IS : 8500</del>	<del>Structural Steel micro alloyed (medium and high strength qualities) — Specification</del>
<del>IS : 803</del>	<del>Code of practice for design, fabrication and erection of vertical mild steel cylindrical welded oil storage tanks</del>
<del>IS : 816</del>	<del>Code of Practice for use of Metal Arc Welding of carbon and manganese steel</del>
IS : 822	Code of Procedure for Inspection of Welds
<del>IS : 1182</del>	<del>Recommended Practice for Radiographic examination of Fusion — Welded Butt Joints in Steel Plates</del>
IS : 1200	Method of Measurement of Building and Civil Engineering Works
<del>IS : 1477</del>	<del>Code of Practice for Painting of (Parts 1&amp;2) Ferrous Metals in Buildings</del>
<del>IS : 2595</del>	<del>Code of Practice for Radiographic Testing</del>
<del>IS : 3658</del>	<del>Code of Practice for Liquid Penetrant Flaw Detection</del>
<del>IS : 5334</del>	<del>Code of Practice for Magnetic Particle Flaw Detection of Welds</del>
<del>IS : 9595</del>	<del>Metal Arc Welding of Carbon and Carbon Manganese Steel- Recommendations</del>

### 3.1.2 Steel Materials

Steel materials shall comply with the referred to in **Sub-Clause 3.1.1**. All materials used shall be new, unused and free from defects.

All steel and other materials used for steelwork and in association with steelwork will conform to appropriate latest Indian standards. Only tested materials will be used.

Unless otherwise specified in the drawings

~~a) All rolled sections and plate will conform to Grade E250 "A" as per IS: 2062-2011.~~

~~b) Plated structures subjected to dynamic loading will conform to Grade E250 "BR" as per IS: 2062-2011.~~

~~Steel sheets will conform to IS: 1079.~~

~~Steel tubes for structural purpose will conform to IS: 1161 (of Grade YST 240)~~

~~Aluminium industrial troughed sheets conforming to IS: 1254 will be used as follows:~~

~~i) In roof 0.91mm thick~~

~~ii) In side walls 0.71mm thick~~

~~Translucent sheets will be fiberglass reinforced polyester sheets of matching profile as per appropriate standards.~~

~~Gutters will be of copper bearing steel conforming to Grade "A" as per IS: 2062-2011. Crane rail will conform to IS: 3443.~~

#### **Drawings to be prepared by the contractor:**

The contractor shall prepare all fabrication and erection drawings for the entire work. All the drawings for the entire work shall be prepared in metric units. The drawings shall preferably be of one standard size and the details shown there in shall be clear and legible.

All fabrication drawings shall be submitted to the Engineer In Charge for approval.

No fabrication drawings will be accepted for Engineer In Charge's approval unless checked and approved by the contractor's qualified structural engineer and accompanied by an erection plan showing the location of all pieces detailed. The contractor shall ensure that connections are detailed to obtain ease in erection of structures and in making field connections.

Fabrication shall be started by the contractor only after Engineer In Charge's approval of fabrication drawings. Approval by the Engineer In Charge of any of the drawings shall not relieve the contractor from the responsibility for correctness of engineering and design of connections, workmanship, fit of parts, details, material, errors or omissions or any and all work shown thereon. The Engineer In Charge's approval shall constitute approval of the size of members, dimensions and general arrangement but shall not constitute approval of the connections between members and other details.

The drawings prepared by the contractor and all subsequent revisions etc. shall be at the cost of the contractor for which no separate payment will be made.

### **3.1.3 Fabrication**

#### **3.1.3.1 General**

All workmanship and finish shall be of the best quality and shall conform to the best approved method of fabrication. All materials shall be finished straight and shall be machined/ground smooth true and square where so specified. All holes and edges shall be free of burrs. Shearing and chipping shall be neatly and accurately done and all portions of work exposed to view shall be neatly finished. Unless otherwise approved by the Engineer In Charge, reference may be made to relevant IS codes for providing standard fabrication tolerance. Material at the shops shall be kept clean and protected from weather.

#### **3.1.3.2 Connections**

Shop/field connections shall be as per approved fabrication drawings.

In case of bolted connections, taper washers or flat washers or spring washers shall be used with bolts wherever necessary. In case of high strength friction grip bolts, hardened washers be used under the nuts or the bolt heads whichever are turned to tighten the bolts. The length of the bolt shall be such that at-least one thread of the bolt projects beyond the nut, except in case of high strength friction grip bolts where this projection shall be at least three times the pitch of the thread.

Rivets shall be heated uniformly throughout their length, without burning or excessive scaling, and shall be of sufficient length to provide a head of standard dimensions. They shall, when driven, completely fill the holes and, if countersunk, the countersinking shall be fully filled by the rivet, any protrusion of the countersunk head being dressed off flush, if required.

In all cases where bearing is critical, the unthreaded portion of bolt shall bear on the members assembled. A washer of adequate thickness may be provided to exclude the threads from the bearing thickness, if a longer grip bolt has to be used for this purpose.

All connections and splices shall be designed for full strength of members or loads. Column splices shall be designed for the full tensile strength of the minimum cross section at the splice.

All bolts, nuts, washers, electrodes, screws etc., shall be supplied/brought to site 10% in excess of the requirement in each category and size. Rates shall cover the cost of this extra quantity.

All members likely to collect rain water shall have drain holes provided.

All black hexagonal bolts, nuts and locknuts shall conform to IS – 1363 and IS: 1364 (for precision and semi precision hexagonal bolts) shall conform to IS : 5369.

All HSFG bolts will conform to IS: 3757. Assembly of joints using HSFG bolts will conform to IS:4000.

Covered electrodes for arc welding will conform to IS: 814. Coding of electrodes will be as follows:

- a) ER421 'C' X for mild steel of Grade 'A' and Grade 'B' as per IS : 2062
  - b) EB 542 'C' H3X for Mild steel of Grade 'B' as per IS 2062 for dynamically loaded structures (arising out of crane, vibratory screen, equipment's etc.)
- 'C' is the value of the current as recommended by the electrode manufacturer.

Certified mill test reports of materials used in the work will be made available for inspection by the Owner upon request. All the materials will be straight and if necessary before being worked will be straightened and/or flattened by pressure including de-coiling of plates unless required to be of curvilinear form and will be free from twists.



#### **3.1.3.3 Straightening**

All materials shall be straight and, if necessary, before being worked shall be straightened and/or flattened by pressure and shall be free from twists. Heating or forging shall not be resorted to without the prior approval of the Engineer In Charge in writing.

#### **3.1.3.4 Rolling and Forming**

Plates, channels, R.S.J. etc., for circular bins, bunkers, hoppers, gantry girders, etc., shall be accurately laid off and rolled or formed to required profile/shape as called for on the drawings. Adjacent sections shall be match-marked to facilitate accurate assembly, welding and erection in the field.

#### **3.1.3.5 High Strength Friction Grip Bolting**

Inspection after tightening of bolts shall be carried out as stipulated in the appropriate standards depending upon the method of tightening and the type of bolt used. The mating surfaces will be absolutely free from grease, lubricant, dust, rust, etc. and will be thoroughly cleaned before assembly. The preparation of the mating surfaces will be done as specified in the design drawings. The nuts will be tightened upto the specified torque with the help of torque wrench or by half turn method with the help of pneumatic wrench lever. Torque value has to be specified in design / fabrication drawings itself. The direction of tightening of the nuts will be from the middle towards the periphery of the joint. The bolt head, nuts and edges of the mating surface will be sealed with a coat of paint to obviate entry of moisture. As far as possible, the diameter of bolts and mating surface preparation will be kept uniform to have specified unique torque.

#### **3.1.3.6 Welding**

Welding procedure shall be submitted to the Engineer In Charge for approval. Welding shall be entrusted to qualified and experienced welders who shall be tested periodically and graded as per IS 817, IS : 7310 (Part 1) and IS : 7318 (Part 1).

While fabricating plated beams and built up members, all shop splices in each component part shall be made before such component part is welded to other parts of the members. Wherever weld

reinforcement interferes with proper fit-up between components to be assembled off welding, these welds shall be ground flush prior to assembly.

Approval of the welding procedure by the Engineer In Charge shall not relieve the Contractor of his responsibility for correct and sound welding without undue distortion in the finished structure.

No welding shall be done when the surface of the members is wet nor during periods of high wind.

Each layer of a multiple layer weld except root and surfaces runs may be moderately panned with light blows from a blunt tool. Care shall be exercised to prevent scaling or flaking of weld and base metal from over peening.

No welding shall be done on base metal at a temperature below  $-5^{\circ}\text{C}$ . Base metal shall be preheated to the temperature as per relevant IS codes. Electrodes other than low-hydrogen electrodes shall not be permitted for thicknesses of 32 mm and above.

All welds shall be inspected for flaws by any of the methods described under **Sub-clause 3.1.6.3**. The choice of the method adopted shall be agreed with the Engineer In Charge.

The correction of defective welds shall be carried out in a manner approved by the Engineer In Charge without damaging the parent metal. When a crack in the weld is removed, magnetic particle inspection or any other equally positive means approved by the Engineer In Charge shall be used to ensure that the whole of the crack and material upto 25 mm beyond each end of the crack has been removed. The cost of all such tests and operations incidental to correction shall be borne by the Contractor.

#### **3.1.4 Tolerances**

The dimensional and weight tolerances for rolled shapes shall be in accordance with IS:1852 for indigenous steel. The tolerances for fabrication of structural steel shall be as per IS:7215.

Cutting, punching, drilling, welding and fabrication tolerances shall be generally as per relevant IS codes.

### **3.1.5 End Milling**

Where compression joints are specified to be designed for bearing, the bearing surfaces shall be milled true and square to ensure proper bearing and alignment.

### **3.1.6 Inspection**

#### **3.1.6.1 General**

The Contractor shall give due notice to the Engineer In Charge in advance of the works being made ready for inspection. All rejected material shall be promptly removed from the shop and replaced with new material for the Engineer In Charge's inspection. The fact that certain material has been accepted at the Contractor's shop shall not invalidate final rejection at site by the Engineer In Charge if it fails to conform to the requirements of these specifications, to be in proper condition or has fabrication inaccuracies which prevent proper assembly nor shall it invalidate any claim which the Employer may make because of defective or unsatisfactory materials and/or workmanship.

No materials shall be painted or despatched to site without inspection and approval by the Engineer In Charge unless such inspection is waived in writing by the Engineer In Charge.

The Contractor shall provide all the testing and inspection services and facilities for shop work except where otherwise specified.

For fabrication work carried out in the field the same standard of supervision and quality control shall be maintained as in shop fabricated work. Inspection and testing shall be conducted in a manner satisfactory to the Engineer In charge.

Inspection and tests on structural steel members shall be as set forth below.

#### **3.1.6.2 Material Testing**

If mill test reports are not available for any steel materials the same shall be tested by the Contractor to the Engineer In-charge's satisfaction to demonstrate conformity with the relevant specification.

### **3.1.6.3 Tests on Welds**

#### **Magnetic Particle Test**

Where fillet welds are examined by magnetic particle testing, such testing shall be carried out in accordance with relevant IS 5334 random 5% of the weld. Weld shall be accepted as satisfactory the defects are within limits stated in IS7310.

#### **Liquid Penetrate Inspection**

In the case fillet of welds examined by Liquid Penetrate Inspection, such tests shall be carried out in accordance with relevant IS Code 3658. All defects shown shall be repaired and rechecked.

#### **Radiographic Inspection**

All full strength butt welds shall be radiography tested in accordance with the recommended practice for radiographic testing as per relevant IS:4260 code random 10% of the weld length.

### **3.1.6.4 Dimensions, Workmanship & Cleanliness**

Members shall be inspected at all stages of fabrication and assembly to verify that dimensions, tolerances, alignment, surface finish and painting are in accordance with the requirements shown in the Contractor's approved fabrication drawings.

### **3.1.6.5 Test Failure**

In the event of failure of any member to satisfy inspection or test requirement, the Contractor shall notify the Engineer In Charge. The Contractor must obtain permission from the Engineer In Charge before any repair is undertaken. The quality control procedures to be followed to ensure satisfactory repair shall be subject to approval by the Engineer In Charge.

The Engineer In Charge has the right to specify additional testing as he deems necessary, and the additional cost of such testing shall be borne by the Employer, only in case of successful testing.

The Contractor shall maintain records of all inspection and testing which shall be made available to the Engineer In charge.

#### **3.1.7 Shop Matching**

For structures like bunkers, tanks, etc. shop assembly is essential. For other steel work, such as columns along with the tie beams/bracings may have to be shop assembled to ensure satisfactory fabrication, obtaining of adequate bearing areas etc., if so desired by the Engineer In Charge.

#### **3.1.8 Drilling Holes for other works**

As a part of this Contract, holes in members required for installing equipment or steel furnished by other manufacturers or other contractors shall be drilled by the Contractor at no extra cost. The information for such extra holes will be supplied by the Engineer In Charge.

#### **3.1.9 Marking of Members**

After checking and inspection, all members shall be marked for identification during erection. This mark shall correspond to distinguishing marks on approved erection drawings and shall be legibly painted and stamped on it. The erection mark shall be stamped with a metal dye with figures at least 20 mm high and to such optimum depth as to be clearly visible.

All erection marks shall be on the outer surface of all sections and near one end, but clear of bolt holes. The marking shall be so stamped that they are easily discernible when sorting out members. The stamped marking shall be encircled boldly by a distinguishable paint to facilitate easy location.

Erection marks on like pieces shall be in identical locations. Members having lengths of 7.0 m or more shall have the erection mark at both ends.

#### **3.1.10 Errors**

Any error in shop fabrication which prevents proper assembling and fitting up of parts in the field by moderate use of drift pins or moderate amount of reaming will be classified by the Engineer In Charge as defective workmanship. Where the Engineer In Charge rejects such material or defective workmanship, the same shall be replaced by materials and

workmanship conforming to the Specifications by the Contractor, at no cost to the Employer.

#### **3.1.11 Painting of Steel Work**

All fabricated steel material, except those galvanised shall receive protective paint coating as specified in specification, which is described below.

##### **3.1.11.1 Materials**

Zinc chrome primer shall conform to IS: 2074.

Synthetic enamel paint shall conform to IS: 2932.

Aluminium paint shall conform to IS: 2339.

All the materials shall be of the best quality from an approved manufacturer. Contractor shall obtain prior approval of the Engineer In-Charge for the brand of manufacture and the colour / shade. All the materials shall be brought to the site in sealed containers.

##### **3.1.11.2 Workmanship**

Painting work shall be carried out only on thoroughly dry surfaces. Painting shall be applied either by brushing or by spraying. Contractor shall procure the appropriate quality of paint for this purpose as recommended by the manufacturer. The workmanship shall generally conform to the requirement of IS: 1477 (Part 2).

Minimum dry film thickness of each coat of finish paint of synthetic enamel shall be 25 microns. Surfaces inaccessible after assembly shall receive two coats of primer prior to assembly. Surfaces inaccessible after erection, including top surfaces of floor beams supporting grating or chequered plate shall receive one additional coat of finish paint over and above the number of coats specified prior to erection.

Primer and finish paint shall be compatible with each other to avoid cracking and wrinkling. Primer and finish paint shall be from the same manufacturer.

All the surfaces shall be thoroughly cleaned of oil, grease, dirt, rust and scale. The methods to be adopted using solvents, wire brushing, power tool

cleaning etc., shall be as per IS: 1477 (Part – I) and as indicated in the item of work.

It is essential to ensure that immediately after preparation of the surfaces, the first coat of zinc chrome primer shall be applied by brushing and working it well to ensure a continuous film without holidays. After the first coat becomes hard dry, a second coat of primer shall be applied by brushing to obtain a film free from 'holidays'.

After the second coat of primer is hard dry, the entire surface shall be wet rubbed cutting down to a smooth uniform surface. When the surface becomes dry, the undercoat of synthetic enamel paint of optimum thickness shall be applied by brushing with minimum of brush marks. The coat shall be allowed to hard-dry. The under coat shall then be wet rubbed cutting down to a smooth finish, taking adequate care to ensure that at no place the undercoat is completely removed. The surface shall then be allowed to dry.

The first finishing coat of paint shall be applied by brushing and allowed to hard-dry. The gloss from the entire surface shall then be gently removed and the surface dusted off. The second finishing coat shall then be applied by brushing.

At least 24 hours shall elapse between the applications of successive coats. Each coat shall vary slightly in shade and this shall be got approved by the Engineer In Charge.

### **3.1.12 Acceptance of Steel, its Handling & Storage**

The Contractor shall carefully check the steel to be erected at the time of acceptance. Any fabrication defects observed should be brought to the notice of the Engineer In Charge.

No dragging of steel shall be permitted. All steel shall be stored 300mm above ground on suitable packing to avoid damage. It shall be stored in the order required for erection, with erection marks visible. All storage areas shall be prepared and maintained by the Contractor. Steel shall not be stored in the vicinity of areas where excavation or grading will be done and, if so stored temporarily, this shall be removed by the Contractor well

before such excavation and/or grading commences to a safe distance to avoid burial under debris.

Scratched or abraded steel shall be given a coat of primer in accordance with the Specifications for protection after unloading and handling prior to erection. All milled and machined surfaces shall be properly protected from rust/corrosion by suitable coating and also from damage.

#### **3.1.13 Anchor Bolts & Foundations**

The Contractor shall carefully check the location and layout of anchor bolts embedded in foundations constructed, to ensure that the structures can be properly erected as per approved drawings.

Levelling of column bases to the required elevation may be done either by providing shims or three nuts on the upper threaded portion of the anchor bolt. All shim stock required for keeping the specified thickness of grout and in connection with erection of structures on foundations, crane brackets or at any other locations shall be of good M.S. plates and shall be supplied by the Contractor at his cost.

A certain amount of cleaning of foundations and preparing the area is considered normal and shall be carried out by the Contractor at no extra cost.

Where beams bear in pockets or on walls, bearing plates shall be set and levelled as part of the work. All grouting under column base plates or beam bearing plates will be carried out by the Contractor.

#### **3.1.14 Assembly & connections**

Field connections may be effected either by riveting, bolting, welding or by use of high strength friction grip bolts as shown on the design and erection drawings.

All field connection work shall be carried as per the drawings. All bolts, nuts, washers, rivets, electrodes required for field connections shall be supplied by the Contractor free of cost.

All assembling shall be carried on a level platform.

Drifts shall be used only for drawing the work to proper position and must not be used to such an extent as to damage the holes. Size of drifts larger than the normal diameter of hole shall not be used. Any damaged holes or burrs must be rectified to the satisfaction of the Engineer In Charge.



Corrections of minor misfits and reasonable amount of reaming and cutting of excess stock from rivets shall be considered as a part of erection. Any error in the shop, which prevents proper fit on a moderate amount of reaming and slight chipping or cutting, shall be immediately reported to the Engineer In charge.

#### **3.1.15 Erection**

All structural steel shall be erected as shown on the drawings prepared by the Contractor. Proper size steel cable slings, etc., shall be used for hoisting. Guys shall not be anchored to existing structures, foundations, etc., unless so permitted by the Engineer In Charge in writing. Care shall be taken to see that ropes in use are always in good condition.

Steel columns in the basement, if any, are to be lowered and erected carefully with the help of a crane and/or derrick without damaging the basement walls or floor.

Structural steel frames shall be erected plumb and true. Frames shall be lifted at points such that they are not liable to buckle and deform. Trusses shall be lifted only at node points. In the case of trusses, roof girders, all of the purlins and wind bracing shall be placed simultaneously and the columns shall be erected truly plumb on screed bars over the pedestals. All steel columns and beams shall be checked for plumb and level individually before and after connections are made. Temporary bracings shall be introduced wherever necessary to take care of all loads to which the structure may be subjected, including erection equipment and the operation thereof. Such bracings shall be left in place as long as may be required for safety and stability.

Chequered plates shall be fixed to supporting members by tack welding or by countersunk bolts as shown / specified in relevant drawings and/or as approved by the Engineer In Charge. The edges shall be made smooth and no burrs or jagged ends shall be left. While splicing, care should be taken so that there is continuity in pattern between the two portions. Care should also be taken to avoid distortion of the plate while welding. The erection of chequered plates shall include:

Welding of stiffening angles/vertical stiffening ribs

Cutting to size and making holes to required shape wherever necessary to allow service piping and/or cables to pass through Splicing as shown in relevant drawings

Smoothing of edges Fixing of chequered plates by tack welding or by countersunk bolts Providing lifting hooks for ease of lifting.

As erection progresses, the work shall be securely bolted to take care of all dead load, wind, seismic and erection stresses.

No riveting or welding or final bolting shall be done until the structure has been properly aligned and approved by the Engineer In Charge. No cutting, heating or enlarging of the holes shall be carried out without the prior written approval of the Engineer In Charge. Test certificates shall be furnished by the Contractor.

#### **3.1.16 Inspection**

The Engineer In Charge shall have free access to all parts of the job during erection and all erection shall be subjected to his approval. In case of faulty erection, all dismantling and re-erection required will be at the Contractor's cost. No paint shall be applied to rivet heads or field welds or bolts until these have been approved by the Engineer In charge.

#### **3.1.17 Tolerances**

##### **3.1.17.1 General**

Tolerances mentioned below shall be achieved after the entire structure or part thereof is in line, level and plumb.

### 3.1.17.2 Columns

Deviation of column axes at foundation top level with respect to true axes:

- |     |                           |                    |
|-----|---------------------------|--------------------|
| (a) | In longitudinal direction | $\pm 5 \text{ mm}$ |
| (b) | In lateral direction      | $\pm 5 \text{ mm}$ |

Deviation in the level  
of bearing surface of  
columns at  
foundation

top with respect to true level	$\pm 5 \text{ mm}$
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(A)	For columns up to and including 15 metres in height or $\pm 15 \text{ mm}$ whichever is less	$\pm 1/1000$ of column height in mm
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(B)	For columns exceeding 15 metres in height or $\pm 20 \text{ mm}$ whichever is less	$\pm 1/1000$ of column height in mm
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(C)	Deviation in straightness in longitudinal and transverse planes of column at any point along the height	$\pm 1/1000$ of column height in mm or $\pm 10 \text{ mm}$ whichever is less
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(D)	Difference in erected position of adjacent pairs of columns along length or across width of building prior to connecting trusses / beams with respect to true distance	$\pm 10 \text{ mm}$
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(E)	Deviation in any bearing or seating level with respect to true level	$\pm 5 \text{ mm}$
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(F)	Deviation in differences in bearing level of a member on adjacent pair of columns both across and along the building	$\pm 10 \text{ mm}$
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Out of plumpness (verticality) of column axis from true vertical axis, as measured at column top:

### 3.1.17.3 Trusses and Beams

Shift at the centre of span of top chord member with respect to the vertical plane passing through the centre of bottom chord	$\pm 1/250$ of height of truss in mm or $\pm 15$ mm whichever is less
Lateral shift of top chord of truss at the centre of span from the vertical plane passing through the centre of supports of the truss	$\pm 1/1500$ of span of truss in mm or $\pm 15$ mm whichever is less
Lateral shift in location of truss from its true vertical position	$\pm 10$ mm
Lateral shift in location of purlin true position	$\pm 5$ mm
Deviation in difference of bearing levels of trusses or beams from the true difference	$\pm 20$ mm for trusses For beams : Depth < 1800 mm : $\pm 6$ mm Depth > 1800 mm : $\pm 10$ mm
Deviation in sag in chords and diagonals truss between node points	$1/1500$ of length in mm or of 10 mm whichever is smaller
Deviation in sweep of trusses, beams etc. in the horizontal plane	$1/1000$ of span in mm subject to a maximum of 10 mm

### 3.1.17.4 Crane Girders & Rails

Shift in the centre line of crane rail with respect to centre line of web of crane girder	$\pm 5$ mm
Shift in plan of alignment of crane rail with respect to true axis of crane rail at any point	$\pm 5$ mm
Difference in alignment of crane rail in plan measured between any two points 2 metres apart along rail	$\pm 1$ mm

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Deviation in crane track with respect to Time gauge	
For track gauges upto and Including 15 metres	$\pm 5 \text{ mm}$
For track gauges more than 15 metres	$\pm [5 + 0.25 (S-15)]$ where S in metres is true gauge
Deviation in crane rail level at any Point from true level	$\pm 1/1200$ of the gauge distance or $\pm 10$ mm whichever is less
Difference in the crane rail actual levels between any two points 2 metres apart along the rail length	$\pm 2 \text{ mm}$
Difference in levels between crane track Rails at	$\pm 15 \text{ mm}$ $\pm 20 \text{ mm}$
Supports of crane girders	
Mid span of crane girders	2mm subject to grinding of surfaces for smooth transition
Relative shift of crane rail surfaces at a Joint in plane and elevation	$1/1000$ of track gauge S in mm subject to maximum of 20 mm
Relative shift in the location of crane Stops (end buffers) along the crane tracks With track gauge S in mm	

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### 3.1.18 Painting of bare spots / rivet head

After steel has been erected, all bare and abraded spots, rivet heads, field welds, bolt heads and nuts shall be spot painted with primer. Before paint is applied, the surface shall be dry and free from dust, dirt, scale and grease. All surfaces inaccessible after erection shall receive two coats of the approved paint before erection.

### **3.1.19 Clean-up of Work site**

During erection, the Contractor shall at all times keep the working and storage areas used by him free from accumulation of waste materials or rubbish. Before completion of erection, he shall remove or dispose of in a satisfactory manner all temporary structures, waste and debris and leave the premises in a condition satisfactory to the Engineer In Charge.

Signature of Contractor

Executive Engineer

## **CHAPTER - XII**

### **ITEM WISE DETAILED TECHNICAL SPECIFICATION**

## **CHAPTER - XII**

### **ITEM WISE DETAILED TECHNICAL SPECIFICATION**

#### **ITEM NO. 1: - DETAIL TECHNICAL SPECIFICATION FOR DISMANTLING**

##### **C.C:**

**Dismantling the existing foundation concrete including sorting out the dismantled stuff and stacking the useful material, removing the debris and making good the damages etc. complete as and where directed. Cement Concrete.**

##### **GENERAL:**

The structures shall be dismantled carefully, and the resulting materials so removed as not to cause any damage to the part of the structure to be retained and any other properties or structures nearby.

Unless otherwise specified, the structure shall be entirely removed, and other parts removed up to at least 600 mm below the slope face or original ground level whichever is the lowest or as necessary depending upon the interference they cause to the new construction. Removal of overlying or adjacent material, if required in connection with the dismantling of the structures, shall be incidental to this item.

Where existing structures are to be extended or otherwise incorporated in the new work, only such part or parts of the existing structure shall be removed as are necessary and directed by the Engineer to provide a proper connection with the new work. The connecting edges shall be cut, chipped and trimmed to the required lines and grades without weakening or damaging any part of the structure to be retained. Due care should be taken to ensure that reinforcing bars which are to be left in place so as to project into the new work as dowels or ties are not injured during removal of concrete.

Steel structures shall, unless otherwise provided, be carefully dismantled in such a manner as avoid damage to members thereof. If specified in the drawings or directed by the Engineer that the structure is to be removed in a condition suitable for erection, all members shall be match-marked by the Contractor with white lead paint before dismantling; end pins, nuts, loose plates, etc. shall be similarly marked to indicate their proper location; all pins, pin holes and machined surfaces shall be painted with a mixture of white lead and tallow and all loose parts shall be securely wired to adjacent members or packed in boxes.

##### **SCOPE OF WORK:**

This work shall consist of dismantling and removing existing body wall, apron, abutments, wing wall, return wall and other structures, etc. from the site location, for reconstruction and strengthening of



existing structure, disposing of the surplus/unsuitable materials and backfilling to after the required compaction as directed by the Engineer.

Dismantling and removal operations shall be carried out with such equipment and in such a manner as to leave undisturbed, adjacent structures and any other work to be left in place.

All operations necessary for the removal of any existing structure which might endanger new construction shall be completed prior to the start of new work.

All surplus materials shall be taken over by the Contractor, which may either be re-used with the approval of the Engineer or disposed of with all leads and lifts.

**MODE OF MEASUREMENT AND PAYMENT:**

The work of dismantling shall be paid for in units indicated below by taking measurements before and after, as applicable: The item shall be measured and paid in cubic meter basis of completed work.

Signature of  
Contractor

Deputy Executive Engineer  
Tribal Area Dev. Works Sub Division  
Dahod

Executive Engineer  
Panchayat Irrigation Division  
Dahod

## **ITEM NO. 2: DETAIL TECHNICAL SPECIFICATION FOR DISMANTLING STONE MASONRY:**

**Dismantling the existing stone masonry including sorting out and stacking the useful material and removing the debris and making good the damages etc. complete as directed. In Cement Mortar**

### **GENERAL:**

The structures shall be dismantled carefully, and the resulting materials so removed as not to cause any damage to the part of the structure to be retained and any other properties or structures nearby.

Unless otherwise specified, the structure shall be entirely removed, and other parts removed up to at least 600 mm below the slope face or original ground level whichever is the lowest or as necessary depending upon the interference they cause to the new construction. Removal of overlying or adjacent material, if required in connection with the dismantling of the structures, shall be incidental to this item.

Where existing structures are to be extended or otherwise incorporated in the new work, only such part or parts of the existing structure shall be removed as are necessary and directed by the Engineer to provide a proper connection with the new work. The connecting edges shall be cut, chipped and trimmed to the required lines and grades without weakening or damaging any part of the structure to be retained. Due care should be taken to ensure that reinforcing bars which are to be left in place so as to project into the new work as dowels or ties are not injured during removal of concrete.

Steel structures shall, unless otherwise provided, be carefully dismantled in such a manner as avoid damage to members thereof. If specified in the drawings or directed by the Engineer that the structure is to be removed in a condition suitable for erection, all members shall be match-marked by the Contractor with white lead paint before dismantling; end pins, nuts, loose plates, etc. shall be similarly marked to indicate their proper location; all pins, pin holes and machined surfaces shall be painted with a mixture of white lead and tallow and all loose parts shall be securely wired to adjacent members or packed in boxes.

### **SCOPE OF WORK:**

This work shall consist of dismantling and removing existing body wall, apron, abutments, wing wall, return wall, stone/brick masonry structure and other structures, etc. from the site location, for reconstruction and strengthening of existing structure, disposing of the surplus/unsuitable materials and backfilling to after the required compaction as directed by the Engineer.

Dismantling and removal operations shall be carried out with such equipment and in such a manner as to leave undisturbed, adjacent structures and any other work to be left in place.

All operations necessary for the removal of any existing structure which might endanger new construction shall be completed prior to the start of new work.

All surplus materials shall be taken over by the Contractor, which may either be re-used with the approval of the Engineer or disposed of with all loads and lifts.

**MODE OF MEASUREMENT AND PAYMENT:**

The work of dismantling shall be paid for in units indicated below by taking measurements before and after, as applicable: The item shall be measured and paid in cubic meter basis of completed work.

Signature of  
Contractor

Deputy Executive Engineer  
Tribal Area Dev. Works Sub Division  
Dahod

Executive Engineer  
Panchayat Irrigation Division  
Dahod

### **ITEM NO. 3: - DETAIL TECHNICAL SPECIFICATION FOR DISMANTLING**

#### **R.C.C:**

**Dismantling the R.C.C. work and disposing off the stuff including stacking of the useful materials etc. complete as directed.**

**Light Reinforcement (Main bar upto 16 mm. dia.)**

#### **GENERAL:**

The structures shall be dismantled carefully, and the resulting materials so removed as not to cause any damage to the part of the structure to be retained and any other properties or structures nearby.

Unless otherwise specified, the structure shall be entirely removed, and other parts removed up to at least 600 mm below the slope face or original ground level whichever is the lowest or as necessary depending upon the interference they cause to the new construction. Removal of overlying or adjacent material, if required in connection with the dismantling of the structures, shall be incidental to this item.

Where existing structures are to be extended or otherwise incorporated in the new work, only such part or parts of the existing structure shall be removed as are necessary and directed by the Engineer to provide a proper connection with the new work. The connecting edges shall be cut, chipped and trimmed to the required lines and grades without weakening or damaging any part of the structure to be retained. Due care should be taken to ensure that reinforcing bars which are to be left in place so as to project into the new work as dowels or ties are not injured during removal of concrete.

Steel structures shall, unless otherwise provided, be carefully dismantled in such a manner as avoid damage to members thereof. If specified in the drawings or directed by the Engineer that the structure is to be removed in a condition suitable for erection, all members shall be match-marked by the Contractor with white lead paint before dismantling; end pins, nuts, loose plates, etc. shall be similarly marked to indicate their proper location; all pins, pin holes and machined surfaces shall be painted with a mixture of white lead and tallow and all loose parts shall be securely wired to adjacent members or packed in boxes.

#### **SCOPE OF WORK:**

This work shall consist of dismantling and removing existing body wall, apron, abutments, wing wall, return wall and other structures, etc. from the site location, for reconstruction and strengthening of existing structure, disposing of the surplus/unsuitable materials and backfilling to after the required compaction as directed by the Engineer.

Dismantling and removal operations shall be carried out with such equipment and in such a manner as to leave undisturbed, adjacent structures and any other work to be left in place.

All operations necessary for the removal of any existing structure which might endanger new construction shall be completed prior to the start of new work.

All surplus materials shall be taken over by the Contractor, which may either be re-used with the approval of the Engineer or disposed of with all loads and lifts.

**MODE OF MEASUREMENT AND PAYMENT:**

The work of dismantling shall be paid for in units indicated below by taking measurements before and after, as applicable: The item shall be measured and paid in cubic meter basis of completed work.

Signature of  
Contractor

Deputy Executive Engineer  
Tribal Area Dev. Works Sub Division  
Dahod

Executive Engineer  
Panchayat Irrigation Division  
Dahod

## **ITEM NO. 4: - DETAIL TECHNICAL SPECIFICATION FOR DISMANTLING THE EXISTING R.C.C. PIPES:**

**Dismantling the existing R.C.C. Pipes including sorting out and stacking of the useful materials of the following diameters including refilling the trenches etc. complete as directed. Np\_2 pipes (600 mm. to 900 mm dia.)**

### **SCOPE OF WORK:**

The item shall include dismantling of all kind of R.C.C / Stone masonry Pipe including disposing off all kind of stuff (Stone, fabricated steel, masonry / PCC block etc all as specified by engineer-in-charge) to the suggested lead and stacking of useful material to the stack area as suggested by engineer-in-charge. Dismantling shall be by means of manually or with suitable machinery as per site condition and suggestion by engineer-in-charge. Other ancillaries work as may be required and directed by the Engineer-in-charge and shall include all the required operations such as removing and disposing off dismantled stuff as directed with all lead & lifts. The dismantled materials declared un-useful and that are to be wasted, shall be deposited as detailed under General Specification of foundation excavation in regular layers as directed by the Engineer-in-charge. Useful excavated materials shall be stacked separate as directed by Engineer-in-charge. The item including dewatering.

1. **Materials:** All tools, equipment, and materials required for the dismantling work should be of good quality and suitable for the type and size of R.C.C. pipe being dismantled.
2. **Safety:** All necessary safety precautions and measures should be taken during the dismantling work, as per relevant government and industry standards.
3. **Dismantling:** The R.C.C. Pipe should be dismantled systematically and carefully, ensuring that no damage is caused to any other part of the building or structure. The dismantling work should be done in a manner that prevents the risk of accidents, and the site should be kept clean and free of any debris or waste.
4. **Reinforcement Removal:** The light reinforcement, including main bars up to 16 mm diameter, should be removed carefully and without damage. The removed reinforcement should be stacked and protected from damage during the dismantling process.
5. **Disposal:** The dismantled material, including all debris and waste, should be disposed of in an environmentally responsible manner, as per relevant government and industry standards.
6. **Stacking of Useful Materials:** All useful materials, such as bricks, steel, and wood, should be stacked and protected from damage during the dismantling process.
7. **Labour:** The labour involved in the dismantling work should be skilled and experienced, and should comply with relevant government and industry standards for labour.
8. **Cost:** The cost of materials, labour, and equipment should be included in the tender, along with any other costs associated with the dismantling work.

**MODE OF MEASUREMENT & PAYMENT:**

Payment shall be made on per running meter contents. No payment shall be made for the unauthorized extra dismantling.

Signature of  
Contractor

Deputy Executive Engineer  
Tribal Area Dev. Works Sub Division  
Dahod

Executive Engineer  
Panchayat Irrigation Division  
Dahod

**ITEM NO. 5: - DETAIL TECHNICAL SPECIFICATION FOR EXCAVATION:  
(IN YELLOW SANDY GRAVELLY SOILS, SOFT & HARD MURRUM ETC.):**

**Excavation for foundation in all sorts of soil including yellow sandy gravelly soils, soft & hard murrum etc. in dry condition including depositing the excavated stuff in uniform layers in banks or as and where directed etc. complete for lead up to 500m and all lift. (BY MACHINERY)**

**Including dewatering.**

**GENERAL:**

The site on which the structure is to be built shall be cleared and all obstructions, loose stone, material sand rubbish of all kind, bush, wood and trees shall be removed as directed. The unused full materials so obtained shall be disposed of as directed incl. burning. The rate of such site clearance shall be deemed to be incl. in the rate of the item of work. Any soil which generally yields to the close application of pickaxes & shovels, phawaras, rakes or any such ordinary excavating tools or organic soil, silt, sand clay/stiff clay, peat, yellow sandy gravelly soils, soft & hard murrum etc. under this category. All specifications for excavation mentioned in general technical specification shall apply to this item also for classification of strata, payline, shoring and strutting, disposal of excavated stuff, etc.

**SCOPE OF WORK:**

The work to be done under these specifications shall consist of furnishing all tools, plant and labours and material required to carrying out excavation, conveyance, and disposal of the excavated stuff, maintaining the excavation slopes and trenches, preparing the foundations as shown in the drawing or as directed in yellow sandy gravelly soils, soft & hard murrum etc. including dewatering.

**WORKMANSHIP:**

The workmanship of the work under this item of work shall be as described in general technical specification for excavation.

**MODE OF MEASUREMENT AND PAYMENT:**

Payment shall be made on a volumetric basis per cubic meter. No payment shall be made for the unauthorized extra excavation. The measurement shall be taken as specified in the general technical specification for excavation.

Signature of  
Contractor

Deputy Executive Engineer  
Tribal Area Dev. Works Sub Division  
Dahod

Executive Engineer  
Panchayat Irrigation Division  
Dahod



## **ITEM NO. 6: - DETAIL TECHNICAL SPECIFICATION FOR EXCAVATION: (IN SOFT ROCK):**

**Excavation for foundation in Soft Rock including depositing the excavated stuff as and where directed etc. complete for lead upto 500m and all lift. (Machinery)**

**Including dewatering.**

### **GENERAL:**

The site on which the structure is to be built shall be cleared and all obstructions, loose stone, material sand rubbish of all kind, bush, wood and trees shall be removed as directed. The unused full materials so obtained shall be disposed of as directed incl. burning. The rate of such site clearance shall be deemed to be incl. in the rate of the item of work. Any soil which generally yields to the close application of pickaxes & shovels, phawaras, rakes or any such ordinary excavating tools or organic soil, gravel, silt, sand clay/stiff clay, peat, soft to hard murrum, rubble stone over burden, rock etc. under this category. All specifications for excavation mentioned in general technical specification shall apply to this item also for classification of strata, payline, shoring and strutting, disposal of excavated stuff, etc.

### **SCOPE OF WORK:**

The work to be done under these specifications shall consist of furnishing all tools, plant and labours and material required to carrying out excavation in soft rock, conveyance, and disposal of the excavated stuff, maintaining the excavation slopes and trenches, preparing the foundations as shown in the drawing or as directed in soft rock strata. including dewatering.

### **WORKMANSHIP:**

The workmanship of the work under this item of work shall be as described in general tech. specification for excavation.

### **MODE OF MEASUREMENT AND PAYMENT:**

Payment shall be made on a volumetric basis per cubic meter. No payment shall be made for the unauthorized extra excavation. The measurement shall be taken as specified in the general technical specification for excavation.

Signature of  
Contractor

Deputy Executive Engineer  
Tribal Area Dev. Works Sub Division  
Dahod

Executive Engineer  
Panchayat Irrigation Division  
Dahod

## **ITEM NO. 7: - DETAIL TECHNICAL SPECIFICATION FOR CONCRETE WORK (C. C. Nominal Mix, M-10 and MSA-40 mm):**

**Providing & Laying in position "NOMINAL MIX" cement concrete using cement, sand and crushed aggregate by mass and machine mix for C.C./R.C.C work incl. necessary formworks centering, scaffolding, compaction by vibrator, curing as directed with all lead & lift etc complete Without Dewatering and excluding cost of steel reinforcement.**

**For Foundation concrete / General purpose  
(C. C. Nominal Mix, M-10 and MSA-40 mm)**

### **MATERIALS:**

(i) CEMENT: Specification M-2 of specification of material section shall apply. ii) WATER: Specification M-1 of specification of material section shall apply. iii) FINE AGGREGATE (SAND): Specification M-3 of specification of material section shall apply. iv) COARSE AGGREGATE: Specification M-4 of specification of material section shall apply. Required testing shall be done as per EIC.

### **WORKMANSHIP:**

#### **General:**

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

#### **Proportion of Mix:**

The proportion of cement, sand and coarse aggregate shall be one part of cement, 3 parts of sand and 6 parts of stone aggregates and shall be measured by volume.

#### **Mixing:**

The concrete shall be mixed in a mechanical mixer at the site of work. Hand mixing may however be allowed for smaller quantity of work if approved by the Engineer-in-charge. When hand mixing is permitted by the Engineer-in-charge in case "of break-down of machineries and in the interest of the work, it shall be carried out on a water tight platform and care shall be taken to ensure that mixing is continued until the mass is uniform in colour and consistency, However in such case 10% more cement than otherwise period 1 1/2 to 2 minutes. The quantity of water shall be just sufficient to produce a dense concrete of required workability for the purpose.

**Transporting & Placing the Concrete:**

The concrete shall be handed from the place, of mixing to the final position in not more than 15 minutes by the method as directed and shall be placed into its final-position, compacted and finished within 30 minutes of mixing with water i.e. before the setting commences.

The concrete shall be laid in layers of 15 cms. to 20 cms.

The concrete shall be compacted with mechanical vibrator to get the required compaction and to allow all the interstices to be filled with mortar.

**Curing:**

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

**MODE OF MEASUREMENT AND PAYMENT:**

The concrete shall be measured for its length, breadth and depth, limiting dimensions to those specified on plan or as directed.

The measurement shall be taken in cubic meter. The rate shall be for a unit of one cubic meter.

Signature of  
Contractor

Deputy Executive Engineer  
Tribal Area Dev. Works Sub Division  
Dahod

Executive Engineer  
Panchayat Irrigation Division  
Dahod

## **ITEM NO. 8: - DETAIL TECHNICAL SPECIFICATION CONCRETE WORK (CONCRETE GRADE M-20 AND MSA-20 MM):**

**Providing & Laying in position "DESIGN MIX" cement concrete using cement sand and crushed aggregate for C.C./ R.C.C work by "FLORI" including necessary formwork, centering, scaffolding, compaction by vibrator, curing as directed with all lead & lift etc complete without dewatering and excluding the cost of steel reinforcement.**

**For Pier and Abutments / Wing wall / Head wall / Return wall / Dowel Wall etc.**

**(Concrete grade M-20 and MSA-20 mm)**

### **MATERIALS :**

i) CEMENT: Specification M-2 of specification of material section shall apply. ii) WATER Specification M-1 of specification of material section shall apply. iii) FINE AGGREGATE (SAND): Specification M-3 of specification of material section shall apply. iv) COARSE AGGREGATE: Specification M-4 of specification of material section shall apply. Required testing shall be done as per EIC.

### **GENERAL :**

General technical specifications for concrete works shall apply here also. Concrete mix shall be "DESIGN MIX" only and is to be design by preliminary tests in the laboratory. The proportions for ingredients shall be by mass only except for water. The grade of concrete shall be M-20 with maximum size of aggregate is 20 mm. **The Cement level for the M-20 grade (20mm MSA) is considered as 360 kg/Cum as per GR (Guj) No. MIS 102010/17/K-1, Dt. 30-07-2018. However, if the obtained Cement level in Design mix will found greater than standard cement level as specified above no extra payment shall be done for above. And if the obtained Cement level in Design mix will found less than standard cement level the payment of difference will be deducted from the bill.**

### **SCOPE OF WORK. :**

The scope of work under this item incl. doing C.C/ R.C.C. at various work locations and compartments as classified under the item incl. providing & supplying all materials, labours and use of equipment's machinery with providing erecting and dismantling of necessary formwork and centring. The contractor shall provide such means and equipments as are required to accurately determine and control the relative volumes of the various materials including water, cement, admixtures, sand and each specified size of coarse aggregates entering the concrete and such means and the equipment and its operation shall be subjected at all times, to the approval of the Engineer-In- Charge. The amount of cement, sand each size of coarse aggregate and water

entering each batch of concrete shall be determined on a volumetric basis. The measuring equipment's shall operate within the limits of accuracy specified.

The mixer should be able to handle all the grades of coarse aggregates, fine aggregates, water and cement and admixtures where specified, facility should be available to obtain samples of each ingredients entering the mixture. The contractor shall maintain a record of number of batches mixed and all other required for checking the correctness of the mix as per the directions of Engineer-In-Charge.

Suitable mixer so as to mix uniformly the various ingredients and discharging the mix without segregation should be used. Preferably tilting types of mixtures should be used. For non-tilting type of mixers, suitable device shall be used and care shall be taken to avoid segregation of large size aggregates. Hand mixing shall not be allowed.

The scope of work also incl. laying of concrete in position as directed with compaction by means of needle of surface vibrator together with finishing the expose surface of concrete work to obtain dense and compact surface, curing for a specified period etc.

## **WORKMANSHIP**

Specifications for workmanship laid down in general technical specifications for concrete works shall apply here also. The workability of the concrete mix shall be controlled by maintaining a w/c ratio, that is bound to give a concrete mix which is just sufficiently wet to be placed and compacted without difficulty with the means specified.

## **MODE OF MEASUREMENT AND PAYMENT:**

The rate shall be for a unit of one cubic meter. The consolidated cubical contents of concrete work as specified in item shall be measured. The concrete laid in excess of section shown on drawing or as directed shall not be measured.

No deduction shall be made for-

- i) Ends of beams, girders, joist, steps, posts, etc of des-similar materials up to 500 sq. cms in section.
- ii) Opening up to 0.1 sq.mt.in area.

The rate includes cost of all materials, labour, tools and plants required for mixing, placing in position, vibrating and compacting, finishing, as directed, curing and other incidental expenses for producing concrete of specified strength. The rate includes cost of formwork. The item shall be measured and paid in cubic meter basis of completed work.

Signature of  
Contractor

Deputy Executive Engineer  
Tribal Area Dev. Works Sub Division  
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Executive Engineer  
Panchayat Irrigation Division  
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## **ITEM NO. 9: - DETAIL TECHNICAL SPECIFICATION FOR WEEP HOLES:**

**Providing and laying in position 110 mm dia (6 kgf/sq cm) P.V.C. Pipe for weep holes with non-corroding jali in abutments, wing walls, retaining walls etc. complete.**

### **MATERIALS:**

i) P.V.C. PIPE: PVC Pipe shall be of minimum 6 kgf/sq cm quality and confirming to M-10 of specification of material.

### **GENERAL: SCOPE OF WORK: WORKMANSHIP:**

The scope of work includes providing and fixing specified dia. PVC. Pipes of approved quality in position with non-corroding jali in abutments, wing walls, retaining walls etc. as and where directed or as shown in drawing. Length of the pipe shall be exactly equal to the width of the wall The pipe shall be fixed in position in the masonry/concrete during work in progress and as it proceeds. The pipe shall have minimum surroundings of 12 mm thick cement mortar at every portion of external surface for masonry wall. The socket end of the pipe shall be kept closed till the next length of pipe is fitted to prevent any chocking. Both end face of the pipe shall be finished with cement mortar and cement niru to have a even look.

### **MODE OF MEASUREMENT AND PAYMENT:**

The item shall be measured and paid in running metre basis of completed work. Nothing extra to be payable for cement mortar/cement niru, non-corroding jali and fixtures like coupler etc. required for fixing of the pipe.

Signature of  
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## **ITEM NO. 10: - DETAIL TECHNICAL SPECIFICATION FOR GRADED FILTER:**

**Providing and laying graded filter of specified materials in uniform layer as per design incl. Watering etc. complete as directed.**

### **MATERIALS:**

The filter material shall consist of clear, sound and well graded natural sand and gravel/crushed metal. Sand shall confirm to m-3 of specification of material and crushed metal shall confirm to m-4 of specification of material.

### **GENERAL:**

The filter materials shall consist of layers, graded on size from fine to coarser as per std. filter criteria. The fine material shall be laid next to the earth to be followed by layers of progressively coarser materials to form a graded filter. Fine materials shall consist of sand as indicated by laboratory tests. Filter material shall be laid in 20 to 30 cms layer. Care shall be taken to maintain porous drainage behind the wheel hole provided in the masonry/concrete retaining wall, training wall, side wall, etc.

### **SCOPE OF WORK:**

The scope of work includes quarrying, transporting with loading/unloading and laying the filter materials in layer as shown in the drawing or as directed along with watering with all lead and all lift with labours and machineries required to carry out the job. The work is to be carried out behind retaining wall, side wall or training wall or as and were directed with all led and lift.

### **WORKMANSHIP:**

Filter zone should be raised simultaneously with the masonry/concrete. work. Care should be taken to ensure that zone material does not get mixed up with the material of adjacent zone and spoiled. Filter material shall be free from any objectionable substances.

### **MODE OF MEASUREMENT AND PAYMENT:**

The mode of measurement and payment shall be on cum basis. Measurement shall be for entire graded filter and not for individual layer of graded materials. No deduction for voids shall be made.

Signature of  
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## **ITEM NO. 11: - DETAIL TECHNICAL SPECIFICATION FOR BACKFILLING:**

**Backfilling the foundation trenches around the structures etc with selected excavated stuff including watering, ramming, compacting etc. complete. (By Machinery)**

### **MATERIALS:**

Selected earth obtains from useful excavated materials other than I.P. material.

### **GENERAL: SCOPE OF WORK: WORKMANSHIP:**

The item includes spreading of excavated stuff in uniform layers of thickness (loose) not exceeding 25 cm or as directed & shall be well compacted. No back filling shall be done behind masonry/concrete which is still fresh. Consolidation near the structure shall have to be done by suitable pneumatic tampers/hammers, or plate vibrators, or light rollers etc as directed by engineer in charge with watering. Back filling shall be done simultaneously with raising of the structure.

The scope of work includes spreading the material including watering, ramming, compacting etc. with all machineries and labours required with all lead and lift. Work shall be done with all care so that there shall not be any damage to the structure. Finished earth fill shall be of required density.

### **MODE OF MEASUREMENT AND PAYMENT:**

The item shall be paid on cubic metre basis based upon cross section of work done. The rate is inclusive of watering, ramming, compacting etc. complete. for all lead and lift.

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## **ITEM NO. 12: - DETAIL TECHNICAL SPECIFICATION FOR RAILING:**

Providing and fixing post and 40 mm dia pipe railing as per detailed drawing including angle iron post of size 80mm x 50mm x 10mm (Height 1.2mt) fixed in C.C. block (M-15 MSA-20mm) of size 0.30 m x 0.30 m x 0.30 m etc. as per specifications including 3 coats of oil painting to steel work and as directed etc. complete.

(Three rows)

### **MATERIALS:**

i) G.I. PIPES: G.I. Pipe shall be of B-class medium duty. Specification, M-11 of material section shall apply. ii) M.S. ANGLE: Specification of M.S. Angle shall confirm to M-12 of material section. iii) PRIMER: Red oxide primer shall confirm to relevant IS code. iv) SYNTHETIC ENAMAL PAINT: Synthetic enamel paint shall confirm to M-13 of material section.

### **GENERAL: SCOPE OF WORK: WORKMANSHIP:**

The vertical post shall be of M.S. Angle of size 80x50x10mm at 2.0mt c/c with 1.2 mt height fixed in C.C. block cement grade of M-15 MSA 20 mm of 40mm dia medium duty B- class G.I. Pipes from it. The vertical post of M.S. Angle shall be firmly fitted in masonry / concrete as shown in the drawing in true and perfect line and level using cement concrete. The scope of work also includes making foundation pit of size shown in the drawing in the masonry/concrete. And filling it with M-15 concrete G.I. Pipe of hand railing should be cut to required length, fitted, drilled, and capped or welded and placed in a workman like manner as shown in the drawing or as directed. After erection, any damage spots of fillet welds, shall be finished spread zinc. G.I. Pipes shall be welded with angle section properly to give required strength to withstand worst condition thrust apply on it. The pipeline shall be fitted properly with coupling & ends anchored properly against sliding Height of the railing shall be 1.0 mt above finished surface. One coat of primer & two coats of approve enamel synthetic paint shall be apply after properly rubbing, scaping, sand papering and cleaning the erected railing.

### **MODE OF MEASUREMENT AND PAYMENT:**

The rate includes of all labour and materials required for satisfactory completion of this item. Measurement of the railing shall be taken in running meter and shall be paid accordingly for completed item in all respect as specified in the item description.

Signature of  
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### **ITEM NO. 13: - DETAIL TECHNICAL SPECIFICATION FOR HR GATE:**

**Providing fabricating and erecting in position service gate and emergency gate including finishing, hoisting arrangement embaded parts as per approved design and drawing with painting as directed etc. complete.**

#### **MATERIAL:**

i) STRUCTURAL STEEL: The structural steel like angles, Tees, channels, RSJ, Hbeam/girder beam etc shall confirm to M-12 of material section. ii) M.S. PLATE: M.S.Plates shall confirm to M-14 of material section. iii) RUBBER SEAL : The rubber seal shall confirm to latest relevant IS code. iv) RED OXIDE PRIMER :Red Oxide Primer shall confirm to latest relevant IS code. v) BLACK EPOXY PAINT : Black Epoxy Paint shall confirm to latest relevant IS code.

The various components or structural steel as under or specified size instructed by engineer in charge shall be utilized for fabrication of M.S. Plate gate.

**1. M.S. Plate :- 5 mm thick**

**2. Angle Frame :- 100 X 100 X 5 mm size**

**3. Bracing :- 100 X 100 X 5 mm size**

**4. Threaded Rod :- 50.00 mm dia.**

**5. Channel :- 130 X 130 X 5 mm size**

**6. I ' Section :- 150 X 130 X 5 mm size**

**7. Checkered :- 5 mm thick**

#### **SCOPE OF WORK:**

The scope of work includes providing, fabricating, transporting and fixing in position service / emergency gate after removal of existing assembly, with all materials, labours, equipment's, etc in all respects with one coat of primer and two coat of black epoxy paint with all lead and lift. The scope of work also includes giving operational testing under full and empty reservoir condition.

#### **GENERAL:WORKMANSHIP:**

All materials of required size and length should be utilized for fabrication of M.S. Plate gate of specified size of standard quality. The structural steel shall confirm to I.S. 226 – 1965.

The steel shall be free from the defects mentioned in I.S. 226 - 1975 and shall be a smooth finish. The materials shall be free from loose mill scale, rust pits or other defects abjection the strength and durability. Rivets bars shall confirm to I.S. 1148 - 1973. The steel supplied by the contractor shall have to obtain test certificate or manufacturer according to I.S. 226 - 1975 and other relevant Indian

Standard - The contractor shall have to procure steel authority of India, or from the original production Companies for verification or which contractor shall have to produce the original Voucher to the Engineer - in - Charge.

The work shall be carried out workman like manner and as per specification of item and instructions of engineer in charge.

The gate shall be prepared as per instruction of engineer in charge for required size or opening. The steel i.e. M.S. Plate angels, channels, clamps, capstan, rod, anchor steel etc. shall be of appropriate quality and approved by engineer in charge.

The erecting work includes side welding, bolting, riveting etc shall be done so in manner as per direction of engineer in charge. For fabrication of structural steel accuracy of lines and levels shall be taken, so that it acts as one unit and the working of gate made smoothly. For fabrication of parts mainly butt weld joint or fillet weld joint are to be weld.

Necessary oiling / greasing shall be applied, One coat of primer & two coat of approved anticorrosive black epoxy paints shall be apply after properly rubbing, scrapping. Sand preparing and cleaning the erected gates & embedded parts of gate.

#### **MODE OF MEASUREMENT AND PAYMENT:**

Rate includes providing and fixing in position including all fixtures and all component accessories as given in drawing or as directed by the Engineer in Charge. The rate for this completed item of work should be paid on actual opening of the gate on Sq. meter basis. No extra payment shall be made for parts used and fabrication or removal of existing assembly.

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## **ITEM NO. 14: - DETAIL TECHNICAL SPECIFICATION FOR ISMB – 150 GIRDER:**

**Providing and fixing structural work of required size incl. Cutting, welding, putting in position, painting, in three coats etc. complete.**

### **MATERIALS:**

The structured steel work shall conform to M-12. Red lead paint shall conform to I.S: 102-1962.

### **WORKMANSHIP:**

The steel sections as specified or required, shall be cut, square and to correct lengths, as per drawings and design or as per instruction of Engineer-In-Charge. The cut ends exposed to view shall be finished smooth. No two pieces shall be welded or otherwise jointed to make up the required length of member, except as indicated in the drawing or as directed. All straightening and shaping to form shall be done by application of pressure and not by hammering. Any bending or cutting shall be carried out in such a manner as not to impair the strength of the metal. All operations shall be done in cold state unless otherwise directed/permitted.

Steel work shall be done by welding. Welding shall generally be done by electric process. Gas welding shall be resorted to, using oxyacetylene flame with specific prior approval. Gas welding shall not be permitted for structural steel work.

The work shall be done as shown in the shop drawings which should clearly indicate various details of the joints to be welded, shop and site welded as well as type of electrodes to be used, symbol for welding on plans and shop drawings shall be according to I.S. 813-1961. As far as possible every effort shall be made to limit the welding that must be done after improper welding that is likely to be done due to heights and difficult positions on scaffoldings etc. The welding work shall conform to I.S. 816-1969.

Preparation of surfaces: Surfaces which are to be welled together shall be free from loose mill scale, rust, paint, grease or other foreign matter. A coating of boiled linseed oil shall be permitted.

Assembly for welding: Before welding is commenced, the plates shall first be brought together and firmly clamped or spot welded at specified distance. This temporary connection has to be strong enough to hold the plates accurately in place without displacement.

Precautions: All operations connected with welding and cutting equipment shall conform to safety requirement given in I.S. 818-1968.

The following paints shall be borne in mind during the process of welding:

Are length voltage and amperage shall be suited to the thickness of material type of groove and other circumstances of the work.

The segments of welding shall be such that where possible the members which offer the greatest resistance to compression are welded first.

The defective welds which shall be considered harmful to the structural strength shall cut out and reworked.

Finished welds and adjacent parts shall be protected with clean boiled linseed oil and after all slag has been removed. Welds and adjacent parts shall be painted after the same are approved.

All the members shall be thoroughly cleaned of rust-scales, dust etc. painting in three coats before fixing them in position.

#### **MODE OF MEASUREMENT AND PAYMENT:**

The steel work shall be measured in general as under:

All work shall be measured on the basis of finished dimensions as fixed at site and measured net unless specified otherwise.

The weight of steel sections, steel rods, and steel strips in finished work shall be calculated from standard weight on the same basis on which steel is supplied to Contractor by department or those given in relevant I.S. if steel is arranged by the contractor.

The weight of steel plates and strips shall be taken from relevant I.S. based on 7.85 kg./ sq. meter for every millimeter sheet thickness if steel is supplied to the contractor by department.

For forged steel and steel castings, weight shall be calculated on the basis of 7850 kg./cum.

Unless otherwise specified, no allowance shall be made for the weld metal in case of welded steel structure. Dimensions other than cross sections and thickness of plates shall be measured to nearest 0.001m.

Mill tolerance shall be ignored when weight is determined by calculation.

The rate includes cost of all material, labour, erection, hoisting scaffolding, protective measure, required for proper completion of the item of work. This shall also include conveyance and delivery handling, loading, unloading and storing etc. required for completing the item described above including necessary wastage involved. The rate shall be for a unit of one M.T.

Signature of  
Contractor

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Executive Engineer  
Panchayat Irrigation Division  
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## **ITEM NO. 15: - DETAIL TECHNICAL SPECIFICATION CONCRETE WORK (CONCRETE GRADE M-25 AND MSA-20 MM):**

**Providing & Laying in position "DESIGN MIX" cement concrete using cement sand and crushed aggregate for C.C./ R.C.C work by "FLORI" including necessary formwork, centering, scaffolding, compaction by vibrator, curing as directed with all lead & lift etc complete without dewatering and excluding the cost of steel reinforcement.**

**For Column/Beam/Solid Slab of Road Bridge/Barrel/Cutoff wall etc.**

**(Concrete grade M-25 and MSA-20 mm)**

### **MATERIALS :**

i) CEMENT: Specification M-2 of specification of material section shall apply. ii) WATER Specification M-1 of specification of material section shall apply. iii) FINE AGGREGATE (SAND): Specification M-3 of specification of material section shall apply. Iv) COARSE AGGREGATE: Specification M-4 of specification of material section shall apply. Required testing shall be done as per EIC.

### **GENERAL :**

General technical specifications for concrete works shall apply here also. Concrete mix shall be "DESIGN MIX" only and is to be design by preliminary tests in the laboratory. The proportions for ingredients shall be by mass only except for water. The grade of concrete shall be M-25 with maximum size of aggregate is 20 mm. **The Cement level for the M-25 grade (20mm MSA) is considered as 380 kg/Cum as per GR (Guj) No. MIS 102010/17/K-1, Dt. 30-07-2018. However, if the obtained Cement level in Design mix will found greater than standard cement level as specified above no extra payment shall be done for above. And if the obtained Cement level in Design mix will found less than standard cement level the payment of difference will be deducted from the bill.**

### **SCOPE OF WORK. :**

The scope of work under this item incl. doing C.C/ R.C.C. at various work locations and compartments as classified under the item incl. providing & supplying all materials, labours and use of equipment's machinery with providing erecting and dismantling of necessary formwork and centering. The contractor shall provide such means and equipments as are required to accurately determine and control the relative volumes of the various materials including water, cement, admixtures, sand and each specified size of coarse aggregates entering the concrete and such means and the equipment and its operation shall be subjected at all times, to the approval of the

Engineer-In- Charge. The amount of cement, sand each size of coarse aggregate and water entering each batch of concrete shall be determined on a volumetric basis. The measuring equipment's shall operate within the limits of accuracy specified.

The mixer should be able to handle all the grades of coarse aggregates, fine aggregates, water and cement and admixtures where specified, facility should be available to obtain samples of each ingredients entering the mixture. The contractor shall maintain a record of number of batches mixed and all other required for checking the correctness of the mix as per the directions of Engineer-In-Charge.

Suitable mixer so as to mix uniformly the various ingredients and discharging the mix without segregation should be used. Preferably tilting types of mixtures should be used. For non-tilting type of mixers, suitable device shall be used and care shall be taken to avoid segregation of large size aggregates. Hand mixing shall not be allowed.

The scope of work also incl. laying of concrete in position as directed with compaction by means of needle of surface vibrator together with finishing the expose surface of concrete work to obtain dense and compact surface, curing for a specified period etc.

## **WORKMANSHIP**

Specifications for workmanship laid down in general technical specifications for concrete works shall apply here also. The workability of the concrete mix shall be controlled by maintaining a w/c ratio, that is bound to give a concrete mix which is just sufficiently wet to be placed and compacted without difficulty with the means specified.

## **MODE OF MEASUREMENT AND PAYMENT:**

The rate shall be for a unit of one cubic meter. The consolidated cubical contents of concrete work as specified in item shall be measured. The concrete laid in excess of section shown on drawing or as directed shall not be measured.

No deduction shall be made for-

- i) Ends of beams, girders, joist, steps, posts, etc of des-similar materials up to 500 sq. cms in section.
- ii) Opening up to 0.1 sq.mt.in area.



The rate includes cost of all materials, labour, tools and plants required for mixing, placing in position, vibrating and compacting, finishing, as directed, curing and other incidental expenses for producing concrete of specified strength. The rate includes cost of formwork. The item shall be measured and paid in cubic meter basis of completed work.

Signature of  
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## **ITEM NO. 16: - DETAIL TECHNICAL SPECIFICATION FOR REINFORCEMENT:**

**Providing & Placing in position reinforcement bars including cutting, bending, welding joints where necessary, hooking etc. complete as per drawing for all lead and lifts.**

### **TMT / CRS (FE 500 D)**

#### **MATERIALS:**

High strength deformed Thermo Mechanically Treated (T.M.T.) bars shall be as per IS: 1786(2008) of grade Fe 500.

Other provision and requirements shall conform to specification of Mild Steel Bars.

Reinforcing steel shall not be stored directly on the ground. These shall be stored under cover and shall be protected from rusting, oil grease and distortions as directed by the Engineer in-charge.

No re-rolled material will be accepted. Contractor shall submit the manufacturer's test certificate along with the gate pass no, lorry no with each truck load consignment.

Frequency of tests shall be as per IS 1786, table-5. Steel not conforming the specifications shall be rejected and removed from the site immediately.

Pitted and defective rods shall not be used. All the reinforcement shall be ISI marked.

#### **GENERAL:**

This item shall include providing, bending, binding and erecting in position T.M.T. steel reinforcement for R.C.C. work.

#### **BENDING REINFORMENT:**

- Bonds, cranks or other shapes on reinforcement bars shall be carefully formed in exact accordance with the drawings. Otherwise, all bars shall be truly straight. Bends shall be made cold having a diameter of at least four times the bars. Seating of bars for any purpose shall not be allowed.
- Splices or overlaps in reinforcement are required the bars shall be provided with such splices or overlaps as are shown on the drawing and in absence of any drawing, as indicated as:

##### **i) BARS IN TENSION:**

Overlap = Bond length = tensile stress in bar

Bar diameter  $\times$  4  $\times$  Permissible average bond stress

Minimum Overlap = 30  $\times$  diameter of bar

ii) BARS IN COMPRESSION:

Overlap = Bond length = Compressive Stress in bar

bar diameter  $\times$  5  $\times$  Permissible average bond stress

Minimum overlap = 24  $\times$  diameter of bar

No bars shall be joined by welding.

**FIXING REINFORCEMENT: -**

- The number, size, form and position of all steel reinforcing bars, tiles, links, stirrups and other parts of the reinforcement shall be in exact accordance with the drawings and such parts shall be kept in the correct positions in the forms without displacement during the process of working the concrete into places. The minimum clearance between parallel round bars shall not be less than either 1.5 time the diameter or 1.5 times the maximum size of the aggregate whichever is more Mortar or concrete block, metallic bars, space bars etc, necessary for maintaining the reinforcement in the correct position shall be used as where shown on the drawing but should the contractor consider further bars and distance pieces etc , to the necessary be shall supply and fix the same without charges special care shall be exercises to prevent any disturbance of the reinforcement in concrete that has already been replaced.
- All straight bars shall be fixed parallel to each other and the side of the forms any ties links or stirrups connecting the bars all be tightened that the bar is properly braced inside of their served parts shall be in actual contact with the bars around which they are intended to fit.
- After placing the bars in position, they shall be tied together with black steel annealed wire 16 SWG (1-626mm). They shall be firm with ends of the wire turned in to the main body of concrete bars shall be tied at all intersections.

**MODE OF MEASUREMENT AND PAYMENT:**

- After all the steel bars have been placed in position they shall be got approved and measured from the Engineer-in-Charge before starting the concrete work.
- The payment for this item shall be on the basis of computed weight of T.M.T. steel bars after measuring the length including specified lengths and hooks. The weight of the steel bars shall be calculated according to the standard weight mentioned in the I.S.I. handbook corrected up to 10 Kg.
- No payment shall be made for extra members or length's net included in the design and which in the opinion of the Engineer-In-Charge are not essential for the purpose of the item of the work even though provided by the contractor as supports and for other reasons and allowed to be embedded in the concrete by the Engineer-In-Charge.

- The weight of annealed steel wire used for tying the reinforcement bars shall not be taken into account for payment purpose.

If the T.M.T. Steel Bars supplied by the department are not of adequate length, then some wastage will occur the useful pieces as may be decided by the Engineer-In-Charge shall be return to the store from where steel was supplied for the materials the received back necessary credit at the issue to at which steel was supplied to the contractor would be allowed. However, the contractor shall have to bear all the expenses of loading unloading freight for returning the above pieces of T.M.T. steel bars to the store. The item shall be measured and paid in Metric Tonne basis of completed work.

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## **ITEM NO. 17: - DETAIL TECHNICAL SPECIFICATION FOR STEEL LADDER:**

**Providing Fabricating and erecting a steel ladder M.S. Angle 50 X 30 X 6 mm in the H.R. well as per design to approach the H.R. gates from top of H.R. well etc complete as directed.**

### **WORKMANSHIP:**

The scope of work includes providing, fabricating and erecting structural steel ladder for HR well as per design with all lead and lift and colour/primer. The ladder shall be fabricated from M.S. Angle 50x30x6mm as per drawing. First of all angle section shall be cut into the design size and shape. Then, all the components shall be welded together. The rise of the ladder shall not be more than 30cms. Ladders shall preferably be vertical and its angle with vertical shall not exceed 5°. Ladders shall be minimum 450 mm clear width. The ladder shall be fixed in the HR well rigidly, using proper method as directed or as shown in the drawing. One coat of approved red oxide primer and two coat of approved synthetic enamel paint shall be apply after proper scrubbing, brushing, grinding and cleaning and before placing in the position. The ladder shall be fixed/anchored with HR well wall by proper size s.s screws or as directed by engineer in charge. Final touching and finishing with primer and paint shall be done after fixing the ladder.

### **MODE OF MEASUREMENT AND PAYMENT:**

The work should be measured after completion in running meter basis and to be paid accordingly.

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## **ITEM NO. 18: - DETAIL TECHNICAL SPECIFICATION FOR MANHOLE COVER:**

**Providing and fixing C.I. Manhole cover 0.60 M. x 0.45M. size having weight not less than 35Kg.**

### **GENERAL:**

Frame and covers for manholes/HR well shall be of required type and dimensions. Following information shall be clearly marked on each cover.

- Year of manufacture,
- Identification mark of the Employer.

### **CAST IRON FRAME & COVER:**

The cast iron frame and cover shall be of grey cast iron as per IS:1726. The general requirements for casting and coating of CI frame and cover shall be as per IS: 5455. The covers shall have a raised chequered design to provide an adequate non-slip grip. The rise of the chequer shall be not less than 4 mm. The locking device for the cover shall be provided as approved by the Engineer In-charge. The frame shall be fixed in cement concrete of M20 grade all round and finished with neat cement. Rectangular CI frame and cover of 600 mm x 450 mm clear opening, the total weight shall not be less than 35 kg. The manholes/HR well cover and frame shall be painted with three coats of anti-corrosive paint after fixing in position.

### **MODE OF MEASUREMENT AND PAYMENT:**

The rate includes cost of all materials, labour, tools and plants required for providing & fixing in position as directed by Engineer in charge. The item shall be measured and paid on number basis of completed work.

Signature of  
Contractor

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## **ITEM NO. 19: - DETAIL TECHNICAL SPECIFICATION FOR DOOR & WINDOW:**

**Providing & fixing of steel door & window of required size incl. Cutting, welding, putting in position, painting, in three coats etc. complete.**

### **MATERIALS:**

Hot rolled steel sections for the fabrication of steel doors, windows and ventilators shall conform to IS:7452, which are suitable for, single glazing.

Pressed steel door frames for steel flush doors shall be out of 1.25mm thick mild steel sheets of profiles as per IS: 4351.

Transparent sheet glass shall conform to the requirements of IS: 2835. Wired and figured glass shall be as per IS: 5437.

Builder's hardware of fittings and fixtures shall be of the best quality from the approved manufacturers.

### **WORKMANSHIP:**

All steel doors, windows and ventilators shall be of the type as specified in the respective items of work prepared by the Contractor and of sizes as indicated in the Drawings prepared by the Contractor. Steel doors, windows and ventilators shall conform to the requirements as stipulated in IS: 1038. Steel windows shall conform to IS: 1361, if so specified.

Doors, windows, and ventilators shall be of an approved manufacture. Fabrication of the unit shall be with rolled section, cut to correct lengths, and metered. Corners shall be welded to form a solid fused welded joint conforming to the requirements of IS: 1038. Tolerance in overall dimensions shall be within  $\pm 1.5\text{mm}$ . The frames and shutters shall be free from warp or buckle and shall be square and truly plain. All welds shall be dressed flush on exposed and contact surfaces. Punching of holes, slots, and other provisions to install fittings and fixtures later shall be made at the correct locations as per the requirements. Samples of the units shall be got approved by the Engineer in Charge before further manufacture/purchase by the Contractor.

Type and details of shutters, hinges, glazing bar requirement, couplings, locking arrangement, fittings and fixtures shall be as described in the respective items of work and / or as shown in the Drawings prepared by the Contractor for single or composite units.

For windows with fly proof mesh as per the item of work prepared by the Contractor, rotor operator arrangement, for the operation of the glazed shutters from the inside shall be provided.

Pressed steel door frames shall be provided with fixing lugs at each jamb, hinges, lock- strike plate, mortar guards, angle threshold, shock-absorbers of rubber or similar material as per the requirements of IS: 4351. Pressed steel doorframes shall be fixed as 'built-in' as the masonry work

proceeds. After placing it plumb at the specified location, masonry walls shall be built up solid on either side and each course grouted with mortar to ensure solid contact with the doorframe, without leaving any voids. Temporary struts across the width shall be fixed, during erection to prevent bow / sag of the frame.

Door shutters of flush welded construction shall be 45mm thick, fabricated with two outer skills of 1.25mm thick steel sheets, 1mm thick steel sheet stiffeners and steel channels on all four edges. Double shutters shall have meeting stile edge bevelled or rebated. Provision of glazed viewing panel, louvers shall be made as per the items of works and/or Drawings prepared by the Contractor. Shutters shall be suitably reinforced for lock and other surface hardware and to prevent sagging/twisting. Single sheet steel door shutters shall be fabricated out of 1.25mm thick steel sheets, mild steel angles and stiffeners as per the Drawings prepared by the Contractor.

Doors, windows and ventilators shall be fixed into the prepared openings. They shall not be 'built-in' as the masonry work proceeds, to avoid distortion and damage of the units. The dimensions of the masonry opening shall have 10mm clearance around the overall dimensions of the frame for this purpose. Any support of scaffolding members on the frames/glazing bars is prohibited.

Steel doors, windows and ventilators shall be provided with finish of either painting as specified or shall be hot dip galvanized with thickness of the zinc coating as stipulated all as described in the respective items of works prepared by the Contractor.

The material of the Builders hardware of fittings and fixtures of chromium plated steel, cast brass, brass copper oxidized or anodized aluminium shall be as specified in the items of works prepared by the Contractor. The number, size and type of fittings and fixtures shall be as in the Drawings /items of works prepared by the Contractor.

Installation of the units with fixing lugs, screws, mastic caulking compound at the specified locations shall generally conform to the requirements of IS:1081. Necessary holes etc. required for fixing shall be made by the Contractor and made good after installation. Workmanship expected is of a high order for efficient and smooth operation of the units.

#### **MODE OF MEASUREMENT AND PAYMENT:**

Measurement of the item shall be taken in square meter and shall be paid accordingly for completed item in all respect.

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## **ITEM NO. 20: - DETAIL TECHNICAL SPECIFICATION FOR I.S./NP3, R.C.C. Pipe:**

**Providing and fixing in position ( different diameter ) I.S., NP-3 class reinforced pipe with caulking the joints with cement mortar 1:1 proportion, using jute string soaked in cement slurry, finishing joints and laying pipes to the designed grade and levels, curing etc. complete for all leads and lifts.**

**NP-3 class 900 MM dia pipe.**

### **GENERAL:**

The work shall consists of fixing and installing reinforced concrete pipe of the above diameter and length required of the location shown on the drawing or as ordered by the Engineer in charge.

Reinforced concrete pipe shall be of NP3 type confirming to the requirements of IS: 458 and shall be of dia. as specified in the item. Each consignment of cement concrete pipes shall be inspected. If necessary and approved by the Engineer in charge either at the works.NP4, NP3, NP2 and NP1 pipes where the testing of pipes will not be feasible the contractors will have to produce a certificate from the production of such certificate will not however relieve the contractor from his responsibility of supplying pipes of required standard and will have to bear the loss or damage coursed to the work on account of defects found subsequently during execution. It will also be necessary to purchase these pipes from manufacturer having standard equipments for carrying out various tests as per IS : 458 at his factory.

### **WORKMANSHIP:**

No pipe shall be place in position until the foundation has been approved by the Engineer in charge. Where two or more pipes are to be laid adjacent to each other they shall be separated by a distance equal to at least half the diameter of the pipe subject to minimum of 450mm.The laying of pipes on the prepared foundation shall start from the outlet and proceed towards the inlet and be completed to the specified lines and grades. The pipes shall be fitted and matched so that when lay in works them from a culvert with a smooth uniform invert. Any pipe found defective or damaged during laying shall be removed at there cost of contractor.

The pipes shall be joined either by collar joint in the former case the collars shall be of R.C.C.150mm to 200mm wide and having the same strength as the pipes to be jointed. Caulking space shall be between 13 and 20 mm according to the diameter of the pipes with caulking materials shall be slightly wet mix of cement and sand in the ratio of 1:2 rammed. Before caulking, the collar shall be so placed that its centre concedes with that of pipe and an even annular space is left between the collar and the pipe. Flush joint may shaped to form a self centering joint with a joining space 13 cms. wide. The joining space shall be filled with cement mortar 1:2(1 cement; 2 sand) mixed sufficiently dry to remain in position when forced with a trowel or rammer. Care shall be

taken to fill all voids and excess mortar shall be removed. All joints shall be made with care so that their interior surfaces smooth and consistent with the interior surface of the pipes. After finishing, the joint shall be covered and damp for at least four days.

**MODE OF MEASUREMENTS & PAYMENT:**

R.C.C. pipes shall be measured along their centre between their inlet. The rate for the pipes shall include the cost of pipe including loading, unloading and placing in a portion. The measurement & payment shall be taken and paid of completed length of pipes in mt. and no extra payment shall be made for providing collars joints etc. under relevant item.

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## **ITEM NO. 21: - DETAIL TECHNICAL SPECIFICATION FOR COFFERDAM:**

**Construction and Removal of Cofferdam to facilitate Repair and Construction of Head Regulator in water by making earthen embankment, protecting the cofferdam by empty bags (filled with local soil), dewatering and other allied activities etc. complete.**

### **GENERAL: SCOPE OF WORK: WORKMANSHIP:**

The item provides for the Design, Construction & Demolition of Temporary Cofferdam or any other suitable means as may be necessary and approved by Engineer-in-charge to facilitate construction and maintenance of Head Regulator, different civil engineering activities like open foundation, pile foundation, pile cap, sub structure & super structure of whole Dam, bridge etc. The contractor shall take all necessary protective measures against possible erosion due to tide variations if any and maintain the coffer dams, bund or island in proper manner during construction. He shall not be entitled for any payment or compensation in the event of washing of the coffer dam, bund, or island at any time, either due to tidal waters if any or floods, or any other reasons whatsoever, and the contractor shall reconstruct the same if required at his risk and cost. The size of the coffer dam, bund or island shall be such as would allow without obstruction and inconvenience, enough working free space all around the foundation works.

Adequate pumping arrangement shall be made for dewatering the inside of coffer dam, bunds etc. Pumps of adequate capacity and in required number shall be provided to ensure adequate pumping. The method of pumping shall be approved by Engineer In-charge, but in any case, the pumping arrangement shall be such that there shall be no movement of subsoil or blowing in due to differential head of water during pumping. Pumping arrangements shall be adequate to ensure no delays in construction. The dewatering shall be continued for at least (7) seven days after the last pour of the concrete. The Contractor shall, however, ensure that no damage to the structure results on stopping of dewatering.

The Contractor shall suitably divert the water obtained from dewatering from such areas of site where a build-up of water in the opinion of the Engineer In-charge obstructs the progress of the work, leads to unsanitary conditions by stagnation, retards the speed of construction and is detrimental to the safety of men, materials, structures, and equipment.

Specifications and requirements laid down in general technical specification for EARTH WORK for Embankment shall apply.

**Suitable excavated earth from excavation of pond deepening shall be used for construction of cofferdam as per the instruction of engineer in charge.** The earth shall be spread uniformly in layers (by mechanically or by labours) having thickness not exceeding 23 cms or as directed by Engineer in Charge. After spreading of each layer, watering, ramming and compaction with pneumatic/mechanical equipment (e.g., roller / tampers/hammers/plate compactors/plate vibrators

etc.) shall be done to achieve required section or slope and up to the satisfaction of Engineer-In-Charge.

Empty cement bags shall be filled with good, excavated earth for preparing U/S side of top layer of Cofferdam. The empty cement bags shall be in good condition without any breakage.

The site of good earth shall be approved by Engineer-in-charge. The excavated earth shall not contain any vegetations or other impurities. The clods of excavated earth shall be broken properly. The excavated earth shall be filled in bags and then it shall be stitched on its top. The earth filled bags shall be placed at the site of work as per the instructions of Engineer-in-charge.

The contractor shall plan, construct and maintain satisfactorily necessary diversion channels and protective works so as to safely pass the stream flow and also satisfactorily meet with any sudden rise of flow due to tides, flood or any other reason, without damaging the structure. The coffer dam or bund shall be such as to give sufficient working space for construction, inspection and installations of pumping machinery inside the enclosed area. The coffer dam or bund shall be of adequate section and properly designed, constructed to prevent ingress of water.

The coffer dam, bund or island shall be completely removed, and their materials shall be disposed of in the manner as directed by the Engineer-in-charge when no longer required. The work consists of complete demolition of entire cofferdam with same degree of care that have been taken during construction of it. Removal means removing all materials including debris if any also so as to not interrupt the flow of the water from U/S to D/S for which it was being constructed.

The garbage shall be removed and dumped as per the instruction of engineer in charge. Removal activity shall be done in such a way that there shall not be any damage to the any other structure adjoining with it.

#### **MODE OF MEASUREMENT AND PAYMENT:**

The measurement of cofferdam shall be done on Job basis. Also, the corresponding payment shall be done on the actual work executed on the field in all respects on Job basis only, for work successfully completed and accepted by Engineer in Charge.

Signature of  
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## **ITEM NO. 22: - DETAIL TECHNICAL SPECIFICATION FOR STEPS IN BRICK/STONE MASONRY:**

**Constructing 1 m. wide steps in brick/ stone masonry in c.m. 1:5 dam slopes as per approved drawing including excavation etc. complete for zero leads and lifts. Using bricks works.**

### **MATERIALS:**

- i) CEMENT: Specification M-2 of specification of material section shall apply.
- ii) WATER: Specification M-1 of specification of material section shall apply.
- iii) SAND: Specification M-3 of specification of material section shall apply. Sand shall be used after proper screening only.
- iv) STONE: Specification M-5 of material section shall apply.
- v) Brick: Specification M-15 of material section shall apply.

### **GENERAL:**

The general technical specification for brick masonry, cement concrete and cement plastering shall apply here also. It consists of providing and constructing brick masonry in C.M. 1:5. Top surface of the steps shall be finished cement plaster in C.M. 1:5.

The step shall have to construct after completion of earth work on U/S slope of bund in all respect up to design level. Steps shall be provided on U/S slope of earth dam as instructed, by excavating the slope as required, ramming the surface as per approved drawing.

### **SCOPE OF WORK:**

The scope of work shall include providing and constructing brick masonry steps in C.M. 1:5 with cement plaster in C.M. 1:5 on top surface with all lead and lift.

### **WORKMANSHIP:**

The work shall be carried out with best workman like manner as mentioned in relevant item of work.

### **MODE OF MEASUREMENT AND PAYMENT:**

Payment for this item of work shall be made on running metre basis with all lead and lift.

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## **ITEM NO. 23: - DETAIL TECHNICAL SPECIFICATION FOR PAINTING:**

**Finishing wall with weather proof exterior emulsion paint on wall surface (two coats) to give an required shape even shade after thoroughly brushing the surface to remove all dirt, and remains of loose powdered materials etc complete**

### **MATERIALS:**

Water shall be conformed to M-1. The plastic emulsion shall conform to I.S. 5411-1969 (part I).

### **WORKMANSHIP:**

#### **1. Scaffolding:**

Wherever scaffolding is necessary it shall be erected in such a way that as far as possible on part of scaffolding shall rest against the surface to be white or colour washed. A properly secured strong and well tied suspended platform (Zoola) may be used for whitewashing. Where ladders are used, pieces of old gunny bag shall be tied at top and bottom to prevent scratches to the floors and walls. For whitewashing of ceilings, proper stage scaffolding shall be erected where necessary.

#### **2. Preparation of surface:**

The surface shall be thoroughly cleaned of all dust, dirt, mortar cropping's and other foreign matter before whitewash is to be applied.

The surface spoiled by smoke soot shall be scraped with steel wire brushes or steel scrapers or shall be rubbed with over-burnt surkhi or brick bats. The surface shall be then broomed to remove all dust, dirt and shall be washed with clean water.

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

All unsound portion of the surface plaster shall be removed to full depth of plaster in rectangular patches and plastered again after raking the masonry joints properly. Such portion shall be wet and allowed to dry. They shall then be given one cat of whitewash.

All unnecessary nails shall be removed, the holes cracks patches etc. shall be made good with materials similar in imposition to the surface to be prepared.

#### **3. Preparation of Mix:**

This shall be done as per manufacturer's instructions. The thinning of emulsion is to be done with water and not with turpentine. The quantity of thinner to be added shall be as per manufacturer instructions.

**APPLICATIONS:**

Before pouring into small containers for use, the paint shall be stirred thoroughly in its container. When applying also, the paint shall be continuously stirred in the smaller container, so that its consistency is kept uniform.

The paint shall be laid on evenly and smoothly by means of crossing and laying off the crossing and laying off consist of covering the area over with paint, brushing the surface hard for the first time over and then brushing alternately in opposite direction two or three times and then finally brushing lightly in a direction at right angles to the same. In this process, no brush marks shall be left after the laying off is finished. No hair marks from the brush or clogging of paint puddles in the corners of panels, angles of mouldings, etc. shall be left on the work. The full process of crossing and laying off will constitute one coat.

The paint shall be applied with brush or rollers. For undecorated surfaces, the surface shall be treated with minimum two coats of cement water proofing paint. The second or subsequent coat shall not be started until the preceding coat has become sufficiently hard to resist marking by brush being used.

The surface on finishing shall present a flat velvety smooth finish. It shall be even and uniform in shade without patches, brush marks, paint drops etc.

**PRECAUTIONS:**

Old brushes if they are to be used with emulsion paints, shall be completely dried of turpentine oil paint by washing in warm soap water. Brushes shall be quickly washed in water immediately after use and kept immersed in water during break periods to prevent the paint from hardening on the brush.

In the preparation of wall for plastic emulsion painting, no oil base putties shall be used in filling cracks, holes etc.

Splashes on floors etc. shall be cleaned out without delay as they will be difficult to remove after hardening.

Washing of surfaces treated with emulsion paint shall not be done within 3 to 4 weeks of application.

**PROTECTIVE MEASURES:**

The surface of doors, windows, floors, articles of furniture etc, and such other parts of the building not to be whitewashed shall be protected from being splashed upon. Such surfaces shall be cleaned of whitewash splashed if any.

**MODE OF MEASUREMENTS & PAYMENT:**

All the work shall be measured in the decimal system as under:

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

(b) Area in individual items shall be worked out to the nearest 0.01 Sq. M.

All the work shall be measured in sq. mt. Deductions for jambs, soffits, sills etc. for opening not exceeding 0.5 sq. mt. each in area for ends of joints, posts, beams, girders, steps etc. not exceeding 0.5 sq. mt. each in area and for opening exceeding 0.3 sq. mt. and not exceeding 3.0 sq. mt. each in area deductions and additions shall be made as under:

No deductions shall be made for ends of joints beams, posts etc. and openings not exceeding 0.5 sq. mt. each. No addition shall be made for reveals, jambs, soffits, sills etc. of these openings nor for finish arounds ends of joints, beams, posts etc.

Deductions for openings exceeding 0.5 sq. mt. but not exceeding 3 sq. mt. each shall be made as follows and no addition shall be made for reveals, jambs, soffits etc. of these openings:

(a) When both the faces and walls are provided with finish, deduction shall be made for one face only.

(b) When each face of wall is provided with different finish deduction shall be made for that side of frame for door, windows etc. on which width of reveals is less than that of the other side, where width of reveals on both faces of wall are equal, deduction of 50% of area of opening on each face shall be made from total area of finish.

(c) When only one face of wall is treated and the other face is not treated, full deduction shall be made if the width of reveal on the treated side is less than that on the untreated side, but if the width of the reveal is equal or more than on the untreated side neither deductions nor additions be made for reveals, jambs, soffits, sills etc.

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

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

Corrugated surfaces shall be measured flat as fixed and not girth. The quantities so measured shall be increased by the following percentage and the resultant shall be included with the general areas.

(a) Corrugated steel sheets 14%

(b) Corrugated A. C. Sheets 20%

(c) Semi corrugated A. C. Sheets 10%

(d) Nainital pattern roof (Plain sheeting with rolls) 10%



(e) Nainital pattern roof (with corrugated sheets) 25%

Cornices and other wall features, when they are not picked out in a different finish/colour shall be girthed and included in the general area.

The rate shall include the cost of all materials, labour, scaffolding, protective measures etc. involved in all the operations described above.

The rate shall be for a unit of one sq. meter.

Signature of  
Contractor

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## **ITEM NO. 24: - DETAIL TECHNICAL SPECIFICATION FOR JUNGLE CLEARANCE:**

**Cleaning the slope of dam within the dam boundry by removing the bushes, shrubs girth and small trees including depositing the materials as and where directed up to 50 mt. and all lift etc completed.**

### **GENERAL:**

Jungle Clearance (Ganda Baval etc.) of light or heavy dense (Work done by manually or by machinery) including grabing of removing the root & girth completely from the ground & back fill with earth & making surface good as directed including depositing & removing the material away from the site of work at own risk and cost as and where directed etc. etc completed for following.

### **SCOPE OF WORK:**

- 1) This item shall include jungle clearance, Ganda baval etc. of heavy density and also light density from the earthen bund and other structures inclusive of the necessary widths as directed.
- 2) Grabing of removing the root & girth completely from the ground & back fill with earth & making surface good as directed.
- 3) All materials thus shall be deposited at one place shown by the Engineer-in-Charge and / or removed from the site of work at own cost as and where directed. The rate is inclusive for lead upto 50 mt. and all lift. All trees fallen shall be the property of the Government and shall be stacked and shall be stacked in a suitable place as directed by the Engineer-in-charge.
- 4) Contractor shall provide his own arrangements at his own cost for billing or pumping out water or diverting the same during site clearance. The rates for this item will be inclusive of all such cost.
- 5) Waste material decided as such by the Engineer-in-charge obtained from the clearing operation shall be burnt or removed.

### **WORKMANSHIP:**

The work shall be carried out with best workmanship manner as directed by engineer in charge.

### **MODE OF MEASUREMENT AND PAYMENT:**

This item will be paid for at the rate of square meter basis.

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## **ITEM NO. 25: - DETAIL TECHNICAL SPECIFICATION FOR EARTHWORK/BACK FILLING.:**

**Earthwork/back filling with selected earth from deepening area of MIS by machinery including conveying and spreading, watering, compaction with pneumatic/mechanical equipment with lead up to 1.00 km and all lift etc. complete.**

### **MATERIAL:**

Embankment earth material shall comply with the general requirements specified in IS: 12169-1987. Required testing shall be done as per requirement and the instruction of engineer in charge.

### **GENERAL:**

Specifications and requirements laid down in general technical specification for Earth work/Back filling shall apply.

### **SCOPE OF WORK:**

The scope of this item of work includes excavating, transporting the suitable earth from deepening area or outside borrow area or excavated useful materials with a lead of 1.0 km and all lift and laying, spreading in as and where require with necessary dressing, finishing, watering, ramming, compaction with pneumatic/mechanical equipment, with all machineries and labours required. In the case where work is to be carried out near structure, all necessary care shall be taken so that the structure is not damaged.

### **WORKMANSHIP:**

Suitable earth or excavated useful materials shall be spread for embankment/backfilling as and where require and as per the instruction of engineer in charge. The earth shall be spreaded uniformly in layers (by mechanically or by labours) having thickness not exceeding 23 cms or as directed by Engineer In Charge. After spreading of each layer, watering, ramming and compaction with pneumatic/mechanical equipment (e.g. roller / tampers/hammers/plate compactors/plate vibrators etc.) shall be done to achieve required section or slope and up to the satisfaction of Engineer-In-Charge.

No earthwork/backfilling shall be done behind masonry/concrete which is still fresh. Compaction near structure shall have to be done simultaneously with raising of structure.

### **MODE OF MEASUREMENT AND PAYMENT:**

The completed work will be measured in cubic meter basis. The quantities shall be computed from the cross-section areas of the compacted fill and on levels basis.

For the purpose of measurement, initial levels of dam seat area shall be taken on the grid of size not more than 10 x 5 mt. in the presence of representative of contractor. The quantities shall be computed from the cross section by the trapezoidal formula only.

The measurement and payment for the different items involve shall be made under the respective items and on the basis of cross sections taken at the start of the work, and also as and when the source of material changes.

The payment & Measurement of this item shall be made on cubic meter basis of the completed work as per above specifications.

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## **ITEM NO. 26: - DETAIL TECHNICAL SPECIFICATION FOR DEEPENING OF TANK:**

**Deepening of tank in all type of soil with yellow, sandy, gravelly soil including wet and slushy condition of soil including soft murrum & hard murrum by machinery including conveying and spreading excavated stuff as & where directed with lead up to 1.00 km and all lift etc. complete.**

### **GENERAL:**

The site on which the excavation is to be done shall be cleared and all obstructions, loose stone, material sand rubbish of all kind, bush, wood and trees shall be removed as directed. The un-useful materials so obtain shall be disposed of as directed incl. burning. The rate of such site clearance shall be deemed to be incl. in the rate of the item of work. Any soil which generally yields to the close application of pickaxes & shovels, phawaras, rakes or any such ordinary excavating tools or organic soil, gravel, silt, sand clay/stiff clay, peat, soft to hard murrum, rubble stone over burden etc. under this category. All specifications for excavation mentioned in general technical specification shall apply to this item also for classification of strata, pay line, shoring and strutting, disposal of excavated stuff, etc.

### **SCOPE OF WORK:**

The work to be done under these specifications shall consist of furnishing all tools, plant and labours and material required to carrying out excavation, conveyance, and disposal of the excavated stuff, maintaining the excavation slopes and trenches, preparing the foundations as shown in the drawing or as directed in yellow, sandy, gravelly soil including wet and slushy condition of soil including soft murrum & hard murrum. Including dewatering.

### **WORKMANSHIP:**

The workmanship of the work under this item of work shall be as described in general tech. specification for excavation.

### **MODE OF MEASUREMENT AND PAYMENT:**

Payment shall be made on volumetric basis per cubic meter No payment shall be made for the unauthorized extra excavation. The rates Includes excavation and depositing of the excavated stuff as directed within a lead upto 1 Km. and all lift. The measurement shall be taken as specified in general technical specification for excavation.

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## **ITEM NO. 27: - DETAIL TECHNICAL SPECIFICATION FOR DRY RUBBLE PITCHING (230 MM THICK):**

**Providing and laying dry rubble pitching of various thickness to required grade including trimming of earth work, hand packing the interstices with spauls, filling earth in interstices panelling complete for all leads and lifts.**

### **230 MM THICK**

#### **MATERIAL:**

i) Rubble (STONE): The pitching material shall consist of the most durable rock fragments of approved quality selected for the purpose. Stones shall be hard, sound, free from cracks, decay and weathering. Stone shall be used from surplus usable excavated rubble or from the approved quarries if required and shall be subject to thorough inspection. The quality of individual stones shall be hard, dense, sound and resistant to abrasion and shall be free from cracks, seams, shale partings, conglomerate, bands and other defects that would tend to increase unduly their susceptibility to destruction by water and weathering action. The shape of the individual stones shall be angular. Stones having thickness less than 50% of their maximum dimensions shall not be used for pitching. Stones with round surface shall not be used. Stones when immersed in water for 24 hours shall not absorb water by more than 5 percent of their dry weight when tested in accordance with IS: 1124-1974. or Specification M-5 of material section shall apply.

#### **GENERAL:**

First, the slope of earth work shall be properly dress to design slope with filling the minor pits with same material incl. tamping, watering etc.

Stone to be used for pitching shall of dense, durable, solid, free from cracks, seams, sale particles and other defects. The shape of individual stone shall be of angular. No stone weighing less than 25 kg (average) and weighing more than 40 kg shall be used. Maximum 10% (of quantity of stone ) spauls for filling the interstices and tight packing the pitching stone shall be used. The stone having thickness less than 50% of their maximum dimension shall not be used. The stone shall be placed on edge with its broad base down and face normal to the slope with necessary hand packing like manner. Stones and spauls shall be tightly driven into the interstices to wedge the riprap in place and close direct opening to. the underlying surface. The stone shall be laid in a compact manner being at the bottom of the slope.

#### **SCOPE OF WORK:**

The scope of the work includes Providing and laying dry rubble pitching of 230 mm thickness including trimming of earth work, hand packing the interstices with spauls, filling earth in interstices panelling complete for all leads and lifts.

**WORKMANSHIP:**

The laying of the pitching stone shall be from the lowest elevations to upwards. While laying the stone, care shall be taken to have minimum of joints space. Joints should be break in all directions, so that they are well keyed together. Job shall be completed with best workmanship like manner.

**MODE OF MEASUREMENT AND PAYMENT:**

The payment & Measurement of this item shall be made on square meter basis of pitching laid including dressing the slope etc. complete. The rate includes quarrying the materials, transporting the same to the site, loading-unloading with all lead and lift. No deduction for any voids shall be made.

Signature of  
Contractor

Deputy Executive Engineer  
Tribal Area Dev. Works Sub Division  
Dahod

Executive Engineer  
Panchayat Irrigation Division  
Dahod

## **ITEM NO. 28: - DETAIL TECHNICAL SPECIFICATION FOR CONCRETE WORK (C. C. NOMINAL MIX, M-20 AND MSA-20 MM):**

**Providing & Laying in position "NOMINAL MIX" cement concrete using cement, sand and crushed aggregate by mass and machine mix for C.C./R.C.C work incl. necessary formworks centering, scaffolding, compaction by vibrator, curing as directed with all lead & lift etc complete Without Dewatering and excluding cost of steel reinforcement.**

**For Foundation concrete / General purpose  
(C. C. Nominal Mix, M-20 and MSA-20 mm)**

### **MATERIALS:**

i) CEMENT: Specification M-2 of specification of material section shall apply. ii) WATER: Specification M-1 of specification of material section shall apply. iii) FINE AGGREGATE (SAND): Specification M-3 of specification of material section shall apply. iv) COARSE AGGREGATE: Specification M-4 of specification of material section shall apply. Required testing shall be done as per EIC.

### **GENERAL:**

General technical specifications for concrete works shall apply here also. Concrete mix shall be "nominal mix". The proportions for ingredients shall be by mass only except for water. The grade of concrete shall be 1:1.5:3 with MSA-20mm (graded). **The Cement level for the M-20 grade (20mm MSA) is considered as 360 kg/Cum as per GR (Guj) No. MIS 102010/17/K-1, Dt. 30-07-2018. However, if the obtained Cement level in Nominal mix will found greater than standard cement level as specified above, no extra payment shall be done for above. And if the obtained Cement level in Nominal mix will found less than standard cement level, the payment of difference will be deducted from the bill.**

### **SCOPE OF WORK:**

The scope of work under this item incl. doing C.C/ R.C.C. at various work locations and compartments as classified under the item incl. providing & supplying all materials (including cover blocks, etc.), labours and use of equipment's machinery with providing erecting and dismantling of necessary formwork and centering as per **specified dimension of guard stone**. The scope of work also incl. laying of concrete in position as directed by machinery or by manually with compaction by means of needle of surface vibrator together with finishing the expose surface of concrete work to obtain dense and compact surface, curing for a specified period etc. and also **cast guard stone of 75 x 20 x 20 Cm Size on site as per instruction of EIC.**



**WORKMANSHIP:**

Specifications for workmanship laid down in general technical specifications for concrete works shall apply here also. The workability of the concrete mix shall be controlled by maintaining a w/c ratio, that is bound to give a concrete mix which is just sufficiently wet to be placed and compacted without difficulty with the means specified.

**MODE OF MEASUREMENT AND PAYMENT:**

The rate shall be for a unit of one cubic meter. The consolidated cubical contents of concrete work as specified in item shall be measured. The concrete laid in excess of section shown on drawing or as directed shall not be measured.

No deduction shall be made for-

- i) Ends of beams, girders, joist, steps, posts, etc of des-similar materials up to 500 sq. cms in section.
- ii) Opening up to 0.1 sq.mt.in area.

The rate includes cost of all materials, labour, tools and plants required for mixing, placing in position, vibrating and compacting, finishing, as directed, curing and other incidental expenses for producing concrete of specified strength. The rate includes cost of formwork. The item shall be measured and paid in cubic meter basis of completed work.

Signature of  
Contractor

Deputy Executive Engineer  
Tribal Area Dev. Works Sub Division  
Dahod

Executive Engineer  
Panchayat Irrigation Division  
Dahod

## **ITEM NO. 29: - DETAIL TECHNICAL SPECIFICATION FOR SIGN BOARDS:**

**Providing and fixing in position 1.80 m high above finished ground level sign boards of standard size 0.45 m x 0.30m with M.S. angle 40mm x 40mm x 6mm with 3mm thick iron plate in 1:5:10 proportion concrete block size 40cm x 40cm x 75 cm including radium paint on both side etc. complete.**

### **MATERIALS:**

i) CEMENT: Specification M-2 of specification of material section shall apply. ii) WATER: Specification M-1 of specification of material section shall apply. iii) FINE AGGREGATE (SAND): Specification M-3 of specification of material section shall apply. iv) COARSE AGGREGATE: Specification M-4 of specification of material section shall apply. Required testing shall be done as per annexure 1. v) M.S. ANGLE & IRON PLATE: Specification of M.S. Angle shall confirm to M-12 of material section.

### **GENERAL: SCOPE OF WORK: WORKMANSHIP:**

Supply, installation, fabrication, erection and finishing in all aspects complete of internal and external Signage Works as per satisfaction of Engineer in Charge. Sign Frame/Sign Board to be welded to main support and post to be welded to 0.45m x 0.30m x 0.003m thick iron plate all welding to be 5mm continuous fillet welded unless otherwise stated. Suitable pedestal or Concrete block shall be provided and welded to receive the M.S. angle posts for the fixed to the concrete block with size of (40cm x 40cm x 75 cm) as per instruction by Engineer in Charge. The font Colour, style & Size shall be as approved by Engineer in charge.

### **MODE OF MEASUREMENT AND PAYMENT:**

The rate includes cost of all materials, labour, tools and plants required for mixing, placing in position, vibrating and compacting, finishing, as directed by Engineer in charge. The item shall be measured and paid on number basis of completed work.

Signature of  
Contractor

Deputy Executive Engineer  
Tribal Area Dev. Works Sub Division  
Dahod

Executive Engineer  
Panchayat Irrigation Division  
Dahod

### **ITEM NO. 30: - DETAIL TECHNICAL SPECIFICATION FOR GAUGE POST:**

**Providing and fixing gauge posts with 15 Cm. Wide enamelled gauge plate including M.S. channel (130 mm x 75 mm x 5 mm) of standard design and section and of required length of specified location etc. complete.**

#### **MATERIALS:**

i) ENAMELED PLATE: Enamelled plate shall be of approved quality and size. ii) M.S. CHANNEL: M.S. Channel shall confirm to latest relevant IS code. iii) CEMENT: Specification M-2 of specification of material section shall apply iv) WATER: Specification m-1 of specification of material section shall apply. iii) SAND: Specification M-3 of material section shall apply. v) COARSE AGGREGATE: Specification M-4 of material section shall apply. vi) PRIMER: Red oxide primer shall confirm to relevant IS code. vii) SYNTHETIC ENAMAL PAINT: Synthetic enamel paint shall confirm to M-13 of material section.

#### **GENERAL: SCOPE OF WORK: WORKMANSHIP:**

The scope of the work includes providing approved quality, 15 cm wide enameled gauge plate showing division in MKS unit & fixing the same as directed. Such gauge plates is to be fixed on the M.S. Channel of size 130x75x5 mm which have to be fixed at the location as directed by making the pit of size 45x45x30 cm and filling the same with cement concrete of M-15 grade for fixing the post as required. The M.S. Channel shall have to paint with one coat of approved primer and two coat of approved anti corrosive paint as directed. Work shall be carried out with best workman like manner.

#### **MODE OF MEASUREMENT AND PAYMENT:**

The item of work will be paid on running meter basis of the gauge plate length only. With all materials and labours with all lead and lift. And curing etc. complete.

Signature of  
Contractor

Deputy Executive Engineer  
Tribal Area Dev. Works Sub Division  
Dahod

Executive Engineer  
Panchayat Irrigation Division  
Dahod

**Annexure - 2**

**BILL OF QUANTITIES**

**PANCHAYAT IRRIGATION DIVISION - DAHOD**  
**TRIBAL AREA DEV. WORKS SUB DIVISION, DAHOD**

Memorandum  
Showing  
Items To be  
carried out :-

**Repair and maintenance Works for Bavka Minor irrigation scheme, Taluka-  
Dahod, Dist.: Dahod**

**Bill of Quantities**

Quantities Estimated but may be more or less	Item of works	Estimated Rates		Unit	Total Amount according to estimated Quantities in Rs.
		In Figures	In Words(Rs)		
1	2	3(A)	3(B)	4	5
	<b>ITEM NO : 1</b>				
<b>26.46</b>	<b>Dismantling C.C.:-</b> Dismantling the existing foundation concrete including sorting out the dismantled stuff and stacking the useful material, removing the debris and making good the damages etc. complete as and where directed. Cement Concrete	1155.20	Rupees One Thousand One Hundred Fifty Five and Twenty Paisa Only	Cum	₹ 30,566.59
	<b>ITEM NO : 2</b>				
<b>364.71</b>	<b>Dismantling stone masonry:-</b> Dismantling the existing stone masonry including sorting out and stacking the useful material and removing the debris and making good the damages etc. complete as directed. In Cement Mortar	750.90	Rupees Seven Hundred Fifty and Ninety Paisa Only	Cum	₹ 2,73,860.74
	<b>ITEM NO : 3</b>				
<b>36.70</b>	<b>Dismantling of R.C.C.:-</b> Dismantling the R.C.C. work and disposing off the stuff including stacking of the useful materials etc. complete as directed. Light Reinforcement ( Main bar upto 16 mm. dia. )	1732.80	Rupees One Thousand Seven Hundred Thirty Two and Eighty Paisa Only	Cum	₹ 63,593.76
	<b>ITEM NO : 4</b>				
<b>5.00</b>	<b>Dismantling R.C.C. Pipe:</b> Dismantling the existing R.C.C. Pipes including sorting out and stacking of the useful materials of the following diameters including refilling the trenches etc. complete as directed. NP_2 pipes 600 mm. to 900 mm.	866.40	Rupees Eight Hundred Sixty Six and Forty Paisa Only	Rmt	₹ 4,332.00

	<b>ITEM NO : 5</b>				
<b>600.46</b>	<b>Excavation (in yellow sandy gravelly soils ,soft &amp; hard murrum etc.) :</b> Excavation for foundation in all sorts of soil including yellow sandy gravelly soils ,soft & hard murrum etc. in dry condition including depositing the excavated stuff in uniform layers in banks or as and where directed etc. complete for lead up to 500m and all lift. (BY MACHINERY) Including dewatering.	107.80	Rupees One Hundred Seven and Eighty Paisa Only	Cum	₹ 64,729.59
	<b>ITEM NO : 6</b>				
<b>188.53</b>	<b>Excavation : (in Soft Rock)</b> Excavation for foundation in Soft Rock including depositing the excavated stuff as and where directed etc. complete for lead upto 500m and all lift. (Machinery) Including dewatering.	249.20	Rupees Two Hundred Forty Nine and Twenty Paisa Only	Cum	₹ 46,981.68
	<b>ITEM NO : 7</b>				
<b>29.98</b>	<b>Concrete work (C. C. Nominal Mix, M-10 and MSA-40 mm):</b> Providing & Laying in position "NOMINAL MIX" cement concrete using cement, sand and crushed aggregate by mass and machine mix for C.C./R.C.C work incl. necessary formworks centering, scaffolding, compaction by vibrator, curing as directed with all lead & lift etc complete Without Dewatering and excluding cost of steel reinforcement. For Foundation concrete / General purpose (C. C. Nominal Mix, M-10 and MSA-40 mm)	3346.00	Rupees Three Thousand Three Hundred Forty Six Only	Cum	₹ 1,00,313.08

	<b>ITEM NO : 8</b>				
<b>432.71</b>	<b>Concrete Work :</b> Providing & Laying in position "DESIGN MIX" cement concrete using cement sand and crushed aggregate for C.C./ R.C.C work by "FLORI" including necessary formwork, centering, scaffolding, compaction by vibrator, curing as directed with all lead & lift etc complete without dewatering and excluding the cost of steel reinforcement. For Pier and Abutments / Wing wall / Head wall / Return wall / Dowel Wall etc. Concrete grade M-20 and MSA-20 mm	4811.00	Rupees Four Thousand Eight Hundred Eleven Only	Cum	₹ 20,81,767.81
	<b>ITEM NO : 9</b>				
<b>16.80</b>	<b>Weep Holes:-</b> Providing and laying in position 110 mm dia (6 kgf/sq cm) P.V.C. Pipe for weep holes with non corroding jali in abutments, wing walls, retaining walls etc. complete.	262.50	Rupees Two Hundred Sixty Two and Fifty Paise Only	meter	₹ 4,410.00
	<b>ITEM NO : 10</b>				
<b>11.20</b>	<b>Graded Filter:-</b> Providing and laying graded filter of specified materials in uniform layer as per design incl. Watering etc.complete as directed.	1943.60	Rupees One Thousand Nine Hundred Forty Three and Sixty Paise Only	Cum	₹ 21,768.32
	<b>ITEM NO : 11</b>				
<b>640.68</b>	<b>Backfilling:-</b> Backfilling the foundation trenches around the structures etc with selected excavated stuff including watering, ramming, compacting etc. complete. (By Machinery)	36.90	Rupees Thirty Six and Ninety Paise Only	Cum	₹ 23,641.09
	<b>ITEM NO : 12</b>				
<b>64.84</b>	<b>Railing:</b> Providing and fixing post and 40 mm dia pipe railing as per detailed drawing including angle iron post of size 80mm x 50mm x 10mm (Height 1.2mt) fixed in C.C. block (M-15 MSA-20mm) of size 0.30 m x 0.30 m x 0.30 m etc. as per specifications including 3 coats of oil painting to steel work and as directed etc. complete. (Three rows)	2165.10	Rupees Two Thousand One Hundred Sixty Five and Ten Paise Only	meter	₹ 1,40,385.08

	<b>ITEM NO : 13</b>				
<b>3.38</b>	<b>HR Gate:</b> Providing fabricating and erecting in position service gate and emergency gate including finishing, hoisting arrangement embaded parts as per approved design and drawing with painting as directed etc. complete.	343214.50	Rupees Three Lacs Forty Three Thousand Two Hundred Fourteen and Fifty Paisa Only	Sqmt	₹ 11,60,065.01
	<b>ITEM NO : 14</b>				
<b>0.08</b>	<b>ISMB- 150 Girder:</b> Providing and fixing structural work of required size incl. Cutting, welding, putting in position ,painting, in three coats etc. complete	85933.10	Rupees Eighty Five Thousand Nine Hundred Thirty Three and Ten Paisa Only	M.T	₹ 6,874.65
	<b>ITEM NO : 15</b>				
<b>81.85</b>	<b>Concrete work:</b> Providing & Laying in position "DESIGN MIX" cement concrete using cement sand and crushed aggregate for C.C./ R.C.C work by "FLORI" including necessary formwork, centering, scaffolding, compaction by vibrator, curing as directed with all lead & lift etc complete without dewatering and excluding the cost of steel reinforcement. For Column / Beam / Solid Slab of Road Bridge / Barrel / Cutoff wall etc. Concrete grade M-25 and MSA-20 mm	5642.00	Rupees Five Thousand Six Hundred Forty Two Only	Cum	₹ 4,61,797.70
	<b>ITEM NO : 16</b>				
<b>6.42</b>	<b>Reinforcement:</b> Providing & Placing in position reinforcement bars including cutting, bending, welding joints where necessary, hooking etc. complete as per drawing for all lead and lifts. TMT / CRS (FE 500 D)	82019.00	Rupees Eighty Two Thousand Nineteen Only	M.T.	₹ 5,26,561.98
	<b>ITEM NO : 17</b>				
<b>14.50</b>	<b>Steel ladder:</b> Providing Fabricating and erecting a steel ladder M.S. Angle 50 X 30 X 6 mm in the H.R. well as per design to approach the H.R. gates from top of H.R. well etc complete as directed	1201.60	Rupees One Thousand Two Hundred One and Sixty Paisa Only	Rmt	₹ 17,423.20



	<b>ITEM NO : 18</b>				
<b>1.00</b>	<b>Manhole Cover:-</b> Providing and fixing C.I. Manhole cover 0.60 M. x 0.45M. size having weight not less than 35Kg.	958.17	Rupees Nine Hundred Fifty Eight and Seventeen Paisa Only	Each	₹ 958.17
	<b>ITEM NO : 19</b>				
<b>5.70</b>	<b>Door &amp; Window:-</b> Providing & fixing of steel door & window of required size incl. Cutting, welding, putting in position, painting, in three coats etc. complete	18941.00	Rupees Eighteen Thousand Nine Hundred Forty One Only	Sqmt	₹ 1,07,963.70
	<b>ITEM NO : 20</b>				
<b>5.00</b>	<b>Providing and fixing NP-3, R.C.C. pipe:</b> Providing and fixing in position ( different diameter ) I.S.,NP-3 class reinforced pipe with caulking the joints with cement mortar 1:1 proportion,using jute string soaked in cement slurry, finishing joints and laying pipes to the designed grade and levels, curing etc. complete for all leads and lifts. NP-3 class 900 MM dia pipe.	2857.70	Rupees Two Thousand Eight Hundred Fifty Seven and Seventy Paisa Only	meter	₹ 14,288.50
	<b>ITEM NO : 21</b>				
<b>1.00</b>	<b>Coffer Dam:</b> Construction and Removal of Cofferdam to facilitate Repair and Construction of Head Regulator in water by making earthen embankment, protecting the cofferdam by cement bags (filled with local soil), dewatering and other allied activities etc.complete.	225000.00	Rupees Two Lacs Twenty Five Thousand Only	Job	₹ 2,25,000.00
	<b>ITEM NO : 22</b>				
<b>13.28</b>	<b>Steps in brick/ stone masonry:</b> Constructing 1 m. wide steps in brick/ stone masonry in c.m. 1 :5 dam slopes as per approved drawing including excavation etc. complete for zero leads and lifts. Using bricks works.	2433.20	Rupees Two Thousand Four Hundred Thirty Three and Twenty Paisa Only	Rmt	₹ 32,312.90

	<b>ITEM NO : 23</b>				
<b>228.86</b>	<b>Painting:</b> Finishing wall with weather proof exterior emulsion paint on wall surface (two coats) to give an required shape even shade after thoroughly brushing the surface to remove all dirt, and remains of loose powdered materials.etc complete	117.40	Rupees One Hundred Seventeen and Forty Paisa Only	Sqmt	₹ 26,868.16
	<b>ITEM NO : 24</b>				
<b>20594.54</b>	<b>Jungle Clearance:</b> Cleaning the slope of dam within the dam boundry by removing the bushes,shrubs girth and small trees including depositing the materials as and where directed up to 50 mt. and all lift etc completed.	4.90	Rupees Four and Ninety Paisa Only	Sqmt	₹ 1,00,913.25
	<b>ITEM NO : 25</b>				
<b>15374.13</b>	<b>Earthwork/back filling:</b> Earthwork/back filling with selected earth from deepening area of MIS by machinery including conveying and spreading, watering, compaction with pneumatic /mechanical equipment with lead up to 1.00 km and all lift etc. complete.	105.90	Rupees One Hundred Five and Ninety Paisa Only	Cum	₹ 16,28,120.37
	<b>ITEM NO : 26</b>				
<b>6827.87</b>	<b>Deepening of tank:</b> Deepening of tank in all type of soil with yellow, sandy, gravelly soil including wet and slushy condition of soil including soft murrum & hard murrum by machinery including conveying and spreading excavated stuff as & where directed with lead up to 1.00 km and all lift etc. complete.	82.60	Rupees Eighty Two and Sixty Paisa Only	Cum	₹ 5,63,982.06
	<b>ITEM NO : 27</b>				
<b>10794.92</b>	<b>Dry rubble pitching ( 230 MM thick) :</b> Providing and laying dry rubble pitching of various thickness to required grade including trimming of earth work, hand packing the interstices with spauls, filling earth in interstices panelling complete for all leads and lifts. 230 MM THICK	339.80	Rupees Three Hundred Thirty Nine and Eighty Paisa Only	Sqmt	₹ 36,68,113.82

	<b>ITEM NO : 28</b>				
<b>0.90</b>	<b>Concrete Work (C. C. Nominal Mix, M-20 and MSA-20 mm) :</b> Providing & Laying in position "NOMINAL MIX" cement concrete using cement, sand and crushed aggregate by mass and machine mix for C.C./R.C.C work incl. necessary formworks centering, scaffolding, compaction by vibrator, curing as directed with all lead & lift etc complete Without Dewatering and excluding cost of steel reinforcement. For Foundation concrete / General purpose (C. C. Nominal Mix, M-20 and MSA-20 mm)	4296.00	Rupees Four Thousand Two Hundred Ninety Six Only	Cum	₹ 3,866.40
	<b>ITEM NO : 29</b>				
<b>1.00</b>	<b>Sign boards:</b> Providing and fixing in position 1.80 m high above finished ground level sign boards of standard size 0.45 m x 0.30m with M.S. angle 40mm x 40mm x 6mm with 3mm thick iron plate in 1:5:10 proportion concrete block size 40cm x 40cm x 75 cm including radium paint on both side etc. complete.	1365.00	Rupees One Thousand Three Hundred Sixty Five Only	No.	₹ 1,365.00
	<b>ITEM NO : 30</b>				
<b>18.34</b>	<b>Gauge Post:</b> Providing and fixing gauge posts with 15 Cm. Wide enamelled gauge plate including M.S. channel (130 mm x 75 mm x 5 mm) of standard design and section and of required length of specified location etc. complete.	719.50	Rupees Seven Hundred Nineteen and Fifty Paise Only	Rmt	₹ 13,195.63
	<b>Total</b>				<b>₹ 1,14,16,020.24</b>
<b>Rupees One Crores Fourteen Lacs Sixteen Thousand Twenty and Twenty Four Paise Only</b>					
I/We am/are willing to carry out the work at ..... % above / below percent (should be written in figure and words) of estimated rates mentioned above. Amount of my/our tender works out as under.					
*Estimate amount put to tender Rs.		*Estimate amount put to tender Rs.			
Deduct.....% below Rs		Add .....% above Rs			
Net Rs		Net Rs			
In words .....		In words .....			
*(Please strikeout whichever is not applicable)					

Notes 1-all works shall be carried out as per public works Department Handbook and other specification of Division.

Notes 2-All the columns is schedule should filled in ink and the total of the entire in the last column should be struck by the contractor under his signature.

Notes 3-Rate quoted include clearance of site(prior commencement of work and at its close)in all respect and hold good for work under all condition,site,moisture,weather etc.

Notes 4- to be continued on additional sheets, if found necessary.

Signature of  
Contractor

Deputy Executive Engineer  
Tribal Area Dev. Works Sub Division  
Dahod

Executive Engineer  
Panchayat Irrigation Division  
Dahod

**PANCHAYAT IRRIGATION DIVISION - DAHOD**  
**TRIBAL AREA DEV. WORKS SUB DIVISION, DAHOD**

**Repair and maintenance Works for Bavka Minor irrigation scheme, Taluka-Dahod, Dist.: Dahod**

**Material Consumption Statement**

Item no.	Item	Quantity	Unit	Quantity of Material		Rate of Consumption
				Cement in M.T.	Steel in M.T.	
1	2					
<b>1</b>	<b>Concrete (Cum)</b>					
	(Nominal Mix) Concrete grade M-10 and MSA-40mm @ 0.22 M.T/cum	<b>29.98</b>	<b>Cum</b>	<b>6.60</b>	<b>-</b>	
	(Design Mix) Concrete grade M-20 and MSA-20mm @ 0.36 M.T/cum	<b>432.71</b>	<b>Cum</b>	<b>155.78</b>	<b>-</b>	
	(Design Mix) Concrete grade M-25 and MSA-20mm @ 0.38 M.T/cum	<b>81.85</b>	<b>Cum</b>	<b>31.11</b>	<b>-</b>	
	(Nominal Mix) Concrete grade M-20 and MSA-20mm @ 0.36 M.T/cum	<b>0.90</b>	<b>Cum</b>	<b>0.33</b>	<b>-</b>	
<b>2</b>	<b>Steel/Reinforcement</b>					
	T.M.T BAR reinforcement	<b>6.42</b>	<b>M.T.</b>	<b>-</b>	<b>6.42</b>	
<b>TOTAL</b>				<b>193.82</b>	<b>6.42</b>	

Deputy Executive Engineer  
Tribal Area Dev. Works Sub Division  
Dahod

Executive Engineer  
Panchayat Irrigation Division  
Dahod

વિભાગનું નામ :- પંચાયત સિંચાઈ વિભાગ, દાહોદ

પેટા વિભાગનું નામ :-

Name of work :-

ટ્રાઈબલ એરિયા ડેવલપમેન્ટ વર્ક્સ પેટા વિભાગ, દાહોદ

**Repair and maintenance Works for Bavka Minor irrigation scheme,  
Taluka-Dahod, Dist.: Dahod**

કામમાં અંદાજે જરૂરી ગોણ બનીજની વિગત દર્શાવતું પત્રક									
અનુ નં	આઈટમનું નામ	કામનો જથ્થો	અંદાજે સિમેન્ટ બેગની જરૂરીયાત	વપરાયેલ ગોણ બનીજ					
				કાંકરી		પથ્થર		રેતી	
				ઘ.મી	મે.ટન	ઘ.મી	મે.ટન	ઘ.મી	મે.ટન
1	Concrete work (C. C. Nominal Mix, M-10 and MSA-40 mm): Providing & Laying in position "NOMINAL MIX" cement concrete using cement, sand and crushed aggregate by mass and machine mix for C.C./R.C.C work incl. necessary formworks centering, scaffolding, compaction by vibrator, curing as directed with all lead & lift etc complete Without Dewatering and excluding cost of steel reinforcement. For Foundation concrete / General purpose (C. C. Nominal Mix, M-10 and MSA-40 mm)	29.98	132	27.88	42.00	0.00	0.00	13.34	18.67
2	Concrete Work : Providing & Laying in position "DESIGN MIX" cement concrete using cement sand and crushed aggregate for C.C./ R.C.C work by "FLORI" including necessary formwork, centering, scaffolding, compaction by vibrator, curing as directed with all lead & lift etc complete without dewatering and excluding the cost of steel reinforcement. For Pier and Abutments / Wing wall / Head wall / Return wall / Dowel Wall etc. Concrete grade M-20 and MSA-20 mm	432.71	3116	376.45	565.00	0.00	0.00	178.44	249.81
3	Concrete work: Providing & Laying in position "DESIGN MIX" cement concrete using cement sand and crushed aggregate for C.C./ R.C.C work by "FLORI" including necessary formwork, centering, scaffolding, compaction by vibrator, curing as directed with all lead & lift etc complete without dewatering and excluding the cost of steel reinforcement. For Column / Beam / Solid Slab of Road Bridge / Barrel / Cutoff wall etc. Concrete grade M-25 and MSA-20 mm	81.85	623	70.39	106.00	0.00	0.00	32.41	45.37

4	Concrete Work (C. C. Nominal Mix, M-20 and MSA-20 mm) : Providing & Laying in position "NOMINAL MIX" cement concrete using cement, sand and crushed aggregate by mass and machine mix for C.C./R.C.C work incl. necessary formworks centering, scaffolding, compaction by vibrator, curing as directed with all lead & lift etc complete Without Dewatering and excluding cost of steel reinforcement. For Foundation concrete / General purpose (C. C. Nominal Mix, M-20 and MSA-20 mm)	0.90	7	0.78	2.00	0.00	0.00	0.37	0.51
5	Dry rubble pitching ( 230 MM thick) : Providing and laying dry rubble pitching of various thickness to required grade including trimming of earth work, hand packing the interstices with spauls, filling earth in interstices panelling complete for all leads and lifts. 230 MM THICK	3000.99	0.00	0.00	0.00	3000.99	4502.00	0.00	0.00
<b>Total</b>				<b>475.50</b>	<b>715.00</b>	<b>3000.99</b>	<b>4502.00</b>	<b>224.56</b>	<b>314.36</b>

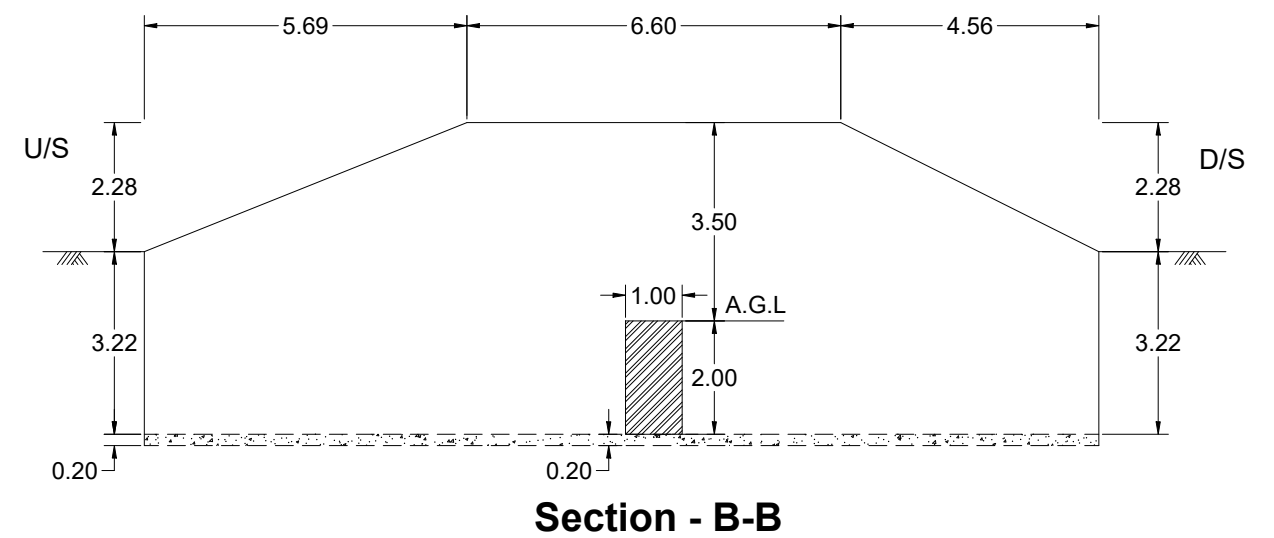
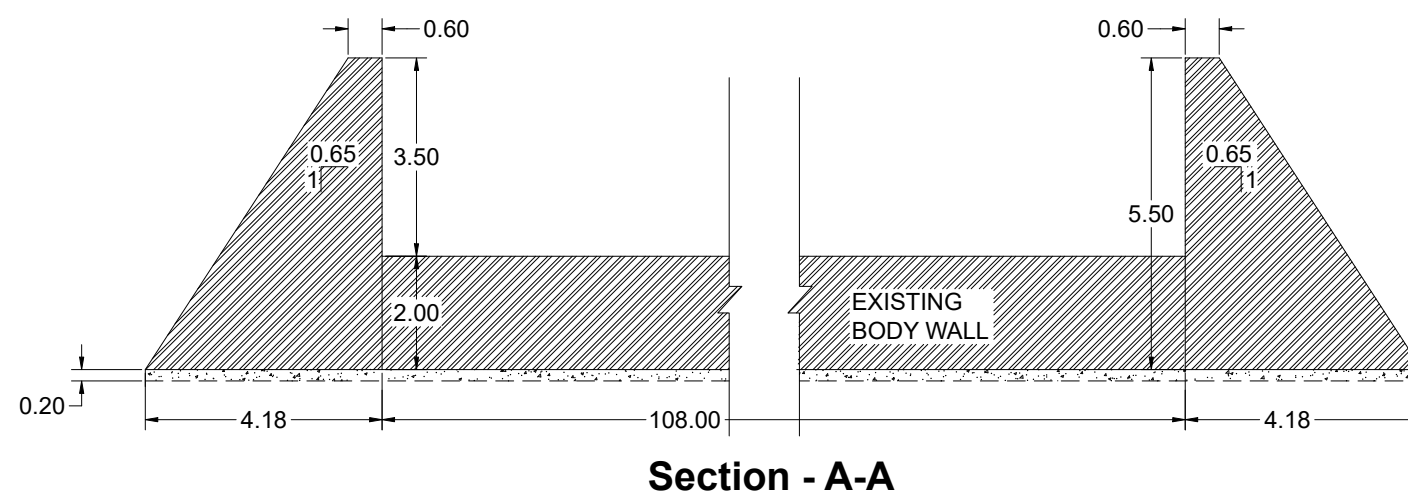
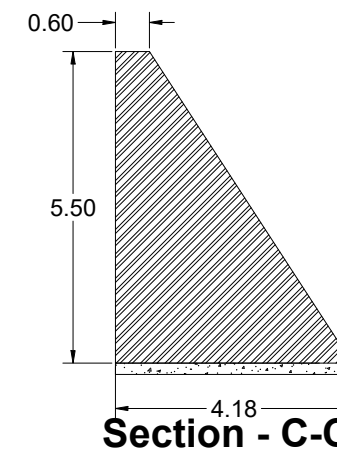
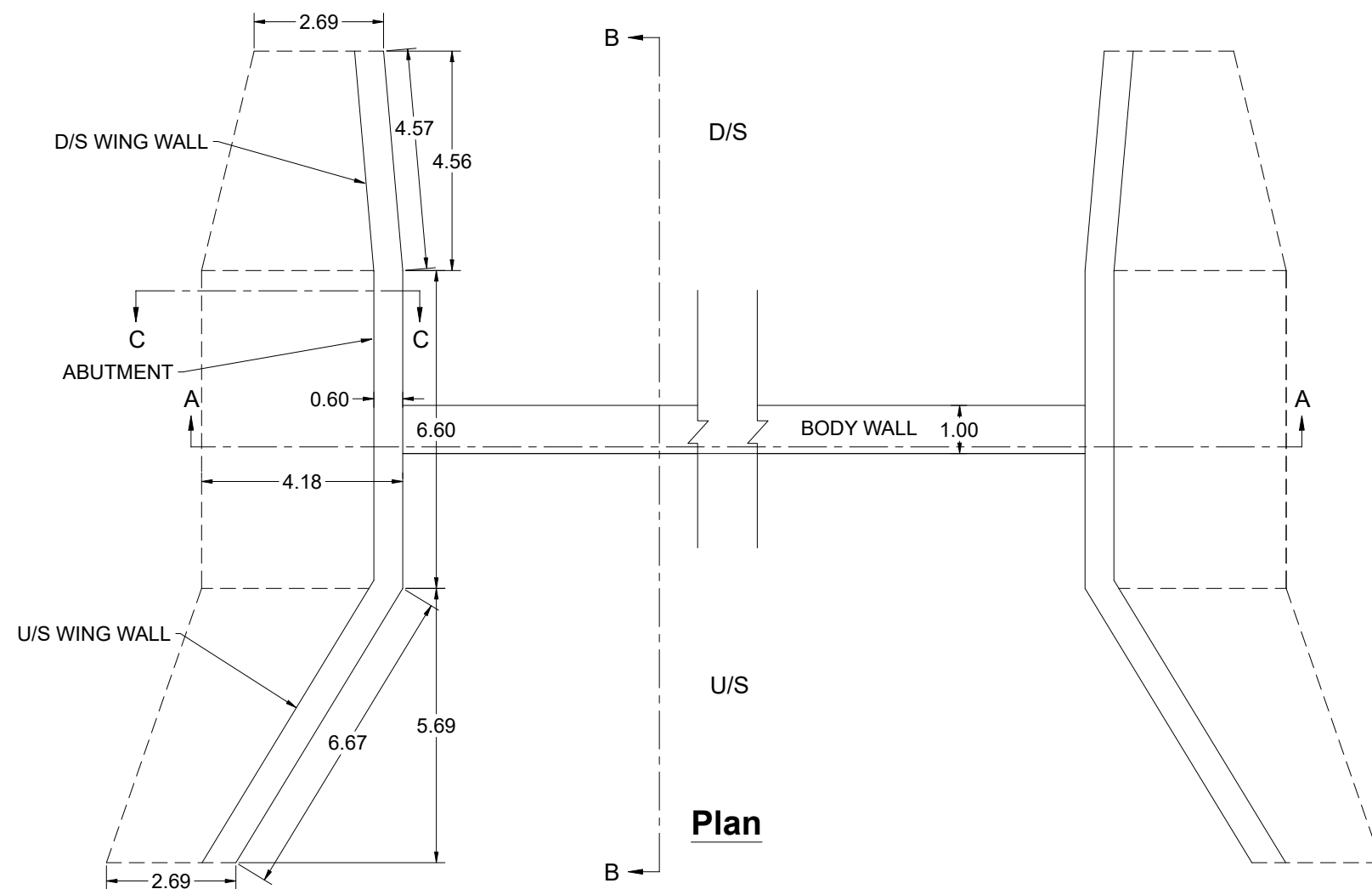
Deputy Executive Engineer  
Tribal Area Dev. Works Sub Division  
Dahod

Executive Engineer  
Panchayat Irrigation Division,  
Dahod

**Annexure - 3**  
**DRAWINGS**



# Drawing of Existing Waste Weir of Bavka Minor Irrigation Scheme

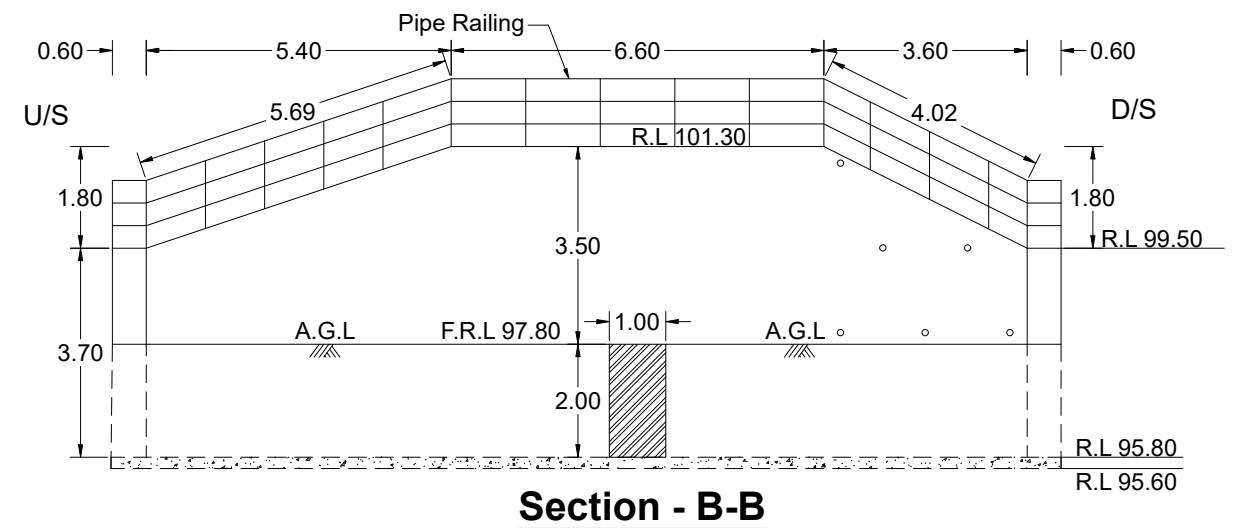
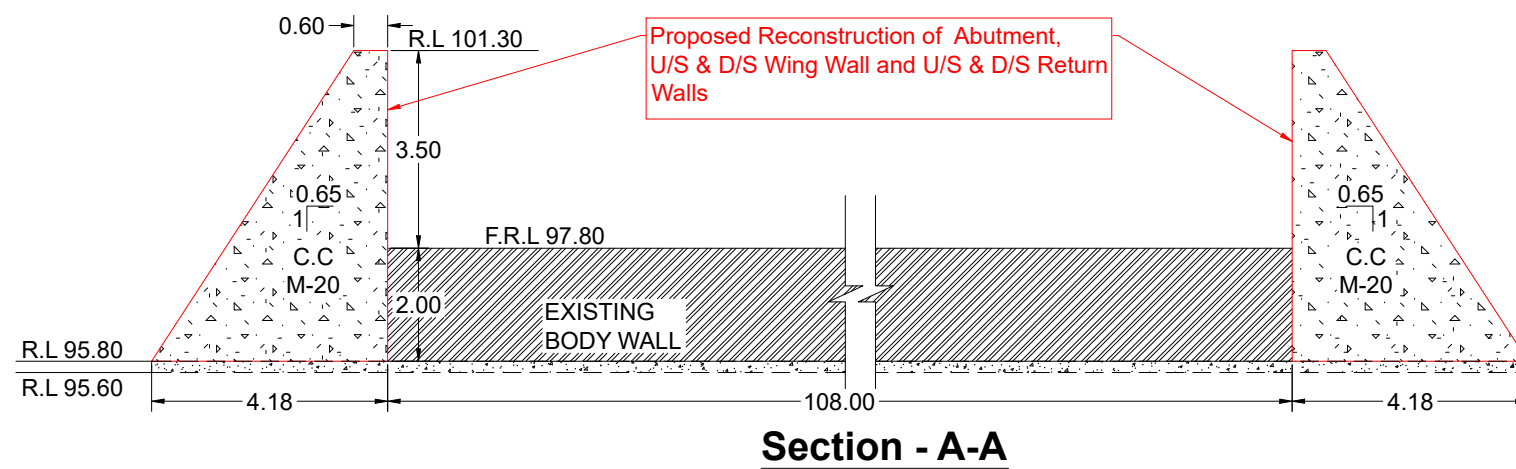
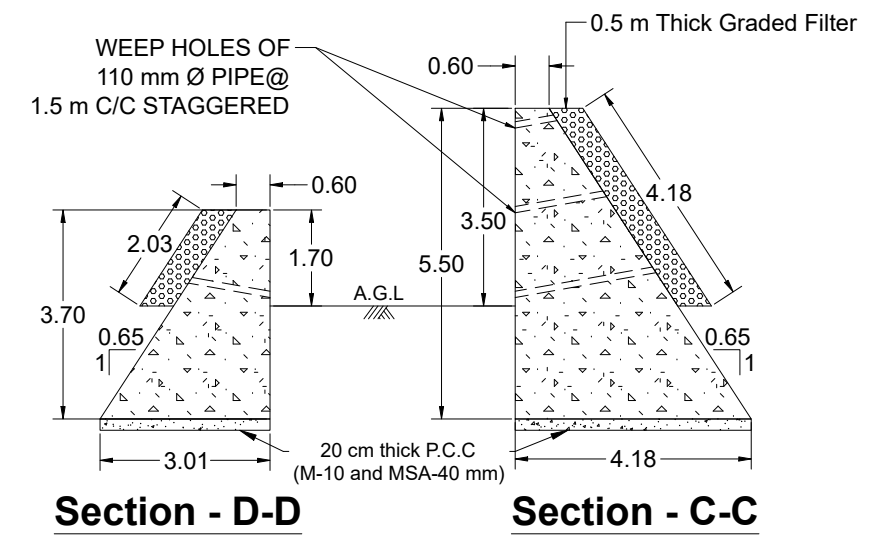
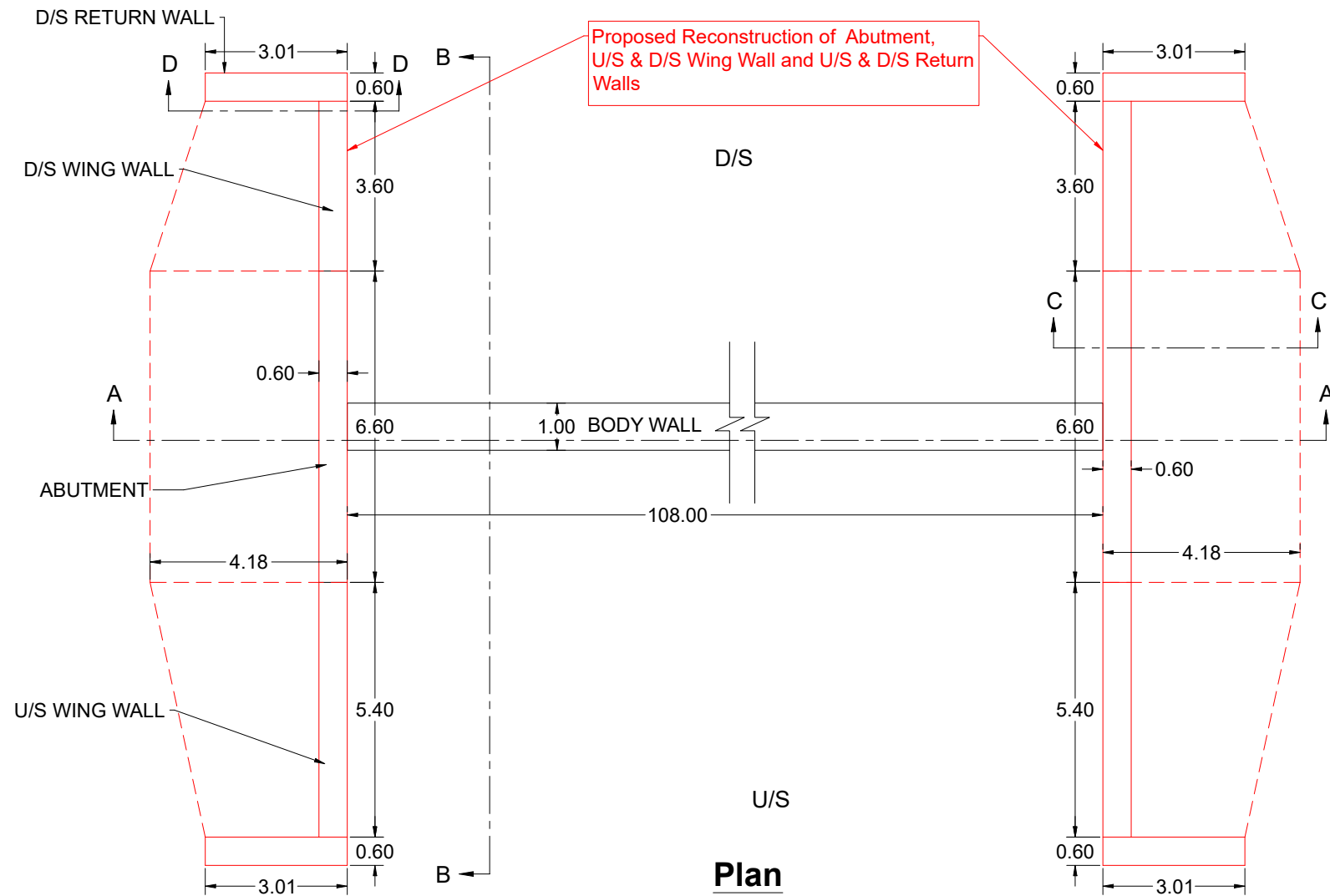


NOTE:  
1. All dimensions are in metre unless otherwise specified.  
2. Drawing is not as per the scale.

ASSISTANT ENGINEER,  
TRIBAL AREA DEV. WORKS SUB DIVISION,  
DAHOD

DEPUTY EXECUTIVE ENGINEER,  
TRIBAL AREA DEV. WORKS SUB DIVISION,  
DAHOD

# Repair and maintenance works of Waste Weir of Bavka Minor Irrigation Scheme



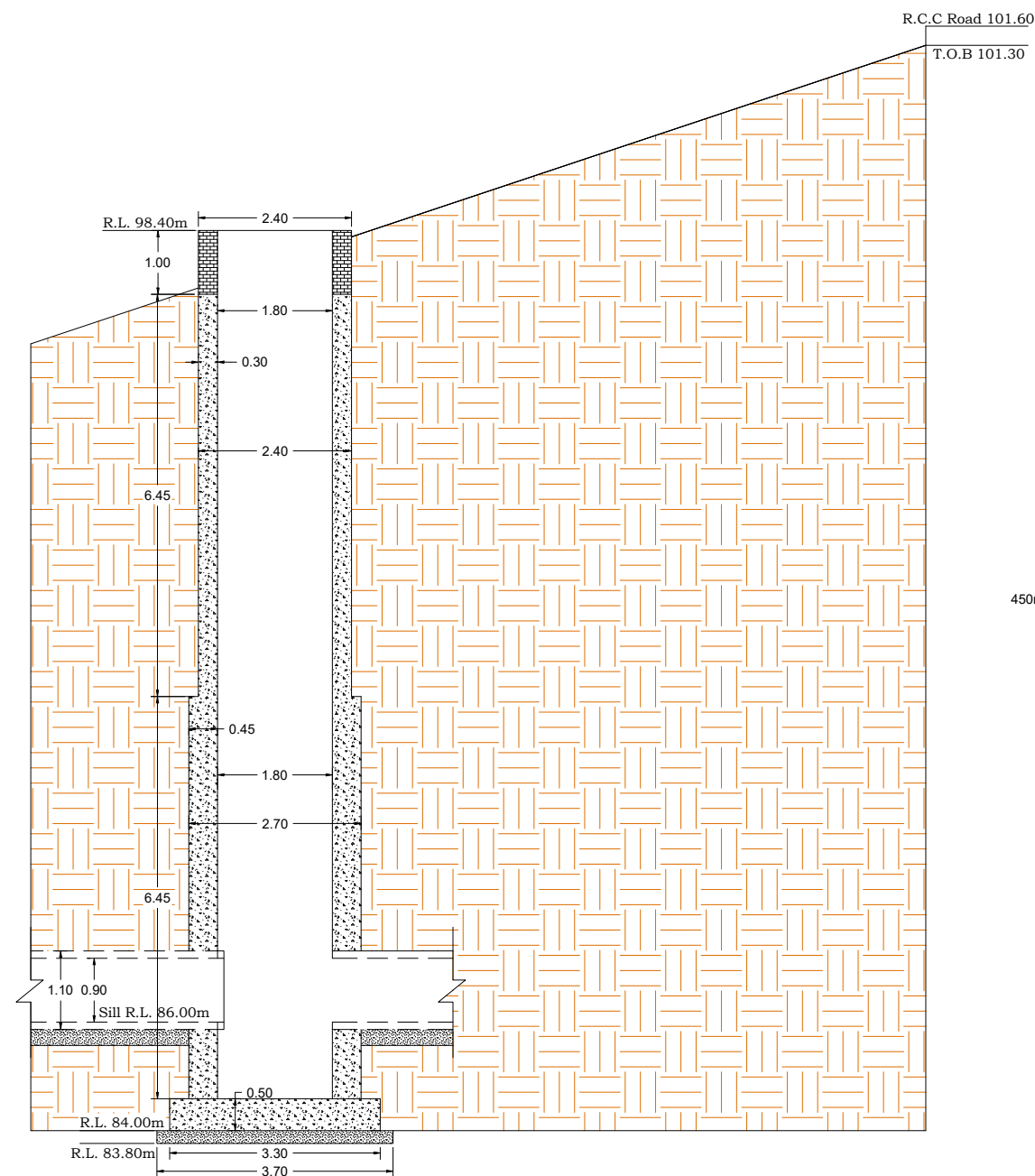
## NOTE:

1. All dimensions are in metre unless otherwise specified.
2. Drawing is not as per the scale.
3. Concrete grade Nominal Mix M-10 and MSA-40mm(Graded) (For PCC of 20 cm thickness)
4. Concrete grade Design Mix M-20 and MSA-20mm(Graded) (For Construction)

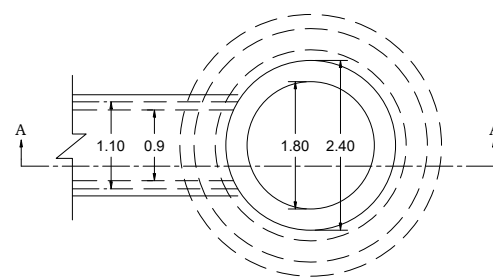
ASSISTANT ENGINEER,  
TRIBAL AREA DEV. WORKS SUB DIVISION,  
DAHOD

DEPUTY EXECUTIVE ENGINEER,  
TRIBAL AREA DEV. WORKS SUB DIVISION,  
DAHOD

## REPAIR AND REMEDIAL MEASURES FOR HEAD REGULATOR OF BAVKA MINOR IRRIGATION SCHEME



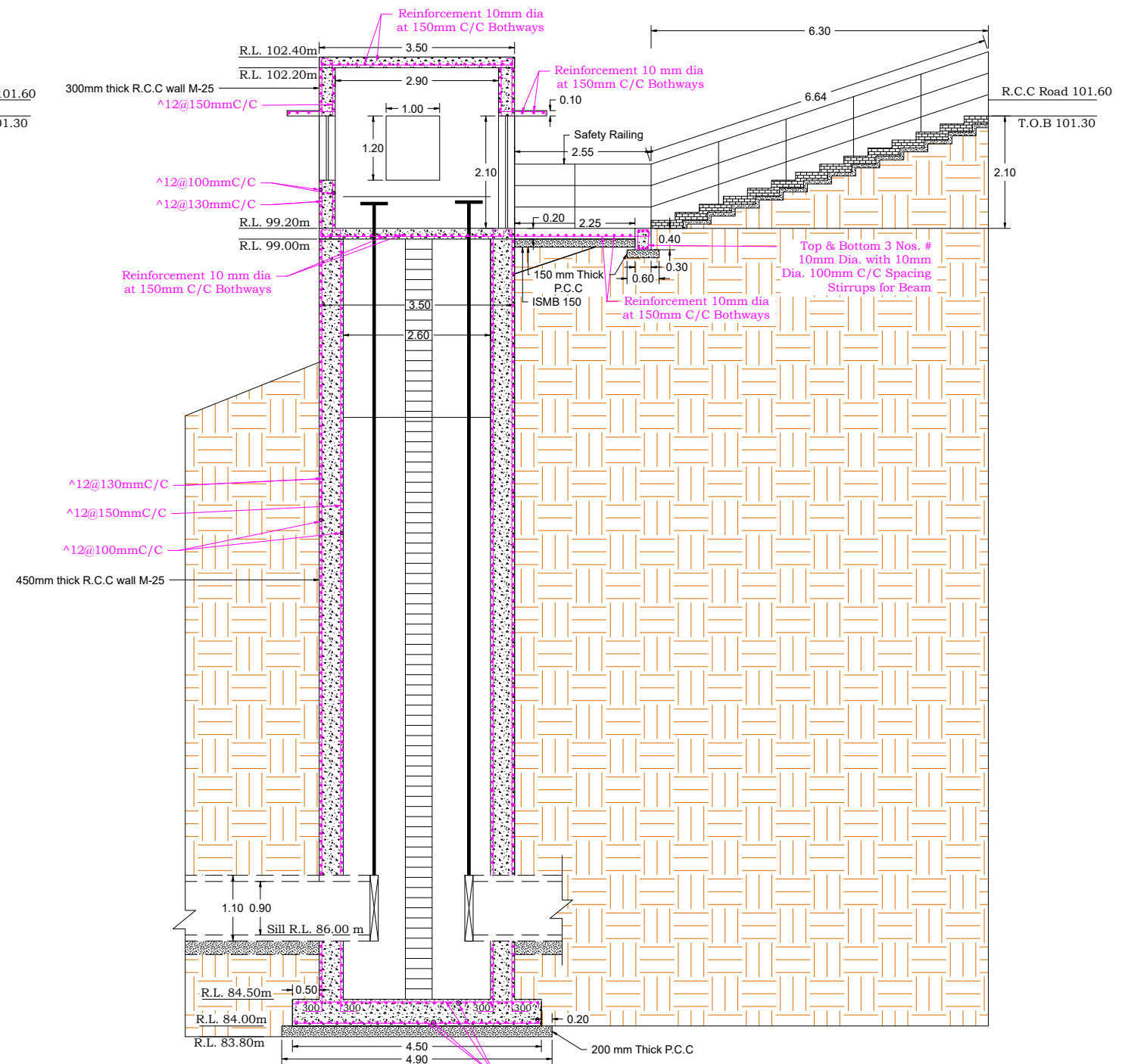
**SECTION A-A**



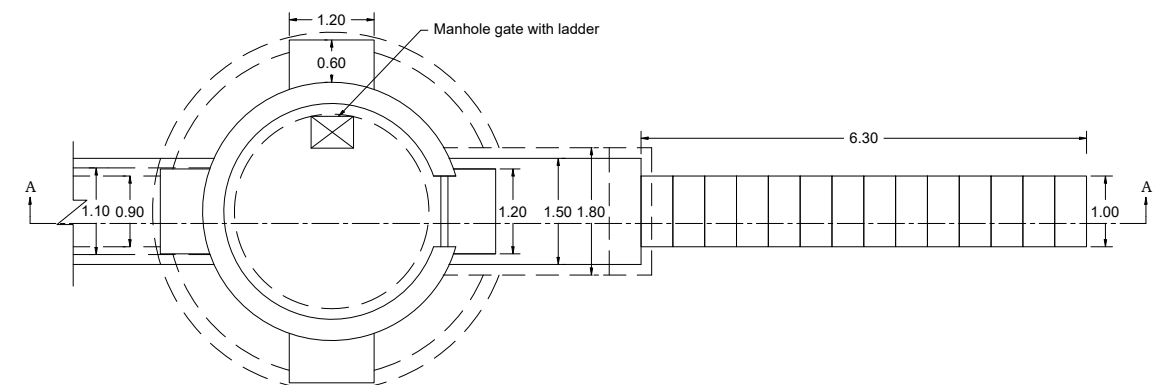
### EXISTING PLAN

**NOTE:**

- NOTE:**
1. All dimensions are in metre unless otherwise specified.
  2. Drawing is not as per the scale.
  3. Concrete grade Design Mix M-25 and MSA-20mm (Graded) for all R.C.C.
  4. Concrete grade Nominal Mix M-10 and MSA-40mm(Graded) for P.C.C.
  5. S.B.C Considered in Design is 50 T/M<sup>2</sup>.



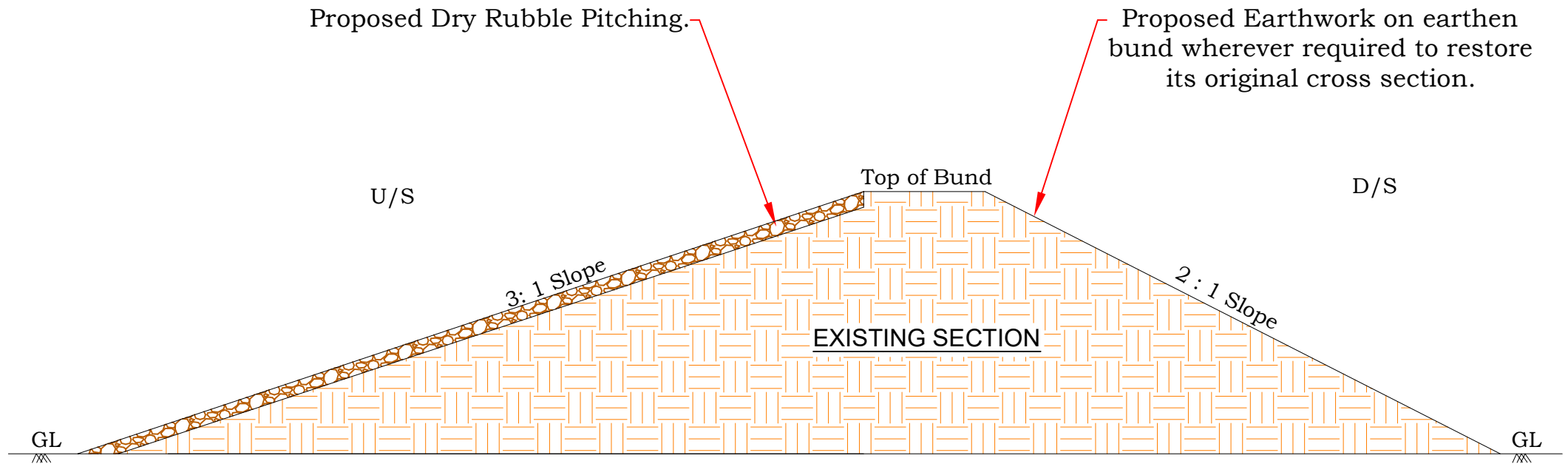
**SECTION A-A**



### PROPOSED PLAN

<p><b>ASSISTANT ENGINEER,</b>  <b>TRIBAL AREA DEV. WORKS SUB DIVISION,</b>  <b>DAHOD</b></p>	<p><b>DEPUTY EXECUTIVE ENGINEER,</b>  <b>TRIBAL AREA DEV. WORKS SUB DIVISION,</b>  <b>DAHOD</b></p>
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# TYPICAL CROSS SECTION OF EARTHEN BUND OF BAVKA MINOR IRRIGATION SCHEME



## NOTES:

1. ALL DIMENSIONS ARE IN METRE UNLESS OTHERWISE SPECIFIED.
2. DRAWING IS NOT TO SCALE.


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TRIBAL AREA DEV. WORKS SUB DIVISION,  
DAHOD



# Bavka MI Scheme

## Legend

 Alignment of Earthen Bund

