

STANDARD BIDDING DOCUMENT

PROCUREMENT OF

CIVIL WORKS

Name of Work:- CONSRTRUCTION OF BOX
CULVERT FIVE CELL (5 M X 4 M)
AT VILLAGE SARTANPAR, TA -
VINCHHIYA, DISTRICT -
RAJKOT



GOVERNMENT OF GUJARAT

Narmada, Water Resources, Water Supply and Kalpsar Department

Rajkot Panchayat Irrigation Circle, Rajkot

Irrigation Panchayat Division, Rajkot

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**INVITATION FOR BID
(IFB)**

NATIONAL COMPETITIVE BIDDING

1. The Executive Engineer, Irrigation Panchayat Division, Rajkot 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

| Sr. No. | Name of work | Approximate value of works (Rs.) | Bid security (Rs.)/EMD (Rs.) | Cost of document / Tender Fee (Rs) | Period of completion | Class of Registration /Category of contractor if Required |
|---------|---|----------------------------------|------------------------------|------------------------------------|----------------------|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 1 | CONSRTRUCTION OF BOX CULVERT FIVE CELL (5 M X 4 M) AT VILLAGE SARTANPAR, TA - VINCHHIYA, DISTRICT - RAJKOT | 59,79,415.32/- | 60,000.00/- | 2400.00/- | 11 Month | "D" Class or 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 Irrigation Panchayat Division, Rajkot and in favour of '**Executive Engineer, Irrigation Panchayat Division, Rajkot**'. 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, Irrigation Panchayat Division, Rajkot' 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 at hrs. at the office of to clarify the issues and to answer questions on any matter that may be raised at that stage as stated in clause 9.2 of 'instructions to Bidders' of the bidding documents.
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), Rs. 7.0 crore (ROAD/ BRIDGE/BUILDINGWORKS), 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. 50 crore for Electrical work~~ following documents shall be submitted in electronic format only through online by scanning and the below mentioned documents should be sent in original to the Tender opening authority through RPAD, so as to reach the Executive Engineer, Irrigation Panchayat Division, Rajkot 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 Pan card.
- (vi) Work Experience.
- (vii) 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 Projector 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 | 2026-2027 | 1.00 |
| -1 | 2025-2026 | 1.10 |
| -2 | 2024-2025 | 1.21 |
| -3 | 2023-2024 | 1.33 |
| -4 | 2022-2023 | 1.46 |
| -5 | 2021-2022 | 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:

- 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.
- 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 sub-contractor, 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)

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 requirements:

- (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 = $(A \times N \times 2 - B)$, 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 here of**, 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. 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 this 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. |
|---------------------------------|------------------------|------------|
| Invitation for Bids(IFB) | | |
| 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 clause 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 bid disagreeing 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 favour 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/4/2024/2859/D.M.O. Date 01/05/2025 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 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 Contract or 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 up to 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 from the stipulated date of completion of the project and the Additional Performance Security shall be valid beyond 28 (twenty-eight) days of Project Completion Date.

Performance Security shall become refundable/releasable within 15 days after certified project completion date subject to Fulfilment of contractual obligation and settlement of all dues and claims.

- 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/4/2023/0057/D.M.O. Date 21/04/2023 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 in definitely 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 incorrupt 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, Irrigation Panchayat Division, Rajkot [Cl.1.1]
2. The last five financial years.
 1. 2025-2026
 2. 2024-2023
 3. 2023-2024
 4. 2022-2023
 5. 2021-2022
3. This Annual Financial Turnover Amount is Rs. ---Not Applicable--- [Cl.4.5.3(a)]
4. Value of Work is Rs. **59,79,415=32/-**
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. ---Not Applicable--- [Cl.4.5.6]
9. Price level of the financial year **2026-27**. [Cl. 4.5.2]
10. The pre-bid meeting will take place at: **Not Applicable**. [Cl. 9.2.1]
11. The technical Bid will be opened at the office of the **Executive Engineer, Irrigation Panchayat Division, Rajkot** on Dt..... at.....AM/PM AS PER NIT
12. Address of the Employer: **Executive Engineer, Irrigation Panchayat Division, Jilla Panchayat Bhavan, Old Court Building, Hospital Chowk, Rajkot 360001**.
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 favour of "**Executive Engineer, Irrigation Panchayat Division, Rajkot**"
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 inviting tender | 2026-2027 | 1.00 |
| -1 | 2025-2026 | 1.10 |
| -2 | 2024-2025 | 1.21 |
| -3 | 2023-2024 | 1.33 |
| -4 | 2022-2023 | 1.46 |
| -5 | 2021-2022 | 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.

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

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. One 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 One 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, Colour 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.15,000=00 per month per Engineer will be made from the bills/deposit/dues of the contractor. Such recovery shall be non-refundable.

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 | 2025-2026 |
| | Work performed in the last five years | 2024-2025 |
| | (in Rs. Lakhs) | 2023-2024 |
| | | 2022-2023 |
| | | 2021-2022 |

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) |
|--------|------------------|----------------------|---|------------------------|--------------------|--|-------------------------------------|
| | | | Cement Concrete (Including RCC&PCC) ITEM1 | 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.

| Other Party (ies) | Employer | Cause of Dispute | Amount Involved | Remarks showing Present Status |
|-------------------|----------|------------------|-----------------|--------------------------------|
| | | | | |

- 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 Clause4.1)

- 1.14 Programme

2. Deleted

3. Additional Requirements

- 3.1 Bidders should provide any additional information required to fulfil 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

1. I, the undersigned, do hereby certify that all the statements made in the required attachments are true and correct.
2. The undersigned also here by 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

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 here under

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 Compensation 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. Headings 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. Engineer's 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 Contractor's 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 all 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** (Rajkot Panchayat Irrigation Circle, Rajkot) 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 (Rajkot Panchayat Irrigation Circle, Rajkot).

24.2

- (a) For the work up to Rs. 100Cr., if any of the parties is not satisfied with the decision of the **#Superintending Engineer** (Rajkot Panchayat Irrigation Circle, Rajkot), both the parties have to refer to the Chief Engineer concern for the conciliation process.
- (b) For the work more than Rs. 100Cr., if any of the parties is not satisfied with the decision of the **#Superintending Engineer** (Rajkot Panchayat Irrigation Circle, Rajkot), 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 works 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) Dated13/12/2013

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, kilo meter / 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 up to 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 there of 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 mile stone 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 Data 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 certified date of completion of the project 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.

Performance and Additional Performance Security shall become refundable/releasable within 15 days after project certified completion date subject to fulfilment of contractual obligation and settlement of all dues and claims.

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 28days;
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 Equipment's, 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 may be.
 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 up to 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 work place 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) (Rajkot Panchayat Irrigation Circle, Rajkot) 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 (Rajkot Panchayat Irrigation Circle, Rajkot), 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, Irrigation Panchayat Division, Rajkot
Address: At. District Panchayat, Old court building, Hospital chowk, Rajkot, Gujarat 360001
Name of authorized Representative (will be intimated later)
2. The Engineer is Executive Engineer, Irrigation Panchayat Division, Rajkot
Name of Authorized Representative: Executive Engineer
3. The Defects Liability Period is **36 (Thirty Six)** Months from the date of completion. [CL. 1.1 & 33]
4. The Start Date shall be **1st** day 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, The time limit is including of 1 monsoon period. Also the Cumulative Time limit (In Day) for milestone shall be calculated from the dt of work order considering the working period and non-working period

| Project Mile Stone | Cumulative Time Limit (In Day) | Cumulative Percentage of Contract Value (Financial) |
|--------------------|--------------------------------|---|
| Milestone 1 | 25% | 10 % |
| Milestone 2 | 50% | 35 % |
| Milestone 3 | 75% | 70 % |
| Milestone 4 | 100% | 100 % |

- The Site is located at Village **Sartanpar, Ta. Vinchhiya**, Dist. Rajkot [CL. 1.1]
6. The name and identification number of the Contract is: [CL. 1.1]
 7. The works consist of Construction of **CONSRTRUCTION OF BOX CULVERT FIVE CELL (5 M X 4 M) AT VILLAGE SARTANPAR, TA - VINCHHIYA, DISTRICT - RAJKOT** 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, check dams, bandhara, T.R., weir, barrages, Flood Protection & Anti Sea Erosion work, canal lining and structures, CD Works, structure repairing, Jungle 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/ down take pipes, arrangements for fixing light posts, watermain, 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.

(D) Other Items

[CL.1.1]

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

- | | |
|--|-------------|
| 8. The following documents also form part of the Contract: | [CL.2.3(9)] |
| _____As per clause 2-3_____ | |
| 9. The law which applies to the Contract is the law of Union of India | [CL.3.1] |
| 10. The language of the Contract documents is English | [CL.3.1] |
| 11. Limit of subcontracting 0.00% of the Initial Contract Price | [CL.7.1] |

| | | |
|--|--------------------------------|------------|
| 12. The Schedule of Other Contractors | ---Nil--- | [CL.8] |
| 13. The Schedule of Key Personnel | As per Annex – II to Section I | [CL.9] |
| 14. 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] |
| 15. Site Investigation report | | [CL.14] |
| 16. The Site Possession dates shall be From the Date Work order issue. | | [CL.21] |
| 17. 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] |
| 18. The period between program updates will be 45 days. | | [CL.27.3] |
| 19. The amount to be withheld for late submission of an updated programme shall be Rs 0.50 lakhs | | [CL.27.3] |
| 20. The following events shall also be Compensation Events 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. | | [CL.44] |
| 21. 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 those 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:

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

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_l = 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 first 15 days of the month under consideration, the price declared on the 1st day of that month.
- For the remaining days of the month under consideration, the rate declared on the 16th day of that month.

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 15th 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 whole sale 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 | 13.09 % |
| 2. Cement - P_c | 21.13 % |
| 3. Steel - P_s | 25.18 % |
| 4. Bitumen - P_b | 0.00 % |
| 5. POL - P_f | 8.64 % |
| 6. Plant & Machinery Spares - P_p | 12.95 % |
| 7. Other Materials - P_m | 19.00 % |
| | ----- |
| Total | 100.00 % |
| | ----- |

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 For delay in completion work | 10 percent of the Initial {CL. 49} 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 Completion of work | 5 percent of the Contract {CL.50} 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 depreciated value for old equipment. Total amount will be subject to a maximum of 5% of the Contract Price | After equipment is brought to site (provided the Engineer is satisfied That the equipment is required for performance of the contract) and on submission of unconditional Bank Guarantee for amount of advance |
| iii | Secured Advance for Non- perishable material Brought to site | Deleted |

(The advance payment will be paid to the Contractor no later than 28 days after fulfilment 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 instalment 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 ---NA--- {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 {Cl60} the Employer’s additional cost for completing the Works shall be 20 percent.

SECTION - 5
TECHNICAL SPECIFICATION
(Attached Separately In Enclosure)

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 Contact 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

SECTION - 7
BILL OF QUANTITIES

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 |
|----------|--|----------|------|-----------------|--------|
| | Attached Separately In Enclosure | | | | |

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 50Cr.):

| 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. |

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) (herein after 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 price is payable, and we undertake to pay you, upon your first written demand and without cavil or argument, any sum or sums within the limits of ----- (amount of guarantee) as 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 it 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 you 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)

To, _____(date)

_____(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) (Herein after called "the Employer) and _____ (name and address of contractor) herein after called "the Contractor" of the other part.

Whereas the Employer is desirous that the Contractor execute

Name and identification number of contract (herein after 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 here by 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

SECTION -9
DRAWINGS
(Attached Separately In Enclosure)

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. | Form of Bid | - | 75 |
| 6. | Undertaking for bid Validity | - | 91 |
| 7. | Undertaking for Engaging Technical Staff & Machineries | As per NIT | 96 |
| 8. | Information regarding any litigation in which the applicant is involved | As per NIT | 97 |
| 9. | 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 |
| | OR Details of civil engineering works completed in last 5 financial year | | 99 |
| 10. | Details of "works on hand" and "works tendered by bidder, found lowest (L-1) & works likely to be awarded (for Bid Capacity Evaluation) (Bidder shall furnish all supporting documents such as work order, | As per ITB Clause no 4.7 Bid Capacity | 100 |

| | | | |
|-----|---|---|-----|
| | necessary certificates/documents/information issued by concerned department/authority) | | |
| 11. | Undertaking on statement of compliance of clause 3.2 | - | 101 |
| 12. | Affidavit | - | 102 |

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

| Other Party (ies) | Employer | Cause of Dispute | Amount Involved | Remarks showing Present Status |
|------------------------------|-----------------|-----------------------------|----------------------------|---|
| | | | | |

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) | 2021-2022 | 1.61 | |
| (2) | 2022-2023 | 1.46 | |
| (3) | 2023-2024 | 1.33 | |
| (4) | 2024-2025 | 1.21 | |
| (5) | 2025-2026 | 1.10 | |
| (6) | 2026-2027 (Base year) | 1.00 | |

Signature

(Stamp of Chartered Accountant)

Unique Document Identification
Number: -

DETAILS OF CIVIL ENGINEERING WORKS COMPLETED IN LAST 5 FINANCIAL YEAR

| 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 |
|--------------|----------------------|---------------------|--------------|-------------------------------|-----------------------------|---------------------------------|----------------------------|--|
| [1] | [2] | [3] | [4] | [5] | [6] | [7] | [8] | [9] |
| 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 Projector 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

1. I, the undersigned, do hereby certify that all the statements made in there quired attachments are true and correct.
2. The undersigned also here by 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 there quest 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 :

SECTION - 5
TECHNICAL SPECIFICATION

TECHNICAL SPECIFICATIONS

INDEX

| Sr. No. | Particulars |
|----------------|--|
| 1 | Chapter-I: Work and Site Condition |
| 2 | Chapter-II: Special Condition |
| 3 | Chapter-III: Standard General Technical Specifications |
| 4 | Chapter-IV: Specification of Principal Materials |
| 5 | Chapter-V: Clearing the site & Excavation for Foundation including blasting |
| 6 | Chapter-VI: General Specification of Concrete |
| 7 | Chapter-VII: General Specification of Reinforcement |
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CHAPTER-I

WORK & SITE CONDITION

WORK AND SITE CONDITION

INDEX

| Sr. No. | Particulars |
|----------------|------------------------------|
| 1 | Introduction |
| 2 | Location |
| 3 | Communication |
| 4 | Brief Description of work |
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| 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

The Construction of Box Culvert Five Cell (5 m X 4 m) at Village Sartanpar, Ta - Vinchhiya, District – Rajkot is to be done at downstream of Sartanpar MI scheme.

2.00 LOCATION:-

The proposed site of work is situated as below: -

The proposed project site is situated near village [Sartanpar, Ta. Vinchhiya](#).

3.00 COMMUNICATION: -

The nearest city & town is [Vinchhiya](#) is a taluka place of [Rajkot](#) district. Nearest villages are connected through VRB & SH with district and taluka place.

4.00 Deleted

4.1 Proposed work consists of following: -

Construction of Box Culvert Five Cell (5 m X 4 m) at Village Sartanpar, Ta -Vinchhiya, District - Rajkot

4.2 Cost of work: [Rs. 59,79,415.32 /-](#)

- I. This work includes [Excavation, cement concrete work in as per grade, Steel for various component, weep holes, Earthwork/ Back Filling, Gabbior and Stone Soling etc.](#)

II. PRINCIPAL DETAILS OF WORK:

Works to be performed for the various items included in Schedule-B.

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 as per Clause-57 of B-1 tender.

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 will be obtained from stone crushers situated in the vicinity of dam site. 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.

Signature of Contractor

**Dy. Executive Engineer Irrigation
Panchayat Sub Division
Jasdan**

**Executive Engineer
Irrigation Panchayat Division
Rajkot**

CHAPTER-II

SPECIAL CONDITION

SPECIAL CONDITIONS

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| 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 |
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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 e.g., GERI, Rajkot 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- 2021-22. Page no-66. 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 t 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 complies 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. (R & B Circular No. PARCH-102007-28-C, dated 31-12-2009)

One percentage of estimated cost of work put to tender for this work after deducting the cost of material as per schedule A valued at basic rates in the sanctioned estimate 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 Excavation Ground 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.224.08 per Cum.*** 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 deem 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 Schedule-B of the tender. These item wise specifications shall cover the applicable provision of the general specification, considering the item description as per Schedule-B. 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.

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.

| IS OR BIS CODE NO | VERSION | SUBJECT OF CODE |
|----------------------------------|---------|---|
| EXCAVATION AND EARTH WORK | | |
| 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 |
| CONCRETE WORK | | |
| 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 |
| 9556 | Latest | Construction of diaphragm walls. |
| 14334 | Latest | Cost. Of diaphragms for under-seepage control. |
| MASONRY WORK | | |
| 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: | 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 THIRD PARTY:

All the conditions and scope of work of Third-Party 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.**

14.0 OFFICE AND VEHICLE FOR DEPARTMENT

- Site Office:** The Contractor has to provide office or portable office (having minimum size 20 ft x 8 ft x 8.6 ft) with required furniture (i.e. computer table and other table with necessary chair), A/C, internet facility and latest computing facilities with printer, scanner etc. to the Department as approved by the Engineer-in-Charge from where communication with the Contractor will be easier. This facility to be available till completion of project.
- Vehicle:** The Contractor has to provide 1 no. Of four-wheeler vehicle of model manufactured after 2020 in working condition to the Department. The vehicle such as 5-seater SUV (can be used at site) to be deployed right from the contract work commencement till completion

period. The vehicle is to be deployed for 365 days in each year. This vehicle will be at the disposal of Department with the provision of licensed driver and is expected to run up-to 3000 km Per month. All travel expenditure should be covered with all regular maintenance. All such expenditure is to be borne by the Contractor. The vehicle should have comprehensive insurance.

Signature of Contractor

**Dy. Executive Engineer Irrigation
Panchayat Sub Division
Jasdan**

**Executive Engineer
Irrigation Panchayat Division
Rajkot**

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 major 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 schedule 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

**Dy. Executive Engineer Irrigation
Panchayat Sub Division
Jasdan**

**Executive Engineer
Irrigation Panchayat Division
Rajkot**

CHAPTER-IV

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, and charges for the same shall be borne by the contractor.

Permissible limit for some of the important test is as under

| | TEST | PERMISSIBLE LIMIT AS PER IS-456-2000 |
|---|---------------------------------|--|
| 1 | Organic solids | 200 mg per liters (max.) |
| 2 | Inorganic solids | 3000 mg per liters (max.) |
| 3 | Sulphates (as So ₂) | 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 only confirming to IS-12269 or PORTLAND POZZOLANA CEMENT (PPC) of grade 53 only confirming to IS- 1489 (part-1) and (part-2).The cement used shall be any of the above and the type selected should be appropriate for the intended use. Portland Pozzolana Cement (PPC) shall be used only under separate authorization by engineer in charge and wherever so permitted.

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 LACS 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-269 Testing charges shall be recovered from the RA/FINAL BILL of the work from the contractor.

The cement bags shall be neatly stacked in an orderly manner so as to afford easy access and count in a damp proof condition. If the consumption of cement exceed 25.0 M.T., than the cement shall be stored in tin shed go down or in a pucca go down, 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 |

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. The 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 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:

Sand shall be of natural river sand having F.M. from 2.1 to 3.2 .for concrete work. Sand shall be clean, well graded, hard durable and strong. It shall be free from any deleterious materials and shall be got approved from E.I.C. before stacking at site. Silt content shall not be more than 3 percentages and shall conform to IS -383. Sand for masonry mortar and plastering work shall only be used after screening through proper number screen. And shall confirm to I.S. - 2116 for masonry mortar and to IS-1526 for plaster work.

| 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 micron | 15-34 | 35-59 | 60-79 | 80-100 |
| 300 micron | 5-20 | 8-30 | 12-40 | 15-50 |
| 150 micron | 0-10 | 0-10 | 0-10 | 0-15 |

The grading of the fine aggregate (sand) shall be as per Table-A given below. (IS-383 page no-11 table-4)\ Sand of grading zone-iv shall not be used for concrete work.

The material shall be tested in field laboratory for silt content & grading. The material shall be sent to government or government approved laboratory for tests required as per IS-383 if found necessary by engineer in charge. The charge of the same shall be recovered from the RA /FINAL BILL of the contractor.

M-4 COARSE AGGREGATE:

The coarse aggregate for the use of making concrete 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 graded. 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. The aggregate shall generally be cubical in shape.

The grading of the coarse aggregate shall be as per Table-B given below. (IS-383 page no-9 table-2)

| TABLE - B | | | | |
|----------------------|--|-----------|-----------|--------|
| IS Sieve designation | % Passing for graded aggregate of nominal size | | | |
| | 40mm | 20mm | 16mm | 12.5mm |
| 80mm | 100 | - | - | - |
| 63mm | - | - | - | - |
| 40mm | 95 to 100 | 100 | - | - |
| 20mm | 30 to 70 | 95 to 100 | 100 | 100 |
| 16mm | - | - | 90 to 100 | - |

| 12.5mm | - | - | - | 90 to 100 |
|---|--------------|----------------------|-----------|-----------|
| 10mm | 10 to 35 | 25 to 55 | 30 to 70 | 40 to 85 |
| 4.75mm | 0 to 5 | 0 to 10 | 0 to 10 | 0 to 10 |
| 2.36mm | - | - | - | - |
| The size of coarse aggregate for mass concrete shall be as Table -C given below. (IS-383 page-10 table-3) | | | | |
| CLASS | SIZE | IS Sieve Designation | % Passing | |
| Very large | 150 to 80mm | 150mm | 90 to 100 | |
| | | 80mm | 0 to 10 | |
| Large | 80 to 40mm | 80mm | 90 to 100 | |
| | | 40mm | 0 to 10 | |
| Medium | 40 to 20mm | 40mm | 90 to 100 | |
| | | 20mm | 0 to 10 | |
| Small | 20 to 4.75mm | 20mm | 90 to 100 | |
| | | 4.75mm | 0 to 10 | |
| | | 2.36mm | 0 to 2 | |

The size of coarse aggregate for mass concrete shall be as Table -C given below. (IS-383 page-10 table-3) The material shall be tested in field laboratory for its gradation. The material shall also subjected to tests for 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 Na₂SO₄ and 18% loss with MgSO₄.
- v) Crushing value. :-45% for concrete and 30% for wearing surface.
- vi) % of deleterious material. - 5%

The material shall be sent to government or government approved laboratory for above tests at the cost of contractor at once at the beginning and at the change of source of materials or in case of dispute. Initially, it will paid by the department and same shall be recovered from the RA/FINAL BILL of the contractor.

M-5 TMT STEEL:

The Thermo Mechanically Treated, popularly known as TMT steel shall confirm to I.S.-1786. 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 shall not be allowed to use.

Testing of steel shall be done for each size of bars and frequency mentioned Below (Table-D), 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 The charges for the same shall be recovered from RA / FINAL BILL of the contractor.

The steel shall be free from loose mill scale, rust oil, grease, or any other harmful matter. For the purpose of payment, the bar shall be measured correct up to 10mm in length. And unit weight of bars shall be computed as per weight given in IS specification for Indian steel. or at the rate specified in Table-C.

| TABLE-C (Table-1 Page-11 of IS-1786) | | | |
|---|-------------|---------|-------------|
| BAR DIA. | UNIT WEIGHT | BAR DIA | UNIT WEIGHT |
| in mm | Kg / Rmt. | in mm | 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 |

| TABLE-D (Table-5,Page-17 of IS-1786) | | |
|--|---|---|
| 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 |
| 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 45 tones or part thereof | One sample from each 50 tones or part thereof |

M-6 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-7 P.V.C.PIPES:

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

M-7 STONE:

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 charge well before carting the same to site Weathered skin maximum up to 2mm 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 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/cm² for stones to be used 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 weathering test for once.

Stone shall be tested in government or government approved laboratories. Charges for the same shall be borne by the contractor for once. In other case, charges of stone testing shall be borne by department, if test result found ok and shall have to be borne by the contractor, if test result found failed.

Signature of Contractor

**Dy. Executive Engineer Irrigation
Panchayat Sub Division
Jasdan**

**Executive Engineer
Irrigation Panchayat Division
Rajkot**

CHAPTER-V

Clearing the site & Excavation for Foundation including blasting

CHAPTER-V

Clearing the site & Excavation for Foundation including blasting

1.0) **SCOPE OF WORK:**

The work to be done under these specifications shall consist of clearing the site, excavation in different type of strata as mention 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 stepped. 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 & 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.

EXCAVATION IN OVERBURDEN:

This shall include all excavation in strata other than soft and hard rocks such as soil, clay sand soft murrum kankar, hard murrum and boulders or mixture of above strata. 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.

EXCAVATION IN SOFT ROCK.:

This shall include all excavation in strata soft rocks which can removed with a pick bar and shovel by little more force & efforts but which do not come under the category of hard murrum and boulders.

EXCAVATION IN HARD ROCK:

This shall include all excavation in rock occurring in masses, which can be best removed by blasting. This shall also include rock required to be removed by chiseling, 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.

- 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 payline. 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.

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. 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 and at the rate mentioned in the Schedule-A on gross stack measurement. 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 to the required depth is completed, calling & trimming of all loosen rock shall be carried out by chisels and wedges. 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 sturfiest 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 obtain from the rock or as decided by engineer in charge.

9.0) **MODE OF MEASUREMENT AND PAYMENT:**

For the purpose of measurement, initial and final levels in grid of not more than 5x5 mt. shall be taken by cross section method. with levels at each corner.

The rate for the respective excavation incl. necessary lead & lift and disposal of excavated stuff as directed and dewatering, if any.

No payment shall be made for any silt, debris etc. that might accumulate in excavated areas on any account. Removal of such, thereof shall be deemed to have been incl. in the tendered rate for the respective item of work.

No extra claim shall be entertained for any excavation in overburden and rock, below those, shown in drawing or instructed.

The rates of the respective item of work are inclusive of all lead and lead specified thereof.

10.0) **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 obtain 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 gelatine/ black gun powder 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.

11.0) **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 contracture will be the sole responsible for procurement of explosive.
- ii) The contracture 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 day time 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 labors shall be made acquainted with the sound. and shall be strictly warned to leave their 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.
- 12.0) **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.
- 13.0) **PRECAUTIONS AFTER BLASTING :**
 - i) After the blast, the supervisor shall carefully inspect the work and satisfy himself that all charges have exploded.
 - ii) For under ground work, the workmen shall only be allowed to go to face after toxic gases got evacuated.
- 14.0) **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) Nither 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.

Signature of Contractor

**Dy. Executive Engineer Irrigation
Panchayat Sub Division
Jasdan**

**Executive Engineer
Irrigation Panchayat Division
Rajkot**

CHAPTER-VI

General Specification of Concrete

CHAPTER-VI

General Specification of Concrete

MATERIALS:

1.1) CEMENT:
Specification m-2 of specification of material section shall apply.

1.2) WATER:
Specification m-1 of specification of material section shall apply.

1.3) FINE AGGREGATE (SAND):
Specification m-3 of specification of material section shall apply.

1.4) COURSE AGGREGATE:
Specification m-4 of specification of material section shall apply.

2.0) SCOPE OF WORK:

The work covered by this chapter consists of furnishing all materials, equipment and labor for the manufacturing, transport, 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 and admixture if asked) well mixed in proportion and 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 under taken 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 re handling. 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 work to be carried out is classified in grades as mention 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 carryout work without claiming any extra cost. The cement level mention in the para-8 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.

7.0) **SPECIFIED CEMENT LEVEL FOR NOMINAL MIX / DESIGN MIX CONCRETE:**

The proportion of cement, sand and aggregate mixed for concrete shall be as per grade of the concrete (i.e. 1:4:8, 1:3:6, 1:2:4 etc.) by weight or by volume as directed by Engineer-in-charge. For volume batching the volume of 1 bag cement will be considered as 0.034 cum. The cement level for the nominal concrete / mix design of different grade shall be as bellow:

1. For M-15/MSA-20 300 kg/Cum
2. For M-15/MSA-40 280 kg/Cum
3. For M-20/MSA-20 360 kg/Cum
4. For M-20/MSA-40 330 kg/Cum
5. For M-25/MSA-20 400 kg/Cum
6. For M-25/MSA-40 370 kg/Cum
7. For M-10/MSA-20 220 kg/Cum
8. For M-10/MSA-40 205 kg/Cum

If the cement level is less than the above specified cement level, the recovery for such less Qty. of cement will be made Rs. _____ per Kg. In the event of higher level of cement in Nominal mix / mix design no extra payment shall be made for use of such additional cement.

8.0 **PROPORTION 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.

PROPORTION FOR NOMINAL MIX CONCRETE

(IS - 456-2000 PAGE No-23 Clauses 9.3 and 9.3.1)

| 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 RATION | CEMENT PER ONE cum OF CONCRETE |
|-------------------|-----------|--|----------------------------|--------------------------|--------|---------------------|--------------------------------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| M-10 | 20 | 480Kg | 320Kg | 160Kg | 50Kg | NOT MORE THAN 0.68 | 220Kg |
| | 40 | 480Kg | 343Kg | 137Kg | 50Kg | | 205Kg |
| | 80 | 480Kg | 343Kg | 137Kg | 50Kg | | 190Kg |
| M-15 | 20 | 330Kg | 220Kg | 110Kg | 50Kg | NOT MORE THAN 0.64 | 300Kg |
| | 40 | 330Kg | 235Kg | 95Kg | 50Kg | | 280Kg |
| | 80 | 330Kg | 235Kg | 95Kg | 50Kg | | 240Kg |
| M-20 | 20 | 250Kg | 166Kg | 84Kg | 50Kg | NOT MORE THAN 0.60 | 360Kg |
| | 40 | 250Kg | 178Kg | 72Kg | 50Kg | | 330Kg |
| | 80 | 250Kg | 178Kg | 72Kg | 50Kg | | 310Kg |

Note: - 1) FINE AGGREGATE (SAND) SHALL CONFIRM TO ZONE-II OF TABLE-4 OF IS-383(FM 2.21 TO 3.37)
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.

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 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 laboratory, in case of field laboratory facility not available. In such case, the charges of the same shall be borne by the department.

9.0) DESIGN MIX CONCRETE:

The design mix shall be design 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 below 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) as per IS-456-2000

10.0) 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 complies with the appropriate limits in col-2 of Table-11 given on Page No-30 of IS-456-2000.
 - b) Any individual test results complies with the appropriate limits in col-3 of Table-11 given on Page No-30 of IS-456-2000.

11.0) 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 with stand the pressure of fresh concrete during compaction, inclusive load and shaped to the required line within the tolerance specified. The tolerance 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 distortion 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 conform 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 discolor 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) **ERECTION 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 a smooth joint and avoid sharp deviation, projections or edges and particular 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. Following is for general guidance only.

- 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.

12.0) **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...

13.0) **FINISHES AND FINISHING:**

Specification laid down in IS-456 & IS-457 shall be applicable. Following table is provided for general guidance only.

| TABLE :- CC | | | |
|------------------|------------------|--|--|
| TYPE OF SURFACE | TYPE OF FINISHES | SPECIFICATIONS | APPLICATION |
| FORMED SURFACE | F1 | SURFACE IRREGULARITIES SHALL NOT EXCEED 25 MM. REQUIRES NO TREATMENT AFTER REMOVAL OF FORMS EXCEPT DEFECTIVE CONCRETE. | PERMANENTLY CONEALD OR CONCRETE WITH BACKFILL |
| ,-DO-, | F2 | SURFACE IRREGULARITIES SHALL NOT EXCEED 5 MM FOR ABRUPT IRREGULARITIES & 10 MM FOR GRADUAL IRREGULARITIES. | PERMANENTLY EXPOSED SURFACES FOR WHICH OTHER FINISHES ARE NOT SPECIFIED. |
| ,-DO-, | F3 | SURFACE ABRUPT IRREGULARITIES SHALL NOT EXCEED 5 MM FOR IRREGULARITIES PARALLEL TO THE DIRECTION OF FLOW & 25 MM FOR IRREGULARITIES IN THE OTHER DIRECTION. GRADUAL IRREGULARITIES SHALL NOT EXCEED 5MM. | STRS PERMANENTLY EXPOSED & APPEARANCE IS OF SPECIAL IMPORTANCE. E.G. PARAPETS, SPILLWAY PIERS, INTERIOR & EXTERIOR WALL OF HOIST, ELEVATOR TOWERS & OTHER DECORATIVE FEATURES. |
| ,-DO-, | F4 | THE SURFACE TREATMENT SHALL CONSIST OF THE GRINDING OF OFFSETS AND BULLDOGS ON A LEVEL OF 1 TO 30 RATIO. GRADUAL SURFACE IRREGULARITIES SHALL NOT EXCEED 6 MM. | WHERE ACCURATE ALIGNMENT & EVENNESS OF SURFACE ARE ESSENTIAL FOR PREVENTION OF DESTRUCTION OF RUNNING WATER. E.G. SPILLWAY FACE, DIVIDE WALL, INTAKE OF CANALS, PENSTOCKS OUTLET FOR CANALS, ENERGY DISSIPATION FOR OUTLET WORKS, INTAKE STRS. |
| UNFORMED SURFACE | U1 | SCREED FINISH. SURFACE IRREGULARITIES SHALL NOT EXCEED 10 MM. | FIRST STAGE FOR FINISH U2 & U3. ALL CONCRETE FLOOR TOPPING & SURFACE REQUIRING ROUGHNESS. |
| ,-DO-, | U2 | FLOATED FINISH. SURFACE IRREGULARITIES SHALL NOT EXCEED 5 MM. | STILLING BASIN, EXPOSE SURFACE OF GUTTER ETC. |
| ,-DO-, | U3 | TROWELLED FINISH. SURFACE IRREGULARITIES SHALL NOT EXCEED 5 MM. | SLAB TO BE COVERED WITH BUILTUP ROOFING, OR MEMBRANE WATER PROOFING & STAIR TREADS |

13.0) CONCRETING FOR CANAL LINING:

PREPARATION FOR CANAL SECTION AND SUB GRADE:

IS-3873 shall be applicable. Canal section shall be prepared by dressing the inside slopes of the canal banks by minor cutting or minor filling, as per site requirement and as directed. The contractor shall make his own arrangement for taking out earth of required quality from nearby area without spoiling the canal banks within lead of 200 mt. Watering and compaction by way of ramming or by using plate vibrator shall be done as directed. No extra payment shall be made for preparation for canal section and subgrade and considered to be inclusive in respective item of work of canal lining, if there is no provision of separate item of work for this in the tender.

LAYING OF CONCRETE.

IS-3873 shall be applicable. The concrete coming out of mixer, shall be collected in large shallow bucket and then transported it by mechanically or manually, to the place of requirement. With the materials having been carried to the site and sub grade prepared, placing of concrete can be start, after due checking of profiles by the competent authority. The sub grade shall be moistured adequately in advance of starting of lining work. Concrete shall be laid on the prepared sub grade in required thickness and in panels by manually or by mechanically using concrete paving machine. The contraction joints of required thickness shall be maintained in between two panels. The concrete shall be compacted by way of ramming or by using plate vibrator, so as to get finished expose surface with dense and compacted concrete without honeycombing.

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 Expose finish surface of concrete shall be protected from the direct rays of the sun for at least first three days after placement. 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 contractors 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 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 mechanical 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 engineer-in charge.

18.0) HANDLING AND CONNVEYING:

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 the place 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 unwater 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 laborers, 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 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 equipment 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 sample (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 shown in the table-DD below.

| TABLE -DD | |
|--------------------------|---|
| | |
| 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 ADDITRIONAL 50CUM OR PART THEREOF |

The 28 days field and laboratory average compressive strength shall not be less than that mention in table-11 of IS 456-2000.

ii) SLUMP TEST:

In order to test the consistency of the mixed concrete, slump test shall be taken as per IS-456-2000

iii) PRELIMINARY TEST:

The exact proportions in which the different ingredients are to be used for different parts of the work shall be determined by the depth, well before the actual work starts. During the progress of work, preliminary tests shall be conducted periodically by the department apart from the field tests, to ascertain the 7 day and 28 day laboratory compressive strength.

iv) OTHER TEST:

Additional tests, if deemed necessary for concrete to determining unit weight & air content, will also be carried out by the department. 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.

v) **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.

vi) **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

vii) **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) **UNACCEPTABLE WORK:**

All defective concreting work including but not limited to defects arising out of honey combing, under sizing etc. are liable to be demolished and redone by the contractor at his cost without claiming any extra payment. Acceptance criteria will be in accordance with provisions of IS-456 and IS-457

22.0) **MEASUREMENT AND PAYMENT:**

Measurement and payment of concrete shall be made on the basis, mentioned in detail technical specification of respective item of work. No deduction shall be made for the space occupied by reinforcement and the quantities of all holes & passages greater than 0.80 sqmt.

In cross section or 100 mm in dia. shall, however, be deducted from the quantity for payment. The reinforcement steel and other embedded metal parts shall be paid separately at the rates accepted as per the schedule of prices. No payment shall, however, be made for embedding minor fixtures or providing grooves, block outs, recess etc. for gates and other installation, electric conduits etc. The rates are also inclusive of erection and removal of formwork and centering.

Signature of Contractor

**Dy. Executive Engineer Irrigation
Panchayat Sub Division
Jasdan**

**Executive Engineer
Irrigation Panchayat Division
Rajkot**

CHAPTER-VII

General Specification of Reinforcement

CHAPTER-VII

General Specification of Reinforcement

1.0 MATERIALS:

1.0) TMT BARS:

Specification m-10 of section of materials shall apply.

2.0) BINDING WIRES:

Specifications of m-11 of section of materials shall apply.

2.0 SCOPE OF WORK:

Scope of work shall include supplying all materials and labour for cutting, bending, binding, and placing in position steel 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 free from any defects and of proper diameter. Bars shall be accurately placed and secured 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 supports 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 straighten 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 exposer 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 be 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 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 provided 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 suitably staggered.

7.0 INSPECTION BEFORE CONCRETE:

No concreting shall be started unless the reinforcement as laid is 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. The charges for the same shall be borne by the contractor and recovered from RA/FINAL BILL of the contractor.

11.0 MEASUREMENT AND PAYMENTS:

The payment for the steel used shall be paid on the basis of the actual length of bars used and placed as shown in the drawing / bar bending schedule including hooks, bends, laps etc. The length of the bars shall be measured to the nearest 100 mm.

The rate quoted in the schedule of price shall include the cost of supplying, cutting, bending, binding, cleaning, straightening, placing, fixing and maintaining in position, including binding wires or welding etc. All steel shall be paid on the basis of the unit weight per running meter for different diameter of bars computed as specified in relevant IS-1786/as specified in Table-D given in specification of

materials No separate payment shall be made for supplying and fixing metal wire, ties, supports, separators, chairs, anchor rod, pins, binding wire, random tack weld, etc. used for tying the bars.

Signature of Contractor

**Dy. Executive Engineer Irrigation
Panchayat Sub Division
Jasdan**

**Executive Engineer
Irrigation Panchayat Division
Rajkot**

CHAPTER-VIII

GENERAL TECHNICAL SPECIFICATION FOR EARTH WORK

CHAPTER-VIII

GENERAL TECHNICAL SPECIFICATION FOR EARTH WORK:

1.0) PREPARATION OF WORK AREA:

- i) **CLEANING THE SITE :** Cleaning and grubbing 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 off as directed by engineer in charge. All trees shall be cut down to at least 0.6 m below ground level. The department will indicate the specific areas which need to be cleared and decision of the engineer in charge in this connection shall be final and binding to the contractor. The measurement 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 stripping, 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. upto 30 cms) as directed to remove unsuitable materials as mentioned in the detailed 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, 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.

- iii) Borrow areas shall be cleaned and stripped by the contractor, at his own cost to a depth necessary to obtain materials of desired quality.
- iv) 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.
- v) Temporary 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.
- vi) 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 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 burnt 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 upto 30cms) of top unsuitable soil, clods and any other materials which are unsuitable for the purposes. No extra payment shall be made for the clearing and stripping done for the borrow area.

BORROW AREA WATERING :

The initial moisture content of material in the borrow areas as well as the optimum moisture content for the materials in the particular borrow areas shall be determined

from the laboratoty tests. The required additional moisture when advantageous shall be introduced in to the borrow area by suitable means of watering in advance of the excavation to ensure uniformity of moisture contents. So that the moisture content in material at the time of laying in layers is at least 2% above the OMC. No textra payment shall be made for watering in the borrow areas.

3.0) EMBANKMENT GENERAL :

For the purpose of these specifications the terms "EMBANKMENT" incl. all portions of the embankment as follows.

- i) The earth fill designated as core/hearting impervious zone in earth dam.
- ii) The earth fill designated as shell/casing/semi pervious zone/gravel fill in earth dam
- iii) The inclined/horizontal sand filter in earth dam.
- iv) Selected surfacing on the dam embankment or elsewhere.
- v) Canal bank embankment/Road bank embankment.
- vi) Backfill behind the structure.

Placement of fill within zonees 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 perfomed subsequent to stripping and excavation, if any. No portion of the embankment should be started untill 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,moistured 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 moistured prior to the placement of fills to create asatisfactory 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. Where it is not practicable to obtain a mixture of materials, finest and most clayey materials shall be placed in COT and in the central portion of the core zone. The intermidiat materials shall be placed between the center and the coarser material shall be placed near the slopes of the embankment.

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 carryout 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 through out 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 substancially in texture or gradation from the surrounding material. The combined excavation and placing operations shall be such that the materians, when compacted in the earth fill, will be blended sufficiently to produce the desire degree of compaction for stability. Partcular 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) WEATHER CONDITION :

Embankment materials shall be placed only when the weather conditions are satisfactory to permit accurate control of the moisture content in the embankment materials. During monsoon, before stopping embankment work, for any continuous spell, the top surface shall be graded and rolled with a smooth wheeled roller to facilitate run off. Prior to resuming work, the top surface shall be scarified & moistured or allowed to dry as necessary without any extra charge.

10.0) MOISTURE CONTROL :

Prior to or during compacting operations the material in each layer of earth fill shall have a moisture content of about 2% less than the optimum moisture content in the casing zone and about 2% more the optimum in the hearting zone. Laboratory investigations may impose some restrictions on the lower limit of the practicable moisture content on basis of studies of consolidation in embankment. As far as practicable, the semi-pervious and hearting material be added on the dam by sprinkling water before rolling the layer. If the moisture content is greater than required, the material shall be spread and allowed to dry before starting rolling.

The moisture content shall be uniform through out the layer of material and ploughing, harrowing or other method of mixing may be required to be employed to obtain uniform distribution. In case of casing materials like sand and gravel, river gravel, rock stuff, the watering shall be done on site of work by proper watering arrangement as directed.

Signature of Contractor

**Dy. Executive Engineer Irrigation
Panchayat Sub Division
Jasdan**

**Executive Engineer
Irrigation Panchayat Division
Rajkot**

CHAPTER-VIII

Item wise detailed Technical Specification

CHAPTER – IX

ITEM WISE DETAILED TECHNICAL SPECIFICATION -

ITEM NO. 1: Excavation in all sort of strata and formation incl. depositing the unuseful excavated stuff as and where directed incl. sorting and stacking useful materials in measurable conditions as directed upto 200 mt lead and all lift etc. complete incl. dewatering.

(C) IN HARD ROCK GENERAL :

The site on which the structure is to be built shall be cleared and all obstructions, loose stone, materials and rubbish of all kind, bush, wood and trees shall be removed as directed. The unuseful 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 specification for excavation mentioned in general technical specification shall apply to this item also for classification of strata, pay line, shoring and strutting, blasting, 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 overburden including hard murrum strata including dewatering.

WORKMANSHIP :

Workmanship of the work under this item of work shall be as describe 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 measurement shall be taken as specified in general technical specification for excavation.

Note : - The agency has to stack the excavated material as directed by Engineer-in-charge in frustum shape if required for volumetric measurement for which no additional cost shall be paid.

ITEM NO. 2: Prov. & Laying in position cement concrete using cement , sand and crushed metal coarse aggregate by mass and machine mix for PCC/RCC including necessary formworks compaction by vibrator, curing as directed with all lead & lift etc complete. (Excluding cost of steel) FOR .BODY WALL, APRON, TRAINING WALL, SIDE WALL, SPLAY WALL, KEY WALL, CUT OF WALL ETC.

- i) CEMENT: Specification M-2 of specification of principle material section shall apply.
- ii) WATER: Specification M-1 of specification of principle material section shall apply.
- iii) FINE AGGREGATE (SAND): Specification M-3 of specification of principle material section shall apply.
- iv) COARSE AGGREGATE: Specification M-4 of specification of principle material section shall apply.

GENERAL:

General technical specifications for concrete works shall apply here also. Concrete mix shall be "nominal mix" 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 (1:2:4) with M.S.A. 20 mm.

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, labors and use of equipment machinery with providing erecting and dismantling of necessary formwork and centering. 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 of 28 days.

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 and 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 paid 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.

ITEM NO. 3: Prov. & Laying in position controlled cement concrete using cement, sand and crushed metal aggregate by machine mix for R.C.C. work incl. necessary formworks, centering, scaffolding, Shuttering, compaction by mechanical vibrator, curing as directed with all lead & lift etc complete Excluding the cost of Reinforcement.

2/e)Concrete grade M-20 and MSA - 20 mm (graded)

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.

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 .

SCOPE OF WORK. :

The scope of work under this item includes doing R.C.C. at various work locations and compartments as classified under the item including providing and supplying all materials labours and use of equipment's machinery with providing, erecting and dismantling of necessary formwork & centering. 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.

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 dissimilar 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.

ITEM NO. 4: Providing & Laying in position controlled cement concrete using cement sand & crushed metal aggregate by machine mix 7 incl. necessary formworks Shuttering, compaction by mechanical vibrator curing as directed with all lead and lift etc complete. Excluding the cost of steel.O) Concrete grade M-25 and MSA-20mm (Graded)

MATERIALS :

- v) CEMENT :Specification m-2 of specification of material section shall apply.
- vi) WATER: Specification m-1 of specification of material section shall apply.
- vii) FINE AGGREGATE (SAND) :Specification m-3 of specification of material section shall apply.
- viii) COARSE AGGREGATE :Specification m-4 of specification of material section shall apply.

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 .

SCOPE OF WORK. :

The scope of work under this item includes doing R.C.C. at various work locations and compartments as classified under the item including providing and supplying all materials labours and use of equipment's machinery with providing, erecting and dismantling of necessary formwork & centering. 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.

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-

- iii) Ends of beams, girders, joist, steps, posts etc. of dissimilar materials up to 500 sq. CMS in section.
- iv) 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.

ITEM NO. 5: Providing and laying graded filters of sand, gravel/metal and and over sized meal (100 to 150 mm) behind the retaining wall & wing walls as directed as per approved drawing with all lead and lifts etc complete.

MATERIALS:

Sand, gravel/metal and over sized metal(100 to 150 mm)shall confirm to specification of material section.

GENERAL: SCOPE OF WORK: WORKMANSHIP:

The scope of includes providing, supplying and filling behind the wing/retaining wall, in true line and level / grade in the retaining wall of masonry/ concrete. The graded filter shall be provided during the construction and at the level and thickness as directed by engineer in charge or as shown in the drawing. . It shall be the responsibility of contractor to maintained weep hole pipes, unchoked and clean during construction and executing the graded filter behind the retaining wall. The cost is inclusive of providing supplying, dressing, laying complete as directed by engineer in charge for all lead and lift complete

MODE OF MEASUREMENT AND PAYMENT:

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

ITEM NO. 6: Prov. & Laying in position controlled cement concrete using cement, sand and crushed metal aggregate by machine mix for R.C.C. work incl. necessary formworks, Shuttering, centering, scaffolding, compaction by mechanical vibrator, curing as directed with all lead & lift etc complete Excluding the cost of Reinforcement.

2/f) Concrete grade M-25 and MSA - 20 mm (graded)MATERIALS :

- ix) CEMENT :Specification m-2 of specification of material section shall apply.
- x) WATER: Specification m-1 of specification of material section shall apply.
- xi) FINE AGGREGATE (SAND) :Specification m-3 of specification of material section shall apply.
- xii) COARSE AGGREGATE :Specification m-4 of specification of material section shall apply.

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 .

SCOPE OF WORK. :

The scope of work under this item includes doing R.C.C. at various work locations and compartments as classified under the item including providing and supplying all materials labours and use of equipment's machinery with providing, erecting and dismantling of necessary formwork & centering. 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.

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-

- v) Ends of beams, girders, joist, steps, posts etc. of dissimilar materials up to 500 sq. CMS in section.
- vi) 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.

ITEM NO. 7 : Providing, cutting, bending, binding and fixing in position as per drawing TMT BAR reinforcement for R.C.C. works and anchor bars incl cost of black annealed 16 to 18 BWG M.S. Wire etc. complete with all lead and lift. (b) Fe-500

MATERIALS.:

- I) TMT BARS: Specification as per section of material shall apply.
- II) BINDING WIRE: Specification as per section of material shall apply.

GENERAL:

General technical specifications for reinforcement works shall apply here. General provision for the weight of steel (it will be supplied and payable under the item for the work done as well as the criteria for recoveries, wastage etc.) prescribed under general technical specifications shall apply and shall be binding to the contractor.

SCOPE OF WORK.:

The scope of work includes providing all necessary materials with transportation, loading and unloading of the same and cutting, bending, binding to the shape and fixing in position along with the cost of binding wire and labors.

WORKMANSHIP

The steel bars shall be clean and free from rust; loose mill scale or any other harmful substance at the time of fixing in position. The work of providing & fixing steel bars shall be carried out in the manner of best workmanship manner. Steel bars shall confirm accurately to the dimensions given and accurately placed in exact position shown in the drawings or as instructed.

MODE OF MEASUREMENT AND PAYMENT:

The work shall be measured and paid on the basis of metric tons of the completed work. as per provision in general technical specification. The binding wire is to be provided by the contractor at his own cost.

ITEM NO. 8: providing & fixing in position 100/110 mm PVC pipe weep holes in the retaining wall.**MATERIALS:**

P.V.C..PIPE: P.V.C. Pipe shall confirm to specification of material section.

GENERAL: SCOPE OF WORK: WORKMANSHIP:

The scope of includes providing and fixing P.V.C. Pipes of approved and min. 4.0 kg/cm² quality, in true line and level / grade in the retaining wall of masonry/ concrete. The pipe shall be provided during the construction and at the level and spacing as directed by engineer in charge or as shown in the drawing. The pipe shall not be damage during construction. It shall be the responsibility of contractor to maintained weep hole pipes, unchoked and clean during construction. The pipe shall be fixed in line and level by using cement mortar in the bed and around. Sufficient mortar cushion shall be provided on all the side, so as to prevent pipe from damage. Outer end of the pipe shall be finished smooth with cement slurry or cement mortar. The rate is inclusive of cement mortar.

MODE OF MEASUREMENT AND PAYMENT:

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

ITEM NO. 9: Providing & fixing G.I. Pipe railing (B-class medium duty) as per design of 1.0 mt height, using 75 x 75 x 10 mm size M.S. Angle at 2.0 mt c/c for vertical posts and 38 mm dia G.I. Pipe for 4 horizontal rows incl one coat of red oxide primer & two coats of oil paint etc complete**MATERIALS:**

The item includes the cost of G.I. Pipe railing (B- class medium duty), 75 x 75 x 10 mm M.S. angle, Structural steel, 358 mm G.I. pipe as per drawing and shall confirm to specification of material section.

GENERAL: SCOPE OF WORK: WORKMANSHIP:

The scope of includes Providing & fixing G.I. Pipe railing (B-class medium duty) as per design of 1.0 mt height, using 75 x 75 x 10 mm size M.S. Angle at 2.0 mt c/c for vertical posts and 38 mm dia G.I. Pipe for 4 horizontal rows incl one coat of red oxide primer & two coats of oil paint etc complete. It shall be the responsibility of contractor to maintained maintain the alignment during construction. The railing shall

be fixed in line and level by using cement mortar/Anchor bolts if fixed with base plate welded for vertical posts provided 2.0m c/c in the Top slab and around. Sufficient mortar cushion shall be provided on all the side, so as to prevent pipe from damage. Outer end of the pipe shall be finished smooth with cement slurry or cement mortar. The rate is inclusive of all work required to be done of fixing G.I. Railing.

MODE OF MEASUREMENT AND PAYMENT:

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

ITEM NO. 10: Providing and placing in position by cranes/manual, mechanically doubly twisted highly galvanized, without PVC coating "GABIONS" of size mention below, made of mesh size 10 x 12 mm woven wire as per ASTM - 975 - 97 including providing and laying stones of size not less than 25 Kg in the gabions and arranging the same as instructed in the breached section or such other locations/structures etc complete incl. dressing the slope, minor earth filling.
1.0 x 1.0 x 0.6 mt (Total weight = 999.00 Kg)

GENERAL :

Depending upon the height in relation to other dimensions as per ASTM-A 975 the below classification is being made accordingly the applicable specification shall be followed mentioned below.

Gabion, n - n-a double-twisted wire mesh container of variable sizes, uniformly partitioned into internal cells, interconnected with other similar units, and filled with stone at the project site to form flexible, permeable, monolithic structures such as retaining walls, sea wall, channel linings, revetments, and weirs for erosion control projects.

Revet mattress, n-a double-twisted wire mesh container uniformly partitioned into internal cells with relatively small height in relation to other dimensions, having smaller mesh openings than the mesh used for gabions; Revet mattresses are generally used for riverbank protection and channel linings (i.e., Height having less than 0.3 mt)

(i.e., Height having less than 0.3 mt) Wire technical specification used in Gabions

Table II-1 Indicative Thickness of Gabion Mattress in Relation to Water Velocity ^[20]

| Type | Thickness (m) | Stone size (m) | d ₅₀ (m) | Critical Velocity (m/s) | Limiting Velocity (m/s) |
|----------------|---------------|----------------|---------------------|-------------------------|-------------------------|
| Revet mattress | 0.15-0.17 | 0.07-0.10 | 0.085 | 3.5 | 4.2 |
| | | 0.07-0.15 | 0.11 | 4.2 | 4.5 |
| | 0.23-0.25 | 0.07-0.10 | 0.085 | 3.6 | 5.5 |
| | | 0.07-0.15 | 0.12 | 4.5 | 6.1 |
| | 0.3 | 0.07-0.12 | 0.1 | 4.2 | 5.5 |
| | | 0.10-0.15 | 0.125 | 5.0 | 6.4 |
| Gabion | 0.5 | 0.10-0.20 | 0.15 | 5.8 | 7.6 |
| | | 0.12-0.25 | 0.19 | 6.4 | 8.0 |

Table II-2: Indicative Gabion Mattress Thickness ^[13]

| Bank soil type | Max velocity(m/s) | Bank slope | Minimum thickness required(m) |
|---------------------------|-------------------|------------|-------------------------------|
| Clay, Heavy cohesive soil | 3.05 | <1:3 | 0.23 |
| | 3.96-4.88 | <1:2 | 0.3 |
| | any | >1:2 | ≥.45 |
| Silts, Fine sand | 3.05 | <1:2 | 0.3 |
| Shingle with gravel | 4.88 | <1:3 | 0.23 |
| | 6.01 | <1:2 | 0.3 |
| | any | >1:2 | ≥0.45 |

All tests on the mesh, lacing wire and selvedge wire (**Fig. 2a shown below**) must be performed prior to manufacturing the mesh.

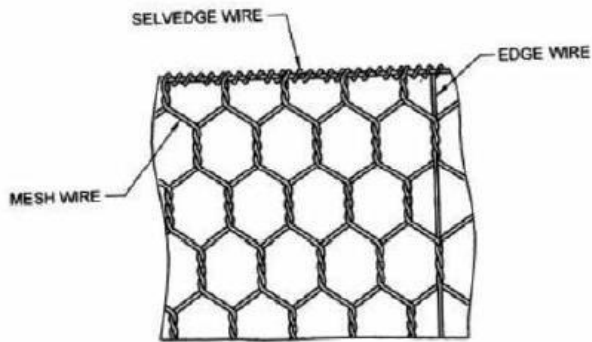


Fig. 2a Details of Mesh Wire, Selvedge and Edge Wire

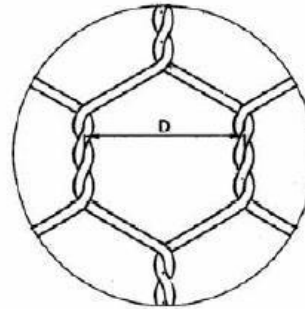


Fig. 2b: Mesh Type and Nominal Size (D)

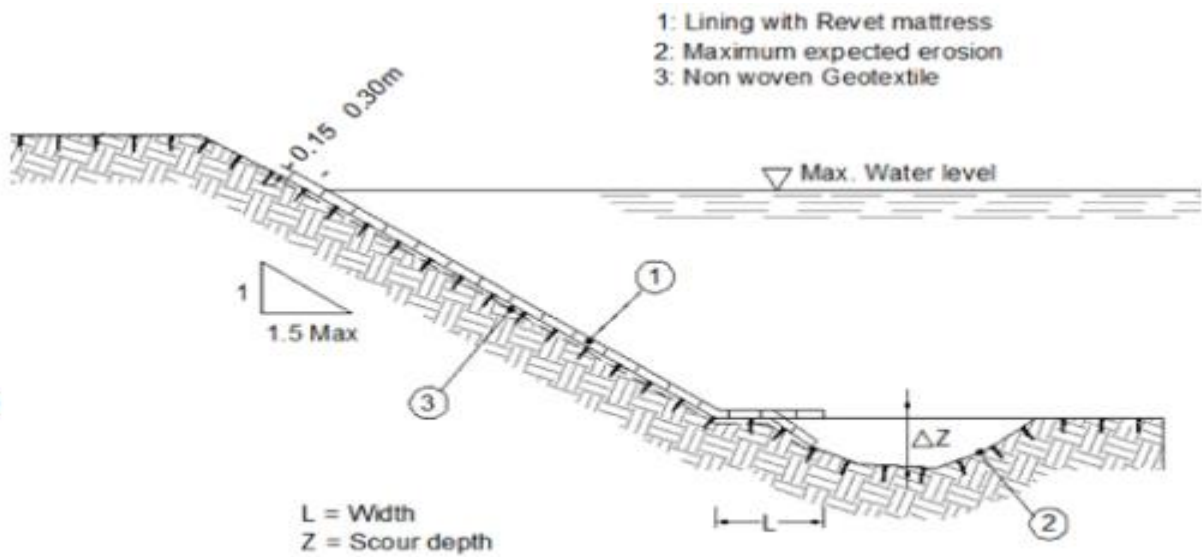
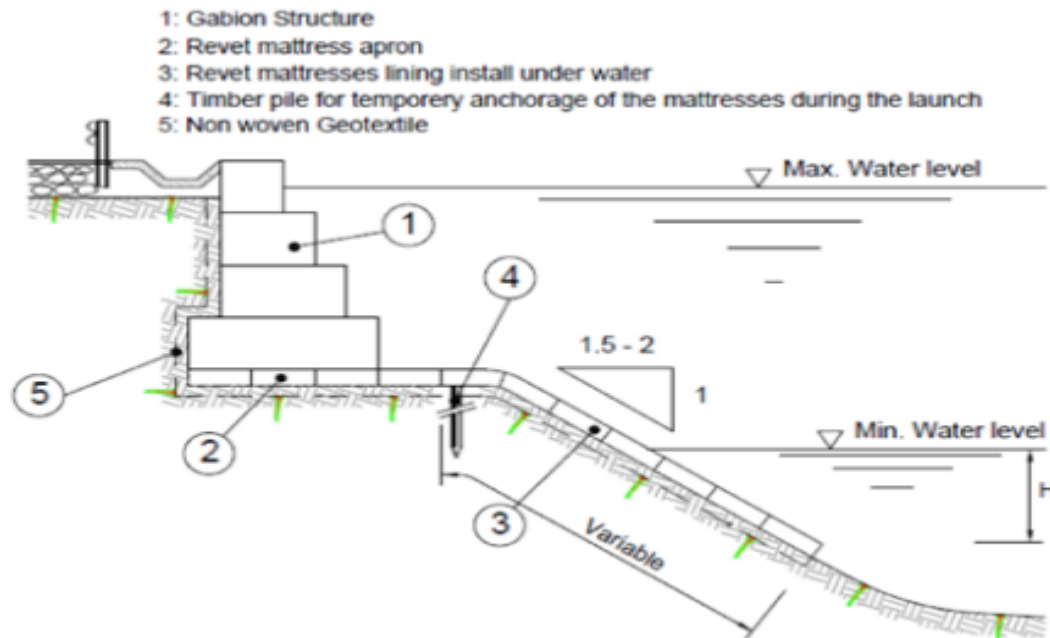


Fig. : Typical Section of Gabion Mattress for Lining



Revet Mattress Foundation of a Retention and Protection Structure of a Road Embankment. The revet mattress were installed partially under water.

Tensile strength: The wire used for the manufacture of Mesh shall have a tensile strength minimum 350 N/mm² – 550 N/mm² in accordance with IS 280. Wire tolerances shall be in accordance with IS 16014 (Class T1).

Elongation: Elongation of wire shall not be less than 10%. Test must be carried out on a sample at least 20 cm long.

Metallic coating: The wire shall have minimum quantities of metallic coating given in accordance with IS 4826 and Zn Al alloy coating has been given as per **Table 1**.

Ageing and corrosion resistance

1. Zinc metallic coating- When subjected to test in a Sulphur dioxide environment according to the procedures in ISO 6988 (0,2 dm³ SO₂ per 2 dm³ water) after 14 cycles of discontinuous test, the mesh samples surface shall not show more than 5 % of DBR (Dark Brown Rust). When subjected to the neutral salt spray test according to the procedures in ISO 9227 after a period of 500 h of exposure, the mesh sample surface shall not show more than 5 % of DBR.

2. 95% Zn+ 5%Al - When subjected to test in Sulphur dioxide environment according to procedures in ISO 6988 after 28 cycles of discontinuous test, the test samples shall not show more than 5% of DBR (Dark Brown Rust). When subjected to the neutral salt spray test according to the procedures in ISO 9227 after a period of 1000 hr of exposure, the mesh samples shall not show more than 5 % of DBR.

3. 90% Zn+ 10%Al - When subjected to test in Sulphur dioxide environment according to procedures in ISO 6988 after 56 cycles of discontinuous test, the test samples shall not show more than 5% of DBR (Dark Brown Rust). When subjected to the neutral salt spray test according to the procedures in ISO 9227 after a period of 2000 hr of exposure, the mesh samples shall not show more than 5 % of DBR.

Adhesion of metallic coating: The adhesion of the zinc coating to the wire shall be such that, when the wire is wrapped six turns around a mandrel having four times the diameter of the wire, it does not flake or crack

when rubbing it with the bare fingers in accordance with EN 10244-1 and IS 4826.

Table 1 Minimum Mass of Metallic Coating for Heavily Coated, Soft Type for Different Wire Sizes Used in Gabion and revet Mattresses [4] (Ref IRC : SP:116:2018, Pg. No. 7)

| Sr. No. | Nominal Diameter of Galvanized Wire mm | Mass of Zinc/Zinc Alloy coating g/m ² | Permitted Tolerances on wire diameters mm |
|---------|--|--|---|
| 1 | 2.00 | 240 | ±0.05 |
| 2 | 2.20 | 240 | ±0.06 |
| 3 | 2.40 | 260 | ±0.06 |
| 4 | 2.70 | 260 | ±0.07 |
| 5 | 3.00 | 270 | ±0.08 |
| 6 | 3.40 | 270 | ±0.09 |
| 7 | 3.90 | 280 | ±0.10 |

A) Internal Connecting Wires

Cross Ties/ stiffener wire: Galvanized wire diameter 2.2 mm, and with Polymeric coating, 3.2 mm when measured with Polymeric coating.

B) PVC (Polyvinyl Chloride) Coating

- Specific gravity — in the range from 1.30 to 1.35 when tested in accordance with IS 13360(Part 3) / ISO 1183.
- Tensile strength — Not less than 20.6 MPa when tested in accordance with IS 13360 (Part 5) /ISO 527. Elongation at break: not less than 200% in accordance with ISO 527.
- Hardness — Shore 'D' between 50 and 60,when tested in accordance with IS 13360 (Part 5) / ISO 868.
- Resistance of PVC coating to sodium chloride solution — When PVC coated wire is tested in accordance with IS 16014 ,there shall be no loss of mass.
- Salt spray exposure — The PVC shall show no effect after 3000 h of salt spray exposure in accordance with IS 13360 (Part 8)/ ISO 9227
- Coating thickness – Nominal 0.5 mm and minimum 0.4 mm

C) Mesh opening

Mechanically woven wire mesh has mesh opening as show in **Fig. 2b**. Mesh opening for different mesh type is shown in **Table 2**.

Table 2 Mesh Opening Size

| Mesh Type | 'D' Mesh Opening Nominal Size (mm) | Tolerance (%) |
|-----------|------------------------------------|---------------|
| 6x8 | 60 | 0 to + 8 |
| 8x10 | 80 | 0 to +12 |
| 10x12 | 100 | - 4 to +12 |

Table 3 Technical Specification of Gabion^[4]

| Sr. No. | Characteristics | Mesh Type | | | | | |
|---------|---|---|------|-----------------------------------|-----------------------|------|-----------------------------------|
| | | 10x12 | | | 8x10 | | |
| | | Only Zn / Zn Al alloy | | Zn / Zn Al alloy + Polymer coated | Only Zn / Zn Al alloy | | Zn / Zn Al alloy + Polymer coated |
| 1 | Mesh wire dia,mm | 2.70 | 3.00 | 2.70/3.70 (ID/OD)* | 2.70 | 3.00 | 2.7/3.7(ID/OD)* |
| 2 | Edge/Selvedge wire dia,mm | 3.40 | 3.90 | 3.40/4.40(ID/OD)* | 3.40 | 3.90 | 3.40/4.40(ID/OD)* |
| 3 | Lacing wire dia,mm | 2.20 | 2.20 | 2.20/3.20(ID/OD)* | 2.20 | 2.20 | 2.20/3.20(ID/OD)* |
| 4 | Polymeric coating thickness, mm | NA | | Nominal-0.50, Minimum-0.40 | | | Nominal-0.50, Minimum-0.40 |
| 5 | Typical sizes-Length x Width x Height (in meter) (Number of diaphragms) | 4x1x1(3 Nos), 3x1x1(2 Nos), 2x1x1(1Nos), 1.5x1x1(0 Nos), 2x1x0.5(1 Nos), 3x1x0.5(2 Nos), 4x1x0.5(3 Nos), 2x1x0.3(1 Nos), 3x1x0.3(2 Nos), 4x1x0.3(3 Nos) | | | | | |
| 6 | Tolerance in size of gabion box | Length and Width ±5 percent; Height >0.3 m ±5 percent; Heights≤0.3m ±10 percent; | | | | | |

* ID/OD - Internal diameter/Outer diameter of Polymer coated wire

Table 4: Technical Specification of Revet Mattresses^[4]

| Sr. No. | Characteristics | Mesh Type | |
|---------|---|---|--------------------------------|
| | | 6x8 | |
| | | Only Zn / Zn Al alloy | Zn / Zn Al alloy + Poly coated |
| 1 | Mesh wire dia, mm | 2.20 | 2.20/3.20 (ID/OD)* |
| 2 | Edge/Selvedge wire dia, mm | 2.70 | 2.70/3.70(ID/OD)* |
| 3 | Lacing wire dia,mm | 2.20 | 2.20/3.20(ID/OD)* |
| 4 | Polymeric coating thickness, mm | NA | Nominal-0.50, Minimum-0.40 |
| 5 | Typical sizes-Length x Width x Height (in meter) (Number of diaphragms) | 4x2x0.17(3Nos), 3x2x0.17(2 Nos), 2x2x0.17(1 No), 4x2x0.23(3 Nos), 3x2x0.23(2 Nos), 2x2x0.23(1Nos), 4x2x0.30(3 Nos), 3x2x0.30(2 Nos), 2x2x0.30(1 No) | |
| 6 | Tolerance in size of gabion box | Length and Width ± 5 percent; Height ≤ 0.3 m ± 10 percent | |

* ID/OD - Internal diameter/Outer diameter of Polymer coated wire

D) Tests and Standard of Acceptance

Gabion mesh and materials shall be tested in accordance with procedure outline below and IS 16014 and shall meet prescribed criteria mentioned in **Table 5**.

Tensile Strength of Wire Mesh Panel

The wire mesh specimens shall be representative of proper field construction as to materials, mesh geometry, and workmanship, and shall be as large as practical to minimize the effect of variations. The tests shall be run with the load applied parallel to the axis of the twist and repeated on a separate test specimen with the load applied perpendicular to the axis of the twist.

Place the mesh into the machine grips such that the gripped mesh will be maintained in the mesh geometry characteristic of field use. The specimen of approximately 0.8 m width and 0.5 m height shall be tested. The effective width to be considered for test specimen shall be the distance between two extreme gripping points. The specimen should extend by at least one mesh repetition beyond the extreme gripping points on either side. However, specimen should not extend more than two mesh repetitions beyond extreme gripping points. The mesh shall be pre-loaded to 10% of the specified minimum strength and machine head travel stopped. The mesh gauge dimensions shall be recorded at this time and taken as the initial dimensions of the specimen where such dimensions are required. If the sample slips at any of the gripping point during the test, such a test shall be discarded and a new sample shall be taken. The loading shall then continue uniformly maintaining the displacement rate of 75 to 100 mm per minute, until first fracture or unwrapping of an individual wire in the system occurs. The distortion of the mesh or changes in gauge length shall be measured to accuracy consistent with reporting the percentage elongation to the nearest 0.5%.

Punch Test

The punch test could be done using two different apparatus.

1) Pre-Tensioned Punch Test

An uncut section of 1.82 m in length (unselvaged) and not less than 0.91 m in width shall have the ends securely clamped for 0.91 m along the width of the sample. When the width of the section under test exceeds 0.91 m, the clamps shall be cantered along the width and the excess width will be allowed to fall free on each side of the clamped section. The sample shall then be subjected to tension sufficient to cause 10% elongation of the sample section between the clamps. After elongation and while clamped as described above (and otherwise unsupported), the section shall be subjected to a load over 960 cm² of area applied to the approximate center of the sample section between the clamps and in a direction perpendicular to the direction of the tension force.

2) Secured Punch Test

An uncut section of 1.24 m in length and not less than 0.9 m in width (selvaged), including all selvedge bindings, shall have the sides and the ends securely clamped at every mesh opening to a rigid frame. After being secured as described above, the section shall be subjected to a load over 960 cm² applied to the approximate center of the sample section between the clamps and in a direction perpendicular to the direction of the tension force. The sample shall withstand, without rupture of any strand or opening of any mesh fastening, an actual load applied by means of a circular ram at a uniform rate not to exceed 220 N/s equalling or exceeding the values shown in **Table 5**. The ram head used in the test shall be circular with a 350 mm diameter and have its edges bevelled or rounded to prevent cutting of the wire strands.

Pull-Apart Resistance Test

A set of two identical rectangular gabion panels, each with a width about 10½ mesh openings along a selvedge wire, shall be joined by properly installed wire fasteners along the two selvedge wires so that each fastener confines two selvedge and two mesh wires. If the fasteners are also to be used to join two individual empty gabion baskets, two additional selvedge wires that are each mechanically wrapped with mesh wires shall be included so that each fastener confines four selvedge and four mesh wires. The set of the jointed panels shall be subject to pull-apart resistance test. The specimen shall be mounted on a loading machine with grips or clamps such that the panels are uniformly secured along the full width. The grips or clamps shall be designed to only transmit tension forces. The load will then be applied at a uniform rate not

to exceed 220 N/s until failure occurs. The failure is defined as when the maximum load is reached and a drop of strength is observed with subsequent loading or alternately the opening between any two closest selvedge wires, applicable to a fastener confining either two or four selvedge wires, becomes greater than 50 mm at any place along the panel width. The strength requirements of the jointed panels at failure shall be as shown in **Table 5**.

Table 5 Minimum Strength Requirements of Mesh and Connections

| Mesh Type | 10x12 | | | 8x10 | | 6x8 | |
|---|-----------------------|-------|--------------------------------|-----------------------|--------------------------------|-----------------------|--------------------------------|
| | Only Zn / Zn Al alloy | | Zn / Zn Al alloy + Poly coated | Only Zn / Zn Al alloy | Zn / Zn Al alloy + Poly coated | Only Zn / Zn Al alloy | Zn / Zn Al alloy + Poly coated |
| Wire Mesh Dia (mm) | 2.7 | 3.0 | 2.7 | 3.0 | 2.7 | 2.2 | 2.2 |
| Tensile strength parallel to twist (kN/m) | 32.0 | 40.0 | 32.0 | 51.1 | 42.3 | 33.6 | 33.6 |
| Tensile strength perpendicular to twist (kN/m) | 15.4 | 20.5 | 15.4 | 26.3 | 20.4 | 13.1 | 13.1 |
| Connection to selvedges (kN/m) | 10.2 | 11.22 | 10.2 | 20.4 | 16.32 | 10.2 | 10.2 |
| Panel to panel connection using lacing wire or fasteners (kN/m) | 10.2 | 11.22 | 10.2 | 20.4 | 16.32 | 10.2 | 10.2 |
| Punch strength (kN) | 17.8 | 19.58 | 17.8 | 26.7 | 21.36 | 17.8 | 17.8 |

E) Fabrication

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

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

F) Rocks for Filling the Gabion

An unweathered (sound) naturally occurring angular or crushed hard rock material can be used for filling. Stone for the Gabion facia shall be hard, angular to round, durable and of such quality that they shall not disintegrate on exposure to water or weathering during the life of the structure. The minimum size of the rock to be filled in the boxes is governed by the mesh opening "D" in the mesh as shown in **Fig. 2b**. The minimum and maximum size of the stone used for filling shall be 1.5 to 2.5 times the mesh opening. Each range of sizes may allow for a variation of 5% oversize rock by number of particles, or 5% undersize rock by number of particles, or both. The rock pieces should be properly hand-placed and packed with their larger dimensions in the horizontal position. The size of any oversize rock shall allow for the placement of minimum of three layers of rock must be achieved when filling the 1 m high units and a minimum of two layers for the

0.50 m high gabion units and 0.3m thick gabion mattress.

Table 6 Properties of Rock to be fill in Gabion

| Sr. No. | Properties of Rockfill | Values |
|---------|-----------------------------------|-------------------------------|
| 1 | Minimum and Maximum size of stone | 1.5 to 2.5 times mesh opening |

| | | |
|---|----------------------------|---------------------|
| 2 | Tolerance on size of stone | ± 5%. |
| 3 | Minimum density | 22kN/m ³ |
| 4 | Los Angeles abrasion value | Not more than 45 |

Minimum density and Los Angeles abrasion can be changed by designer based on availability of the rock in the area. In places where stones are not available alternate material having good characteristics can be used.

G) Inspection

Unless otherwise specified in the contract or purchase order, the producer is responsible for the performance of all inspection and test requirements of this specification. The producer shall use his own or any other suitable facilities for the performance of the inspection and test requirements, at his option, unless disapproved by the purchaser at the time the order is placed. The purchaser at their own expense shall have the right to perform any of the inspections and tests set forth in this specification when such tests are deemed necessary to ensure that the material conforms to the prescribed requirements.

H) Certification

When specified in the purchase order or contract, a producer's or supplier's certification that the material meets the contract specifications shall be furnished to the purchaser.

I) Measurement

(1) In case of gabion retaining and breast walls, the length of the wall shall be measured in running metre correct to 10 mm and the quantity shall be calculated nearest to two places of decimal.

(2) In case gabion protection works the measurement shall be taken in cubic meter and volume calculated nearest to two places of decimal.

J) Rates

(1) In case of gabion retaining walls and breast walls, the rate shall include the cost of excavation to foundation level, back and side filling and providing and delivering stones from quarry and their preparation to use for gabion walls, as well as the providing, delivery and filling and closing of the gabion boxes, materials, including all testing, labour, equipment, tools, and incidentals necessary to complete the works as specified.

(2) In case of protection works, the rate shall include providing and delivering stones from quarry and their preparation to use for gabion walls, as well as the providing, delivery and filling and closing of the gabion boxes, materials, including all testing, labour, equipment, tools, and incidentals necessary to complete the works as specified.

(A) Check List of Site Preparation of Site:

- I. The alignment of the structure shall be marked before excavation.
- II. The excavation shall be carried out as per levels in drawing.
- III. Excavated area shall be compacted using roller.
- IV. In areas where vibro roller cannot reach, a plate compactor / vibro tamper should be used.
- V. Weak pockets shall be checked and must be replaced with compacted granular fill. (IRC:SP:116-2018)
- VI. The density of formation shall be checked.
- VII. The density of compacted ground shall be more than 95% modified Proctor density.
- VIII. The levels shall be checked for confirmation before placement of the gabion / mattress.

(B) Check List for Installation of Gabion

- I. Assembly of Gabion units

- All the Gabion units received at site shall be collapsed and packed in bundles.
- Check for damage to the DT wire mesh of gabion / mattress after opening.
- The unit shall be stretched for removal of fold / bend after opening as per manufacturer procedure.
- The edge wire shall be straightened with wooden mallet.
- The right angle bend shall be formed at all four corners during preparation of the box.
- All vertical panels of the gabion / mattress shall be at one level before the start of lacing.
- All the corners shall be formed by single loop double loop lacing pattern or rings.
- All diaphragms shall be at correct position.
- The dimensions of the units shall be checked.

II. Placement of Gabion units

- Gabion / mattress units shall be placed as per the required alignment of facia
- All adjacent gabion / mattress units shall be connected to each other by the lacing procedure.

III. Placement of rock in Gabion box

- Size and quality of the rocks shall be as per the specifications mentioned in the drawing.
- Temporary formwork shall be used for gabion.
- Check damage of gabion / mattress while placing the rock fill.
- Rockfill in Gabion / mattress shall be filled in layers not exceeding 300 mm.
- Porosity of gabions shall be in between 30% to 40%.
- The internal cross-ties / tie wires shall be provided after every 300 mm of rock fill.
- The lid of the unit shall be matched as per the required alignment of facia.
- Levels shall be taken at every 10m along of wall length.

WORKMANSHIP:

Workmanship of the work under this item of work shall be as describe in general tech. specification for excavation.

MODE OF MEASUREMENT AND PAYMENT:

Payment shall be made on per Square meter basis. The measurement shall be taken as specified in general technical specification for Gabion work.

Signature of Contractor

Deputy Executive Engineer
Panchayat Irrigation Sub Division
Jasdan

Executive Engineer
Panchayat Irrigation Division
Rajkot

ITEM NO.11 : Providing and laying 15cm thick STONE SOLING below apron using stone weighing not less than 20 Kg or as specified as per design and drawing incl hand packing etc complete with all lead and lift..

This Item includes providing and laying rubble for soling base to concrete provided on causeway top as per drawing or as specified by engineer in charge.

The material required for this work like rubble shall be of good quality as specified in general specification. The weight of stone shall not be less than as specified. Voids shall be packed by small stone or boulders and hammered by hand to fix tightly in voids.

Before starting the work, the base ground or earth work shall be well dressed and in proper gradient.

All material equipment and labor required for providing and laying rubble talus shall be supplied by the contractor. The stones shall be laid carefully true to line and grades as directed by Engineer-in-Charge. The voids between stones shall be filled by small stones and packed firmly. The top of talus shall be well in proper gradient.

The measurement of work shall be in cubic meter basis of work actually done. The rate shall be includes cost of materials and labors for completed item. The rate shall be paid for cubic meter basis of completed item.

ITEM NO.12 : Providing JCB JCB-80-EXCAVATION MACHINE as Directed by Engineer in charge...

This Item includes providing JCB machine including fuel, consumables, operator for necessary preparing the temporary road, dressing and other works as directed by engineer in charge.

The measurement of work shall be in Hourly basis of work actually done. The rate shall be includes cost of providing JCB at site, fuel cost, consumables, operator etc completed item. The rate shall be paid for Hourly basis of completed item.

Signature of Contractor

**Deputy Executive Engineer
Irrigation Panchayat Sub Division
Jasdan**

**Executive Engineer
Irrigation Panchayat Division
Rajkot**