

STANDARD BIDDING DOCUMENT PROCUREMENT OF CIVIL WORKS

**Installation of various instruments at
Lakhanka and Hamirpara Irrigation Scheme**

ESTIMATED COST RS. 7,06,384.40/-



**GOVERNMENT OF GUJARAT
Water Resources Department**

**OFFICE OF THE
EXECUTIVE ENGINEER
BHAVNAGAR IRRIGATION DIVISION
BHAVNAGAR**

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**INVITATION FOR BID
(IFB)**

NATIONAL COMPETITIVE BIDDING

1. The **Executive Engineer, Bhavnagar irrigation Division, Bhavnagar** 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

Pack age No.	Name of work	Approximate value of works (Rs.)	Bid security (Rs.)	Cost of document	Period of completion	#Class of Registration/ Category of contractor if required
1	Installation of various instruments at Lakhanka and Hamirpara Irrigation Scheme	7,06,384.40/-	8000/-	900/-	6 months	'E2' or Above

2. Prospective / Interested bidder may download the Bid Documents from website <https://www.tender.nprocure.com> free of cost till the Time and Date as mentioned on online NIT at website <https://www.tender.nprocure.com>.
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 **Bhavnagar** and in favour of **Executive Engineer, Bhavnagar irrigation Division, Bhavnagar**. 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, Bhavnagar Irrigation Division, Bhavnagar**' 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 & Dt.21/05/2022.**
4. Bids received online, will be opened on the time, date and place as specified in the online NIT at website <https://www.tender.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 onathrs. 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 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.

8. For the works costing up to Rs. 7.5 crore (WRD Works), Rs. 7.0 crore (ROAD/ BRIDGE/ BUILDING WORKS), Rs. 0.5 Crore (Electrical Works) kindly refer to GoG NWRWS & K Department's Circular No. Paracha/1097/1397(11)/pa.fa./ MI-CELL(k-1) Dated 18/01/2018 and 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. 0.5 crore for Electrical work following documents shall be submitted in electronic format through online by scanning and (i) Bid Document Fee / Tender Fee (ii) Bid Security / EMD should be sent in original to the Tender opening authority through RPAD, so as to reach the Deputy Executive Engineer, Irrigation Sub Division, Bhavnagar 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 Class E-2 or Above.
- (iv) GST Number

- (v) Bidder agency should be ISO 27001:2015 Certified company. And Bidder has to submit the OEM Authorization letter establishing it's status as an authorised system integrator/Channel Partner. The OEM shall confirm its commitment to provide necessary technical and operational support to the bidder during the execution of the project.
- (vi) Undertaking on statement of compliance of clause 3.2.
- (vii) Undertaking for Engaging Technical Staff & Machineries.

Signature of Contractor

**Deputy Executive Engineer
Irrigation Sub division
Bhavnagar**

**Executive Engineer
Bhavnagar Irrigation Division
Bhavnagar**

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 **Executive Engineer, Bhavnagar irrigation Division, Bhavnagar** invites bids for the **Installation of various instruments at Lakhanka and Hamirpara Irrigation Scheme** detailed 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 service provider or any other entity that has prepared the design, specifications, and other documents for the Project or being proposed as Project Manager for the Contract. A firm that has been engaged by the Employer to provide services for the installation and completion 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	20__-20__	1.00
-1	20__-20__	1.10
-2	20__-20__	1.21
-3	20__-20__	1.33
-4	20__-20__	1.46
-5	20__-20__	1.61

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

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

4.5.3. General Experience

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

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

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

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

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

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

- (c) ~~Contractor should have completed 60% of quantity of principal items of work like concrete, earthwork, pipeline, pumping station etc. within last five financial years. Certificate of competent authority of work done with detail shall be produced. (as per GOG GR NWRWSKD/efile/13/2023/13648/section K7 DT-16/03/2023)~~

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 as per appendix.~~

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

4.5.8. Litigation History

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

4.5.9. Disqualification

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

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

- ~~4.5.10. The bidder who have applied for corporate Debt Restructuring (CDR) / facing recovery proceedings from financial institutions / facing winding up processing /~~

~~those under BIFR in the last 5 financial year shall be considered for bid qualification. However if the bank / financial institution has accepted the proposal of debt restructuring on or before the last date of online submission, the same shall be considered for further evaluation. An affidavit by bidder along with certificate from bank must be produced in such cases. In case of Joint Venture agreement, this provision shall be applicable for both lead partner and JV partner.~~

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

4.6.1. Joint ventures must comply with the following requirement:

(a) Following are the minimum qualification requirements:

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

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

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

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

4.7. — Bid Capacity.

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

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

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

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

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

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

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

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

5. One bid per bidder

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

6. Cost of Bidding

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

7. Site Visit

7.1. The Bidder, at the Bidder's own responsibility and risk is encouraged to visit and examine the Site of work and its surrounding and obtain all information that may be necessary for preparing the Bid and entering into a contract for construction of the Works.

The costs of visiting the site shall be at the Bidder's own expense.

Signature of Contractor

**Deputy Executive Engineer
Irrigation Sub division
Bhavnagar**

**Executive Engineer
Bhavnagar Irrigation Division
Bhavnagar**

B. BIDDING DOCUMENTS

8. Content of Bidding Documents

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

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

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

9. Clarification of 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.tender.nprocure.com. Any modification of the bidding documents listed in sub-Clause 8.1 which may become necessary as a result of the pre-bid meeting shall be made by the Employer exclusively through the issue of an Addendum pursuant to Clause 10 and not through the minutes of the pre-bid meeting.~~

~~9.2.5. Non-attendance at the pre-bid meeting will not be a cause for disqualification of a bidder.~~

10. Amendment of Bidding Documents

10.1 Before the deadline for submission of bids, the Employer may modify the bidding documents by issuing addenda.

10.2. Any addendum thus issued shall be part of the bidding documents. The Employer will assume no responsibility for the same.

10.3. To give prospective bidders reasonable time in which to take an addendum into account in preparing their bids, the Employer may, at his discretion, extend as necessary the deadline for submission of bids, in accordance with Sub-Clause 20.2 below.

Signature of Contractor

**Deputy Executive Engineer
Irrigation Sub division
Bhavnagar**

**Executive Engineer
Bhavnagar Irrigation Division
Bhavnagar**

A. 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 cause shall be included in the rates, prices and total Bid Price submitted by the Bidder. (GST will be paid extra)

13.4 Deleted

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

14. Currencies of Bid and Payment

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

15. Bid Validity

- 15.1 Bids shall remain valid for a period of not less than 120 days after the deadline date for bid submission specified in Clause 20.
- 15.2 In exceptional circumstances, prior to expiry of the original time limit, the Employer may request that the bidders may extend the period of validity for a specified period. A bidder may refuse the request without forfeiting his bid security. A bidder agreeing to the request will not be required or permitted to modify his bid, but will be required to extend the validity of his security for a period of the extension, and in compliance with Clause 16 in all respects.

16. Bid Security

- 16.1. The Bidder shall furnish, as part of his Bid, a Bid security in the amount as shown in column 4 of the table of IFB for this particular work. This Bid security shall be in favor of Employer as named in Appendix and may be in one of the following forms;
- a. Bank Guarantee from any scheduled Indian bank, in the format given in Volume III. **(Bank Guarantee is applicable only for Bid Estimated Amount of 01 Crore and above) and Bank** Guarantee of Schedule and Private Banks shall be considered as per GoG Finance Department's Circular No. FD/MSM/e-file/4/2025/2712/D.M.O. Date 01/04/2026 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
- (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.

Signature of Contractor

**Deputy Executive Engineer
Irrigation Sub division
Bhavnagar**

**Executive Engineer
Bhavnagar Irrigation Division
Bhavnagar**

B. SUBMISSION OF BIDS

19. Deleted

20. Deadline for Submission of the Bids

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

Signature of Contractor

**Deputy Executive Engineer
Irrigation Sub division
Bhavnagar**

**Executive Engineer
Bhavnagar Irrigation Division
Bhavnagar**

C. 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

Signature of Contractor

**Deputy Executive Engineer
Irrigation Sub division
Bhavnagar**

**Executive Engineer
Bhavnagar Irrigation Division
Bhavnagar**

D.AWARD OF CONTRACT

31. Award Criteria

- 31.1. Subject to Clause 32, the Employer will award the contract to the Bidder whose Bid has been determined.
- (i) to be substantially responsive to the Bidding documents and who has offered the lowest evaluated Bid Price; and
 - (ii) to be within the available bid capacity adjusted to account for his bid price which is the lowest evaluation in any of the packages opened earlier than the one consideration.
- In no case, the contract shall be awarded to any bidder whose available bid capacity is less than the evaluated bid price, even if the said bid is the lowest evaluated bid. The contract will in such cases be awarded to the next lowest bidder at his evaluation bid price.

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

- 32.1. Notwithstanding Clause 31, the Employer reserves the right to accept or reject any Bid, and to cancel the Bidding process and reject all Bids, at any time prior to the award of contract, without thereby incurring any liability to the affected bidder or Bidder or any obligation to inform the affected Bidder or Bidders of the grounds for the Employer's action.

33. Notification of Award and Signing of Agreement

- 33.1. The Bidder whose Bid has been accepted will be notified of the award by the Employer prior to expiration of the Bid validity period by cable, telex or facsimile confirmed by registered letter. This letter (hereinafter and in the condition of contract called the "Letter of Acceptance") will state the sum that the Employer will pay the Contractor in consideration of the execution, completion, and maintenance of the Works by the Contractor as prescribed by the Contract (hereinafter and in the Contract called the "Contract Price").
- 33.2 The notification of award will constitute the formation of the contract, subject only to the furnishing of a performance security in accordance with the provisions of Clause.
- 33.3. The Agreement will incorporate all agreements between the Employer and the successful Bidder. It will be signed by the Employer and to the successful Bidder, within 28 days following the notification of award along with the Letter of Acceptance. Within 21 days of receipt, the successful Bidder will sign the Agreement and deliver it to the Employer.
- 33.4. Upon the furnishing by the successful Bidder of the Performance Security, the Employer will promptly notify the other Bidders that their Bids have been unsuccessful.

34. Performance Security

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

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

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/4/2025/2712/D.M.O. Date 01/04/2026 or as per their latest amendment. (As per GOG GR TNC/102022/458/C dt-04/05/2026)
- 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 of Fraudulent Practices

- 37.1 The Employer will reject a proposal if it determines that the Bidder recommended for award has engaged in corrupt or fraudulent practices in completing for the contract in question and will declare the firm ineligible, either indefinitely or for a stated period of time, to be awarded a contract with National Highways Authority of India/ State PWD and any other agencies, if it at any time determines that the firm has engaged in corrupt or fraudulent practices in completing for the contractor, or in execution.
- 37.2 Furthermore, Bidders shall be aware of the provision stated in Sub- Clause 59.2 of the Conditions of Contract.

Signature of Contractor

Deputy Executive Engineer
Irrigation Sub division
Bhavnagar

Executive Engineer
Bhavnagar Irrigation Division
Bhavnagar

APPENDIX TO ITB

Clause Reference

With respect to

Section -I

1. The Name of the Employer is **Executive Engineer, Bhavnagar irrigation Division, Bhavnagar** [Cl.1.1]
2. ~~The last five financial years.~~
~~2024—2025~~
~~2023—2024~~
~~2022—2023~~
~~2021—2022~~
~~2020—2021~~
3. ~~This Annual Financial Turnover Amount is Rs.~~ [Cl.4.5.3 (a)]
4. **Value of Work is Rs. 7,06,384.40/-**
5. Deleted
6. ~~The cost of electric work is Rs. 0~~
7. ~~The cost of water supply / sanitary works is Rs. 0~~
8. ~~Liquid assets and / or availability of credit facilities is Rs.~~ [Cl.4.5.6]
9. ~~Price level of the financial year~~ [Cl. 4.5.2]
10. ~~The pre bid meeting will take place at~~ [Cl. 9.2.1]
11. **The Technical Bid will be opened at the office of Executive Engineer, Bhavnagar irrigation Division, Bhavnagar.**
12. **Address of the Employer: Office of the Executive Engineer, Panwadi, Bhavnagar.**
13. Deleted
14. The bid should be submitted latest by [Cl. 20.1 & 20.2]
As stated on online NIT
15. **The bid will be opened at Executive Engineer, Bhavnagar irrigation Division, Bhavnagar** [Cl. 23.1]
As stated on online NIT
16. The Bank Draft in favor of Executive Engineer, Bhavnagar irrigation Division, Bhavnagar
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	20__-20__	1.00
-1	20__-20__	1.10
-2	20__-20__	1.21
-3	20__-20__	1.33
-4	20__-20__	1.46
-5	20__-20__	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 or 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. Two graduate Civil Engineers and three diploma Civil Engineers when cost of the work to be executed is more than Rs.50 lakhs.~~
- ~~2. One graduate & two Diploma, Civil Engineers when the cost of the work to be executed is more than Rs.15 lakhs but less than Rs.50 lakhs.~~
- 3. Minimum Two Diploma Civil Engineer when the cost of work is less than Rs.15 lakhs but more than Rs.5 lakhs.**
- ~~4. Minimum One Diploma Civil Engineers for the work when the cost of work to be executed is less than Rs. 5 lakhs. The Engineer so employed for the Government work must have sufficient experience to handle the work independently. Such an Engineer shall have to stay at the site of work and he shall not be entrusted with other duty except this work.~~

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

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

Signature of Contractor

**Deputy Executive Engineer
Irrigation Sub division
Bhavnagar**

**Executive Engineer
Bhavnagar Irrigation Division
Bhavnagar**

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 20 20
Work performed in the last five years 20 20
(in Rs. Lakhs) 20 20
20 20
20 20

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) ITEM 1	Masonry ITEM 2	Earth Works ITEM 3	Bituminous Work ITEM 4	
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
Project Manager				
Etc.				

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 Clause 4.1)~~

- ~~1.14 Programme~~

2. Deleted

3. Additional Requirements

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

~~(i) Affidavit~~

~~(ii) Undertaking~~

~~*_____ Fill the name of Consultant~~

Signature of Contractor

Deputy Executive Engineer
Irrigation Sub division
Bhavnagar

Executive Engineer
Bhavnagar Irrigation Division
Bhavnagar

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

(Signed by an Authorized Officer of the Firm)

Title of Officer

Name of Firm

Date

UNDERTAKING

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

(Signed by an Authorized officer of the firm)

Title of officer

Name of firm

DATE

SECTION - 3

CONDITIONS OF CONTRACT

Conditions of Contract

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CONDITIONS OF CONTRACT

A. GENERAL.

1. Definitions

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

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

Compensation Events are those defined in Clause 44 hereunder

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

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

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

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

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

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

Days are calendar days; **months** are calendar months.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

2. **Interpretation**

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

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

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

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

Bid

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

3. **Language and Law**

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

4. **Engineers Decisions**

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

5. **Delegation**

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

6. **Communications**

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

~~7. **Sub-Contracting**~~

- ~~7.1 The Contractor may subcontract any portion of work, up to a limit specified in contract data, with the approval of the engineer but may not assign the Contract without the approval of the Employer in writing. Subcontracting shall not alter the Contractor's obligations. **Sub-contracting of supply or specific items of work is not allowed.**~~

- ~~7.2 The sub-contractor must be registered in appropriate class and category for the part of work to be subcontracted.~~

8. **Other Contractors**

- 8.1 The Contractor shall cooperate and share the Site with other contractors, public authorities, utilities and the Employer between the dates given in the Schedule of other Contractor. The Contractors shall as refer to in the Contract Data, also provide facilities and services for them as described in the Schedule. The employer may modify the schedule of other contractors and shall notify the contractor of any such modifications.

9. Personnel

9.1 The Contractor shall employ the key personnel named in the Schedule of Key Personnel as referred to in the Contract Data to carry out the functions stated in the Schedule or other personnel approved by the Engineer. The Engineer will approve any proposed replacement of key personnel only if their qualifications, abilities, and relevant experience are substantially equal to or better than those of the personnel listed in the Schedule.

9.2 If the engineer asks the Contractor to remove a person who is a member of the Contractor Staff or his work force stating the reasons the Contractor shall ensure that the person leaves the Site within seven days and has no further connection with the work in the Contract.

10. Employer's and Contractors Risks

10.1 The Employer carries the risk which these Contract states are Employer's risks, and the Contractor carries the risks which these Contracts states are 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 a part is not given by the date stated in the Contract Data the Employer is deemed to have delayed the start of the relevant activities and this will be a Compensation Event.
- 21.2 If within 25% of the time limit of the project, 80% of possession of the site is not handed over to the Contractor, then contractor/ Employer may fore-close the contract. Contractor/Employer has to foreclose the work within 30 days after lapse of 25%-time limit and after 30 days foreclosure option will be closed.

22. Access to the Site

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

23. Instructions

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

24. Disputes

- 24.1 If the Contractor is of the view that a decision taken by the Engineer was either outside the authority given to the Engineer by the Contract or that the decision was wrongly taken, the decision shall be referred to **Superintending Engineer, Bhavnagar Irrigation Project Circle, Bhavnagar** 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, Bhavnagar Irrigation Project Circle, Bhavnagar**
- 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, Bhavnagar Irrigation Project Circle, Bhavnagar** both the parties have to refer to the **Chief Engineer (Saurashtra) & Additional Secretary N.W.R.W.S. & Kalpsar Department, Gandhinagar** concern for the conciliation process.
- (b) For the work more than Rs.100 Cr., if any of the parties is not satisfied with the decision of the **Superintending Engineer, Bhavnagar Irrigation Project Circle, Bhavnagar** 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

Signature of Contractor

**Deputy Executive Engineer
Irrigation Sub division
Bhavnagar**

**Executive Engineer
Bhavnagar Irrigation Division
Bhavnagar**

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.

Signature of Contractor

**Deputy Executive Engineer
Irrigation Sub division
Bhavnagar**

**Executive Engineer
Bhavnagar Irrigation Division
Bhavnagar**

C. QUALITY CONTROL

33. Identifying Defects/ Defect liability period

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

A. ~~For works of WRD Except Building~~

- ~~(a) (1) For all works costing up to Rs. 50,000 (amount put to tender), the period shall be 3 Months from the certified date of completion.~~
- ~~(b) (1) For WRD works likes Check Dam/ Canal / Drainage / Road Structure tender amount from RS. 50,000 to 10,00,000, the defect liability period shall be 12 months from the certified date of completion.~~
(2) For WRD work except likes Check Dam/ Canal / Drainage / Road Structure tender amount from RS. 50,000 to 10,00,000, the defect liability period shall be 6 months from the certified date of completion.
- ~~(c) (1) For WRD works likes Check Dam/ Canal / Drainage / Road Structure tender amount more than RS. 10,00,000, the defect liability period shall be 3 Years from the certified date of completion.~~
~~(2) For WRD work except likes Check Dam/ Canal / Drainage / Road Structure tender amount from RS. 10,00,000 to 1 Crore, the defect liability period shall be 12 months from the certified date of completion.~~
- ~~(d) (1) For all WRD works of tender amount more than RS. 1 Crore, the defect liability period shall be 3 Years from the certified date of completion~~

B. ~~For Building works of WRD:-~~

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

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

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

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

33.2 ~~For Road works:-~~

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

- ~~(a) For resurfacing work of road free maintenance guarantee period one year from the date of completion.~~
- ~~(b) In case of widening of the road/strengthening of the road/bridge, the contractor shall have to give four years free maintenance guarantee from the certified date of completion. During this period the contractor shall visit the site every six months along with the concerned Section Officer / Deputy Executive Engineer and will examine the work already carried out in this contract like road work, jungle cutting, side shoulders, side gutter, road furniture, patta etc. and will prepare Km. wise inspection report duly~~

~~signed by all concerned and any defect observed shall be done within 15 days by the contractor at his risk and cost as per the direction of Engineer in charge. The contractor needs to do videography of these visits and require to submit at the time of release of FMG. If B.T. the surface during the maintenance period of 4 years is worn out then agency shall have to provide renewal coating as per tender item as directed by the Engineer in charge. The amount equivalent to 5% of each running bill shall be withheld and will be released after the free maintenance guarantee period (i.e. 4 years) is over.~~

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

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

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

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

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

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

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

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

~~(6) Maintenance during Construction Period~~

~~During the Construction Period, the Contractor shall maintain, at his own risk and cost, the existing lane(s) of the road so that the traffic worthiness~~

~~and safety thereof are at no time materially inferior as compared to their condition 10 (ten) days prior to the date of the Agreement, and shall undertake the necessary repair and maintenance works for this purpose; provided that the Contractor may, at his cost, interrupt and divert the flow of traffic if such interruption and diversion is necessary for the efficient progress of works and conforms to Good Industry Practice; provided further that such interruption and diversion shall be undertaken by the Contractor only with the prior written approval of the Executive Engineer which approval shall not be unreasonably withheld. For the avoidance of doubt, it is agreed that the Contractor shall at all times be responsible for ensuring safe operation of the road.~~

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

34. Tests

- 34.1 If the engineer instructs the Contractor to carry out a test not specified in the Specification to check whether any work has a Defect and the test shows that it does, the Contractor shall pay for the test and any samples. If there is no defect the test shall be a Compensation Event.

- 34.2 #1% of the amount of work done for works upto Rs. 10 crore of estimate cost should be deducted from R.A. Bill of the contractor for testing the quality of material workmanship. Whereas for estimated cost of works more than 10 crore, the charges for testing of quality of material workmanship shall be deducted from R.A. bill of contractor as per actual charges. ~~As Per GoG NWRWS & K Department's Circular No. PARCH/132023/401/MICELL Dated:05/10/2023~~ (GOG GR NWRWSKD/GCA/EFILE/13/2023/13648/SECTIONK7 DT13/03/2024

- ~~34.3 Agency has to establish testing laboratory on site for the various test to be carried out in the work for this purpose agency shall construct a pukka laboratory building with all facility on site at location specified by the engineer in charge.~~

35. Correction of defects

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

36. Uncorrected Defects

- 36.1 If the Contractor has not corrected a defect within the time specified in the Engineer's notice, the Engineer will assess the cost of having the Defect corrected, and the Contractor will pay this amount.

D. COST CONTROL

37. Bill of Quantities

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

38. Change in the Quantities

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

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

39. Variations

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

40. Payments for Variations

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

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

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

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

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

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

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

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

41. Cash Flow Forecasts

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

42. Payment certificates.

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

43. Payments

- 43.1 Payments shall be adjusted for deductions for advance payments, retention, other recoveries in terms of the contract and taxes at source, as applicable under the law. The Employer shall pay the Contractor the amounts certified by the Engineer within 28 days of the date of each certificate.
- 43.2 Payment of GST (prevailing rates) on the amount payable under the contract to the Contractor will be made by the Employer. Hence, it is the responsibility of the contractor to pay the GST to the concerned Authority.
- 43.3 Items of the works for which no rate or price has been entered in will not be paid by the Employer and shall be deemed covered by other rates and prices in the Contract.

44. Compensation events

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

45. Tax

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

46. Currencies.

- 46.1 All payment shall be made in Indian Rupees.

47. ~~Price Adjustment~~

- ~~47.1 Contract price shall be adjusted for increase or decrease in rates and price of labour, materials, fuels and lubricants in accordance with the following principles and procedures and as per formula given in the contract data:~~

~~(a) The price adjustment shall apply for the work done from the start date given in the contract data up to end of the initial intended completion date or extensions granted by the Engineer and shall not apply to the work carried out beyond the stipulated time for reasons attributable to the contractor.~~

~~(b) The price adjustment shall be determined during each month from the formula given in the contract data.~~

~~(c) Following expressions and meanings during to the work done during each month~~

~~R = Total value of work done during the month. It would include the amount of secured advance granted, if any, during the month less the amount of secured advance recovered, if any during the month. It will exclude value for works executed under variations for which price adjustment will be worked separately based on the terms mutually agreed.~~

- ~~47.2 To the extent that full compensation for any rise or fall in costs to the contractor is not covered by the provisions of this or other clause in the contract, the unit rates and prices included in the contract shall be deemed to include amounts to cover the contingency of such other rise or fall in costs.~~

48. Retention

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

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

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

49. Liquidated Damages

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

The employer may, without prejudice to any other method of recovery deduct the amount of such damages from any monies due or to become due to the contractor. The payment or deduction of such damages shall not relieve

the contractor from his obligation to complete the works on from any other of his obligations and liabilities under the contract.

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

50 Bonus

- ~~50.1 If the contractor achieves completion of the whole of the works prior to the intended Completion Date prescribed in Contract Data the Employer shall pay to the contractor a sum stated in Contract Data as bonus for every completed month but subjected to maximum amount as stated in Contract Data; which shall elapse between the date of completion of all items of works as stipulated in the contract, including variations ordered by the Engineer and the time prescribed in Clause 17.~~
- ~~50.2 Bonus shall be paid only to works amounting to above INR 5 crore with time limit of the works is equal or more than 6 months. The bonus would be paid as under~~

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

51. Advance Payment.

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

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

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

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

51.4 Deleted

52. Securities

52.1 The performance Security (including additional security for unbalanced bids) shall be provided to the Employer no later than the date specified in the Letter of Acceptance and shall be issued in an amount and form and by a bank or surety acceptable to the Employer, and denominated in Indian Rupees. The performance Security shall be valid until a date 60 days from the date of expiry of Defects Liability Period and the additional security for unbalanced bids shall be valid until a date 28 days from the date of issue of the certificate of completion.

Performance and Additional Performance Security shall become refundable/releasable within 15 days after project certified completion date subject to fulfillment of contractual obligation and settlement of all dues and claims. (GOG GR RBD/1176/04/2026 DT-04/05/2026)

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.

Signature of Contractor

**Deputy Executive Engineer
Irrigation Sub division
Bhavnagar**

**Executive Engineer
Bhavnagar Irrigation Division
Bhavnagar**

E. FINISHING THE CONTRACT

55. Completion

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

56. Taking Over

- 56.1 The Employer shall take over the Site and the Works within seven days of the Engineer issuing a certificate of Completion.

57. Final Account

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

58. Operating and Maintenance Manuals

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

59. Termination

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

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

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

For the purpose of this paragraph: "corrupt practice" means the offering, giving, receiving or soliciting of anything of value to influence the action of a public official in the procurement process or in contract execution. "Fraudulent practice" means a misrepresentation of facts in order to influence a procurement process or the execution of a contract to the detriment of the borrower, and includes collusive practice among Bidders (prior to or after bid submission) designed to establish bid prices at artificial non-competitive levels and to deprive the Borrower of the benefits of free and open competition.

59.3 When either party to the Contract gives notice of a breach of contract to the Engineer for a cause other than those listed under Sub Clause 59.2 above, the Engineer shall decide whether the breach is fundamental or not.

59.4 Notwithstanding the above, the employer may terminate the Contract for convenience.

60. Payment upon Termination

60.1 If the Contract is terminated because of a fundamental breach of Contract by the Contractor, the Engineer shall issue a Certificate for the value of the work done less advance payments received up to the date of the issue of the

certificate, less other recoveries due in terms of the contract, less taxes due to deducted at source as per applicable law and less the percentage to apply to the work not completed as indicated in the Contract data. Additional Liquidated Damages shall not apply. If the total amount due to the Employer exceeds any payment due to the Contractor the difference shall be a debt payable to the Employer.

- 60.2 If the Contract is terminated at the Employer's convenience or because of a fundamental breach of Contract by the Employer, the Engineer shall issue a certificate for the value of the work done, the cost of balance material brought by the contractor and available at site, the reasonable cost of removal of equipment, repatriation of the Contractor's personnel employed solely on the works, and the Contractor's cost of protecting and securing the Works and less advance payment received up to the date of the certificate, less other recoveries due in terms of the contract and less taxes due to deducted at source as per applicable law.

61. Property

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

62. Release from Performance

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

Signature of Contractor

**Deputy Executive Engineer
Irrigation Sub division
Bhavnagar**

**Executive Engineer
Bhavnagar Irrigation Division
Bhavnagar**

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 & Conditionsof service) Act 1979:-**The Act is applicable to an establishment which employs 5 or more inter-state migrant workmen through an intermediary (who has recruited workmen in one state for employment in the establishment situated in another state).The inter-state migrant workmen, is an establishment to which this Act becomes applicable, are required to be provided certain facilities such as housing, medical aid, traveling expenses from home upto the establishment and back, etc.
- O) **The Building and Other Construction workers (Regulation of employmentand Conditions of Service) Act 1996 and the Cess Act of 1996:-**
All the establishments who carry on any building or other constructions work and employ 10 or more workers are covered under this Act.
All such establishments are required to pay cess at the rate not exceeding 2% of the cost of construction as may be modified by the government. The Employer of the establishment is required to provide safety measures at the Building or construction work and other welfare measures, such as canteens, First Aid facilities, Ambulance, Housing accommodations for workers near the workplace etc. The Employer to whom the Act applies has to obtain a registration certificate from the Registering Officers appointed by the Government.

P) **Factories Act 1948** :-The Act lays down the procedure for approval of plans before setting up a factory, health and safety provisions, welfare provisions, working hours, annual earned leave and rendering information regarding accidents or dangerous occurrences to designated authorities. It is applicable to premises employing 10 persons or more with aid of power or 20 or more persons without the aid of power engaged in the manufacturing process.

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

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

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

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

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

The procedure for arbitration will be as follows: -

24.1 If the Contractor is of the view that a decision taken by the Engineer was either outside the authority given to the Engineer by the Contract or that the decision was wrongly taken, the decision shall be referred to **Superintending Engineer, Bhavnagar Irrigation Project Circle, Bhavnagar** 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, Bhavnagar Irrigation Project Circle, Bhavnagar**.

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, Bhavnagar Irrigation Project Circle, Bhavnagar** both the parties have to refer to the **Chief Engineer (Saurashtra) & Additional Secretary N.W.R.W.S.& Kalpsar Department, Gandhinagar** 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.

Signature of Contractor

Deputy Executive Engineer
Irrigation Sub division
Bhavnagar

Executive Engineer
Bhavnagar Irrigation Division
Bhavnagar

SECTION - 4
CONTRACT DATA

CONTRACT DATA

Item marked "N/A" do not apply to this Contract.

Clause Reference With
respect To section 3

1. The Employers is [CL.1.1]
Name: Executive Engineer
Address: Office of Executive **Engineer, Bhavnagar irrigation Division, Panwadi, Bhavnagar.**
Name of authorized Representative (will be intimated later)
2. The Engineer is Executive Engineer
Name of Authorized Representative: **Executive Engineer, Bhavnagar Irrigation Division, Bhavnagar.**
3. **The Defects Liability Period is 06 (Six) Months from the date of completion.** [CL.1.1&33]
4. The Start Date shall be **1st** days for the date of issue of the Notice to proceed with the work. [CL.1.1]
5. **The Intended Completion Date for the whole of the work is 6 Months after start of work with the following milestones:** [CL.1.1,17&2]

Milestone dates: [CL.2.2&49.1]
Physical works to be completed Period from the start date
Milestone 1 i.e 45 days
Milestone2 i.e. 90 days
Milestone3 i.e. 135 days
Milestone4 i.e. 180 days
6. The Site is located at :- **Hamirpara & Lakhanka Dam site, Talaja and Lakhanka Dam site, Ghogha.** [CL.1.1]
7. The name and identification number of the Contract is: [CL.1.1]
8. The works consist **Installation of various instruments at Lakhanka and Hamirpara Irrigation Scheme** with items as per B.O.Q. The works shall, interalia, include the following, as Specified or as directed: [CL.1.1]

(A)WRD Works

Site clearance; setting – out and layout; carry out required earthwork as suggested by Engineer also to carry out leveling for excavation with required compaction, Carry out body work of checkdam using concrete as per approved mix design curing same with water or membrane all as per item specifications 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.

(B) Road Works :

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

(C) Bridge Works

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

[CL.1.1]

[CL.2.3(9)]

(D) Other Items

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

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

~~As per clause 2-3~~

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

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

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

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

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

16. The minimum insurance cover for [CL13]
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.

17. Site Investigation report [CL.14]

18. The Site Possession dates shall be [CL.21]

19. The period for submission of programme for approval of the engineer shall be 21 days from the issue of Letter of Acceptance. [CL. 27.1]
20. The period between program updates will be days. [CL.27.3]
21. The amount to be withheld for late submission of an updated programme shall be Rs lakhs [CL. 27.3]
22. The following events shall also be Compensation Events [CL. 44]
- Substantially adverse ground conditions encountered during the course of execution of work not provided for in the bidding document.
- (i) Removal of underground utilities detected subsequently
 - (ii) Significant changes in classification of soil requiring additional mobilization by the contractor, e.g. ordinary soil to rock excavation,
 - (iii) Removal of unsuitable material like marsh, debris dumps, etc. not caused by the contractor.

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

23. The currency of the Contract is Indian Rupees

[CL. 46]

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

[CL.47]

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

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

Adjustment for labour component

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

$$V_L = \text{---} 0.85 \times (P_i/100) \times R \times (L_i - L_0)/L_0$$

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

~~L₀ = 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_i = Percentage of labor 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.~~

~~C₀ = 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~~

~~S₀ = 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 Rebar** 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.~~

~~B₀ = 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 15th day of the month under consideration.~~

P_b = Percentage of bitumen component of the work

Adjustment of POL (fuel and lubricant) component

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

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

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

~~F₀ = 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~~

~~P₀ = 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.~~

~~M₀ = The All Indian wholesale price index (all commodities) on 28 days preceding the scheduled date of opening of technical Bids, as published by the **Office of the Economic Adviser, Department for Promotion of Industry and Internal Trade, Ministry of Commerce & Industry.**~~

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

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

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

1. Labour P _l	_____%
2. Cement P _c%
3. Steel P _s	_____%
4. Bitumen P _b	_____%
5. POL P _f	_____%
6. Plant & Machinery Spares P _p	_____%
7. Other Materials P _m	_____%
<hr/>	
Total	100 %
<hr/>	

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~~ ~~5 percent~~ of the Contract {CL. 50} ~~Completion of work~~ ~~Price~~
30. ~~The amount of the advance payment are: {CL. 51 & 52}~~

#Nature of Advances

Amount (Rs.) Conditions to Be fulfilled

- | | | |
|-----|---|--|
| i | Mobilization 10% of the contract unconditional Price | On submission of 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 Deleted Advance for Non-persish able material Brought to site | |

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

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

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

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

32. Deleted

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

As a percentage of the Contract Price:

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

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

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

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

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

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

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

Signature of Contractor

**Deputy Executive Engineer
Irrigation Sub division
Bhavnagar**

**Executive Engineer
Bhavnagar Irrigation Division
Bhavnagar**

SECTION – 5

Technical Specification
(Atteched below)

SECTION - 6
FORM OF BID

FORM OF BID

Description of the Works:

--- BID

To :

Address :

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

()

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

Dated this ----- day of 20

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

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

(in block capitals or typed)

Address

Witness

Address

Occupation

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.

BHAVNAGAR IRRIGATION DIVISION - BHAVNAGAR					
	Name of work	Installation of various instruments at Lakhanka and Hamirpara Irrigation Scheme			
	SCHEDULE - 'B'				
	MEMORANDUM SHOWING ITEMS OF WORK TO BE CARRIED OUT				
It. No.	Qty.	Description of Item.	Estimated Rate	Unit	Amount
			In Figure		
1	2	3	4	6	7
1	14	Item No. - 1 Providing, Supplying, installing, testing, and commissioning of a V-Notch Weir (Mechanical Flow Measuring Device) for measuring low flow seepage in dams. The device shall have a notch angle of 22.5°, 45°, 60°, or 90° depending on discharge range, a stainless steel SS-304 / SS-316 plate with thickness of 3–5 mm, and be suitable for measurement ranges of approximately 0–50 L/s depending on notch angle. The weir shall have ±1% full-scale reading accuracy, operate under 5–100% humidity, temperature –20°C to +60°C, and provide corrosion protection through anti-corrosion finish. Complete in all respects as directed by the Engineer-in-Charge. (1) 90° V-NOTCH-20 X 40 Sesticin 15 Lit/Sec	19250	Nos.	2,69,500.00
2	32	Item No. - 2 Providing, installing and commissioning permanent Ground Control Point (GCP) Settlement Marker comprising MS base plate (250×250×5 mm conforming to IS 2062), GI riser pipe 25 mm dia (medium class as per IS 1239), sand filling (clean river sand, loose), optional PVC/GI outer casing (min 100 mm dia), precast concrete cover (M20, 500×500×50 mm with central hole), MS/GI reference cap, and painting in black & white checkerboard pattern using weather-resistant enamel paint, complete with excavation, installation, alignment, and all materials, labour, tools, and accessories, suitable for survey works using Total Station / drone survey, complete as per specifications and direction of Engineer-in-Charge.	10000	Nos.	3,20,000.00
3	30.582	Item No. 3 Providing & Laying in position 'NOMINAL MIX' cement concrete using cement sand and crushed aggregate by machine mix incl. necessary formworks ,centering ,scaffolding compaction by mechanical vibrator curing as directed with all lead & lift etc. C) Concrete grade 1:2:4 and MSA-40mm(Graded)	3822.00	m3	116884.40
	TOTAL Rs.			7,06,384.40	
	I/We am/are willing to carry out the work at above/below (should be written in figures and words) of				

	the estimated rates mentioned above. Amount of my/our tender works out as under.						
	*Estimated Amount			*Estimated Amount			
	Put to tenderRs.			Put to tenderRs.			
	Deduct. % below Rs.			Add.....% above. Rs.....			
	NetRs.			Total Rs.....			
	In words Rs.			In words.....			
1)	All work shall be carried out as per Public Works Department Hand book and other specifications of Division or as directed.						
2)	All the columns of Schedule should be filled in ink and the total of the entries in the last column should be struck by the contractor under his signature.						
3)	Rates quoted include clearance of site (prior commencement of work and at its close) in all.						

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					

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

Estimated amount put to tender

Estimated amount put to tender

Deduct.....% below

Add.....% Above

Net

Net

In words

In words

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

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

(A) Total Tendered Amount

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

(in words).....

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

(in words).....

1	The Contractor shall exhibit a board with brief details of work as directed by the Engineer-In-Charge for which no extra payment shall be made.	
2	The labourcess 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.	
<div><div>Signature of Contractor</div><div>Deputy Executive Engineer Irrigation Sub division Bhavnagar</div><div>Executive Engineer Bhavnagar Irrigation Divis Bhavnagar</div></div>		

SECTION - 8

SECURITIES AND OTHER FORMS

BID SECURITY (BANK GUARANTEE)

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

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

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

THE CONDITIONS of these obligations are:

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

Or

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

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

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

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

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

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

DATE -----

SIGNATURE-----

WITNESS -----

SEAL -----

(Signature, name and address)

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

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

PERFORMANCE SECURITY

TO,

-

(Name of Employer)

-

(Address of Employer)

WHEREAS ----- (name and address of contractor) (hereafter called "the Contractor") has undertaken, in pursuance of Contract s No. ----- dates ----- to execute ----- (name of Contract and brief description of Works) (hereinafter called "The Contract")

AND WHEREAS it has been stipulated by you in the said Contract that the Contractor shall furnish you with a Bank Guarantee by a recognized bank for the sum specified therein as security for compliance with his obligation in accordance with the Contract.

AND WHEREAS we have agreed to give the Contractors such a bank Guarantee:

NOW THEREFORE we hereby affirm that we are the Guarantor and responsible to you on behalf of the Contractor, up to a total of ----- (amount of guarantee)* (in words), such sum being payable in types and proportions of currencies in which the Contract prices is payable, and we undertake to pay you, upon your first written demand and without cavil or argument, any sum or sums within the limits of ----- (amount of guarantee) as aforesaid without your needing to prove or to show grounds or reasons for your demand for the sum specified therein.

We hereby waive the necessity of your demanding the said debt from the contractor before presenting is with the demand.

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

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

Signature and Seal of the guarantor -----

Name of Bank -----

Address -----

Date -----

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

ADDITIONAL PERFORMANCE SECURITY

[Clause 34.1. (A)]

TO,

-

(Name of Employer)

-

(Address of Employer)

WHEREAS ----- (Name and address of contractor) (hereafter called "The Contractor") has undertaken, in pursuance of Contracts No. ----- dates ----- to execute ----- (Name of Contract and brief description of Works) (hereinafter called "The Contract")

AND WHEREAS it has been stipulated by you in the said Contract that the Contractor shall furnish you with a Bank Guarantee by a recognized bank for the sum specified therein as security for compliance with his obligation in accordance with the Contract.

AND WHEREAS we have agreed to give the Contractors such a bank Guarantee:

NOW THEREFORE we hereby affirm that we are the Guarantor and responsible to you on behalf of the Contractor, up to a total of ----- (amount of guarantee) (in words), such sum being payable in types and proportions of currencies in which the Contract prices is payable, and we undertake to pay you, upon your first written demand and without cavil or argument, any sum or sums within the limits of ----- (amount of guarantee) as aforesaid without your needing to prove or to show grounds or reasons for your demand for the sum specified therein.

We hereby waive the necessity of your demanding the said debt from the contractor before presenting is with the demand

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

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

Signature and Seal of the guarantor -----

Name of Bank -----

Address -----

Date -----

~~BANK GUARANTEE FOR ADVANCE PAYMENT~~

TO,

_____ (Name of Employer)

_____ (Address of Employer)

_____ (Name of Contractor)

Gentlemen:

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

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

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

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

YOUR'S TRULY

Signature and Seal _____
Name of Bank/ Financial Institution _____
Address _____
Date _____

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

Letter of Acceptance

(Letter head paper of the Employer)

_____ (date)
To,
_____(Name and address of the Contractor)

Dear Sirs,

This is to notify you that your Bid dated _____ for execution of the _____ (Name of the contract and identification number, as given in the Instructions to Bidders) for the Contract Price of Rupees _____ (_____) (amount in words and figures) as corrected and modified in accordance with the Instructions to Bidders* is hereby accepted by our agency.

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

Yours Faithfully

Authorized Signature
Name and title of
Signatory Name of
Employer

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

Issue of Notice to proceed with the work

(Letterhead of the Employer)

To, _____(date)

_____(Name and address of the Contractor)

Dear Sir,

Pursuant to your furnishing the requisite security in ITB Clause 34.1 and
signing of the Contract for the construction of _____

at a bid Price of Rs.....

You are hereby instructed to proceed with the execution of the said works in
accordance with the contract documents.

Yours faithfully

(Signature, name and title of signatory authorized
To sign on behalf of Employer)

AGREEMENT FORM

This agreement, made on the _____ day of _____ between _____ (name and address of Employer) (Hereinafter called "the Employer) and _____ (name and address of contractor) hereinafter called "the Contractor" of the other part.

Whereas the Employer is desirous that the Contractor execute

Name and identification number of contract (hereinafter called "the works") and the employer has accepted the Bid by the Contractor for the execution and completion of such works and the remedying of any defects therein, at a cost of Rs. _____

NOW THIS AGREEMENT WITNESSETH AS FOLLOWS

1. In this Agreement, words and expression shall have the same meanings as are respectively assigned to them in the conditions of contract hereinafter referred to and they shall be deemed to form and be read construed as part of this Agreement.
2. In Consideration of the payment to be made by the Employer to the contractor as hereinafter mentioned, the Contractor hereby covenants with the Employer to executive and complete the works and remedy any defects therein in conformity in all aspects with the provisions of the contracts.
3. The employer hereby covenants to pay the Contractor in consideration of the execution and completion of the works and the remedying the defects wherein contract price or such other sum as may become payable under the provisions of the Contract at the times and in the manner prescribed by the contract.
4. The Following documents shall be deemed to form and be ready and construed as part of this Agreement viz
 - i) letter of Acceptance
 - ii) Notice to proceed with the works:
 - iii) Contractor's Bid
 - iv) Conditions of contract: General and Special
 - v) Contract Data
 - vi) Additional conditions

- vii) Drawings
- viii) Bill of Quantities and
- ix) Any other documents listed in the Contract
data as forming part of the Contract.

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

The Common seal of _____
Was hereunto affixed in the presence of :

Signed, sealed and Delivered by the said _____

In the presence of

Binding signature of Employer _____

Binding Signature of Contractor _____

UNDERTAKING
(For Investment)

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

(Signed by an Authorized officer of the firm)

Title of officer

Name of firm

DATE

UNDERTAKING

(For Validity)

I, the undersigned do hereby undertake that our firm M/s
..... agree to abide by this bid for a period 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.

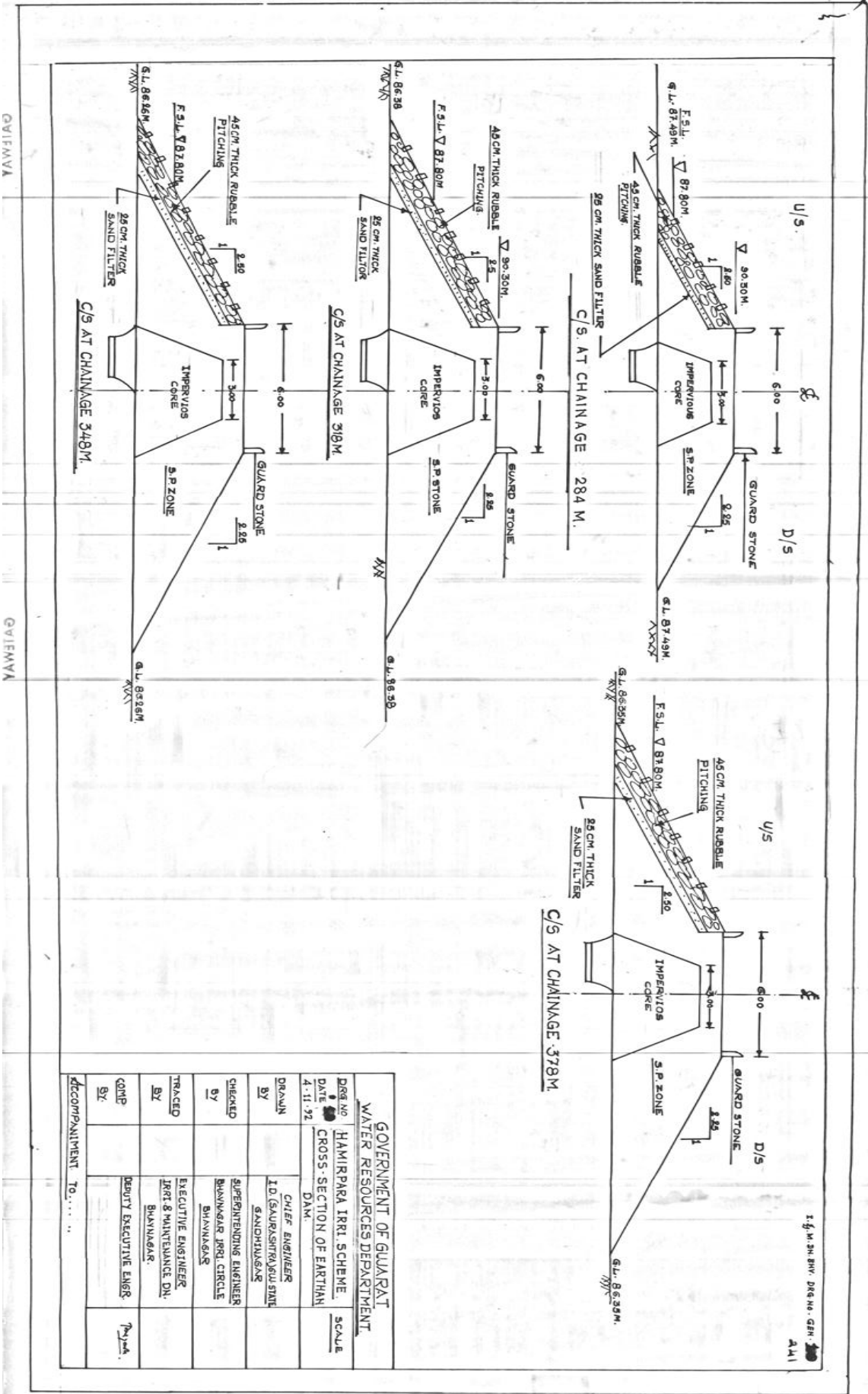
~~(Signed by an Authorized officer of the firm)~~

Title of officer

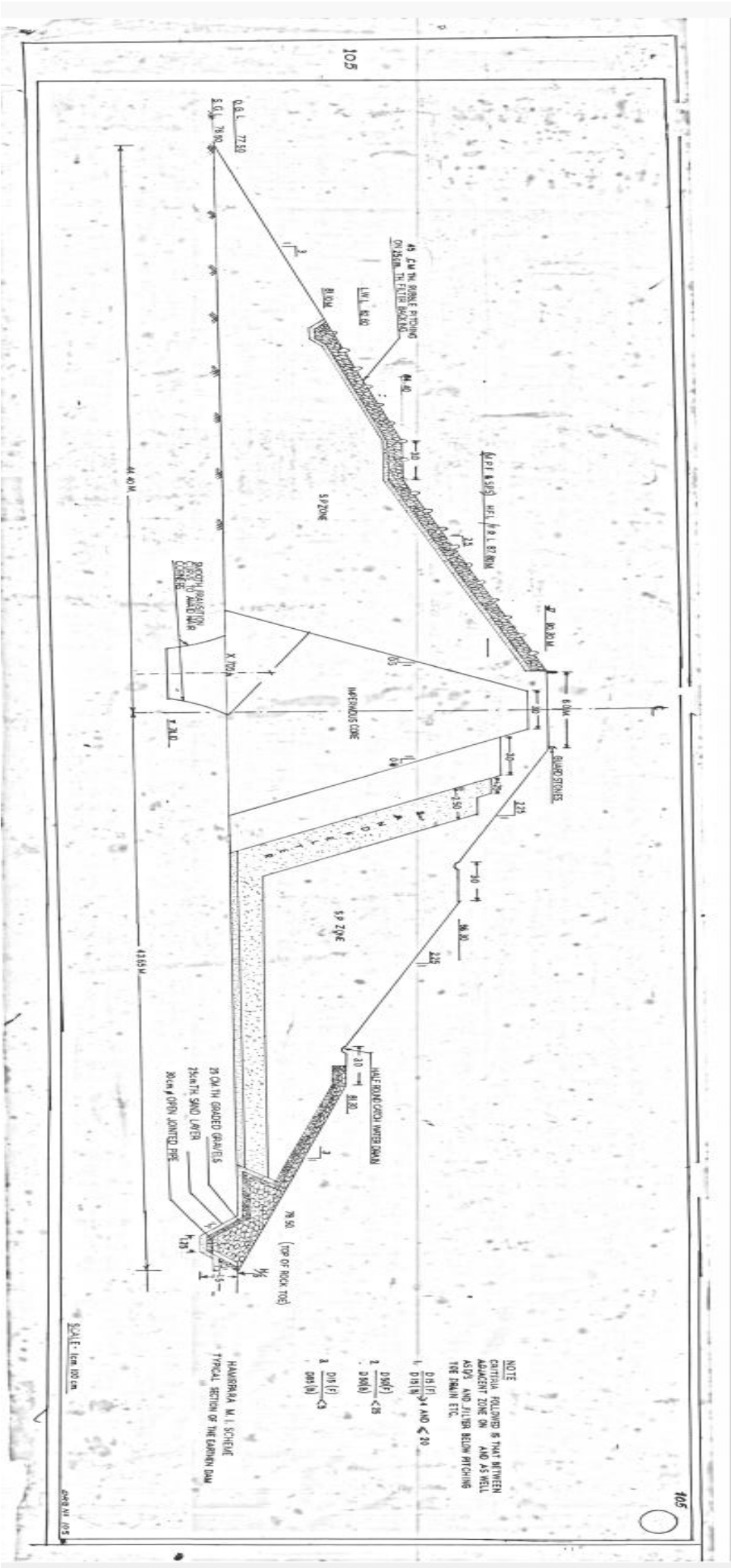
Name of firm

DATE

SECTION - 9
DRAWINGS



Drawing-2



SECTION - 10
DOCUMENTS TO BE FURNISHED BY BIDDER

Scope of Work for Bidder

Procurement, Inspection, Supply and Transport of Instruments

The Bidder shall be responsible, at his own costs, for loading, transporting, shipping and unloading of the equipment to be supplied under the contract from the point of manufacture to the final destination of delivery.

Arrangement for secure storage of the goods at designated location near the project site prior to installation shall be responsibility of the Bidder. The Purchaser may, if available, provide such unsecured accommodation as may be available for the purpose on a specific request from the contractor. Watch & ward of the same has to be arranged by contractor at his expenses.

Delivery of the Goods shall be made by the Contractor in accordance with the terms specified by the Department in the Agreement for the contract work.

Contractor shall be responsible till the entire stores ordered for arrive in good condition at destination and are installed, tested and commissioned.

The Bidder shall ensure that all instruments supplied comply with applicable BIS/IS codes, relevant national standards, and Original Equipment Manufacturer (OEM) certifications.

Each instrument shall be permanently marked with:

Manufacturer's name
Serial number
Operating Range
Accuracy class
Year of manufacture
Location ID (tagged during installation)

Testing and Inspection

It is the bidder's responsibility to ensure that the equipment is sufficiently tested prior to the shipment and installation.

The costs for all tests and for all inspections to be made under the contract shall be borne by the bidder along with boarding & lodging, local travel etc., expenses (both in India and/ or abroad) and shall be deemed to be included in the contract price.

The purchaser or its representative shall have the right to inspect and / or test the Goods to confirm their conformity to the contract specifications at no extra cost to the purchaser. The purchaser shall notify the contractor in writing, in a timely manner, of the identity of any representatives retained for these purposes. TA/DA of the inspection team will be borne by the purchaser.

The inspections and tests may be conducted on the premises of the Contractor or its subcontractor(s), at point of delivery, and / or at the Good's final destination.

If any Goods inspected or tested are found not to conform to the contract specifications, the Purchaser shall have the right to reject such Goods. In such event, the Contractor shall, at its own cost and without any additional expense to the Purchaser, promptly replace the rejected Goods or carry out such modifications or corrective measures as may be necessary to ensure full compliance with the specified requirements.

The purchaser's right to inspect, test and, where necessary, reject the goods after the goods' arrival in the Purchaser's country shall in no way be limited or waived by reason of the Goods having previously been inspected, tested, and passed by the purchaser or its representative prior to the

Goods shipment from the country of origin. Nothing shall in any way release the Contractor from any warranty or other obligations under this contract.

The inspection of the Goods shall be carried out to check whether the Goods are in conformity with the technical specifications attached to the contract agreement. Complete hardware and software as specified in the contract should be supplied, installed and commissioned properly by the contractor prior to commencement of acceptance tests.

Before the goods and equipment are taken over by the Purchaser, the Contractor shall supply operation and maintenance manuals together with drawings of the goods civil works and equipment. These shall be in such detail as will enable the Purchaser to operate, maintain, adjust and repair all parts of the works as stated in the technical specifications.

The manuals and drawings shall be in the ruling language (English). Unless and otherwise agreed, the goods and equipment shall not be considered to be completed for the purpose of taking over until such manuals and drawings have been supplied to the Purchaser.

Installation, Testing and Commissioning

The Bidder shall carry out all civil, mechanical, and electrical works required for installation, including drilling, grouting, cabling, trenching, mounting, and provision of protective measures.

The Bidder shall submit the Test Certificate of Each Instrument mentioned in the Bill of Quantity. As per Requirement of Engineer in charge, The Bidder shall perform the Trial/ Test of Instrument in order to verify the Accuracy, precision, Resolution and other instrumentation Data at Manufacturer Lab. No separate cost for Testing/ Trail of Instrument shall be paid to Bidder.

The bidder shall be responsible for the calibration of all instruments at the time of installation and at regular intervals thereafter, in accordance with the manufacturers (OEM) recommendations and/or as directed by the Engineer-in-Charge. This activity shall form an integral part of the Operation and Maintenance (O&M) scope.

Documentation and Submittals

The Bidder shall submit complete documentation in English for all equipment and software components supplied, including user manuals and operation & manual.

Warranty

The warranty period shall begin immediately after all instruments have been commissioned and final acceptance accorded. The warranty and Comprehensive operation & maintenance period will last for five (5) years', during which time the Bidder will be responsible for the comprehensive operation and maintenance of the entire network. The Bidder will be responsible to replace faulty or damaged equipment.

Units

Measurement units of all the equipment / systems to be procured shall be metric system.

HAMIRPARA IRRIGATION SCHEME

WORK AND SITE CONDITION

1.0 Introduction:-

General Features of the Project:-

Hamirpara Irrigation Scheme is situated at **Talaja Taluka of Bhavnagar District**. It is essential to carry out annual maintenance of earthen dam and providing outsource services for dam and inspection bungalow of Hamirpara Irrigation Scheme.

2.0 Location:-

The site of work for which tenders are called for is situated at Talaja Taluka of Bhavnagar District

3.0 Communication:-

The nearest town is Bhavnagar headquarter at distance 45 KM from site of Hamirpara Dam.

4.0 Brief Description of Work :-

(i) Work to be executed / scope. The work to be executed under the project is as under:

Installation of various instruments at Lakhanka and Hamirpara Irrigation Scheme

(ii) Principal details of work

Works to be performed for the various items are in Schedule-B. The above information only general out line and does not in any way limit, the performance of all work and supply of plant machinery, all labours and materials necessary for completing the work as shown in approved working drawing and mentioned in specifications. The set of drawings supplied with tender are only the general drawing to indicate nature of work, construction details for various cross drawings. No extra payment or claim on account of any additional or alternation in working drawings shall be admissible.

5.0 Labour:-

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

6.0 Housing:-

Area being highly rural there is no local housing arrangements 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 54 of the tender.

7.0 Water Supply:-

The contractor shall have to make his own arrangements of water supply for this work. Use of fresh water for work will be allowed free of cost of the contractor from the river length flowing in construction area and area transferred Water Resources Department. Pumping, purification, storage tank, pipe line etc. for the said purpose will be arranged by the contractor at his own cost.

8.0 Drainage:-

Suitable and adequate arrangements shall have to be made by the contractor for drainage of drain 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 and seepage from his colony. The labour layout system 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 shall be excluded from the camp & the work. If in the opinion (which shall not be questioned) of the Engineer-in-charge any employee or agent of the contractor in misbehavior and / or causes obstructing in the proper execution, the contractor shall on receipt of the instruction of do so remove him from the premises

10.0 Medical Aid:-

There is no dispensary on project site, however, there is a Government hospital at Talaja at 25 K.M. from work site. The services of this hospital will be available to contractor's staff and labour on payment of required charges may be required to be paid.

11.0 Electrical Power:-

The contractor at his or her own cost shall arrange power supply. The department guarantees no power supply or if possible, the electric supply available at dam site will be provided to the contractor if demanded on no loss no profit basis from the existing supply point.

12.0 Roads:-

The contractor shall construct and maintain the inspection roads and roads for all purpose required during construction at his own cost. There will however, be no change for any reasonable use of any road constructed by Government of site of work.

13.0 Post Telegraphs and Telephone:-

A post office is 5 Kms away from work site. Contractor shall make their own arrangement for telephone if required.

14.0 Bank Facilities:-

Branches of State Bank of India and other schedule Bank are available at 10 Kms away from work site

15.0 Supply of Petrol & Diesel:-

The Petrol pump available at 5 Kms away from work site

16.0 Materials:-

The contractor shall have to make his own inquiries availability of required materials and other materials required for construction of work and accordingly he shall quote the rates.

Signature of Contractor

**Deputy Executive Engineer
Irrigation Sub division
Bhavnagar**

**Executive Engineer
Bhavnagar Irrigation Division
Bhavnagar**

LAKHANKA IRRIGATION SCHEME

WORK AND SITE CONDITION

1.0 Introduction:-

Lakhanka Irrigation Scheme is situated at Bhavnagar Taluka of Bhavnagar District. It is essential to carry out annual maintenance of earthen dam and providing outsource services for dam and inspection bungalow of Lakhanka Irrigation Scheme.

2.0 Location:-

The site of work for which tenders are called for is situated at Bhavnagar Taluka of Bhavnagar District

3.0 Communication:-

The nearest town is Bhavnagar headquarter at distance 10 KM from site of Lakhanka Dam.

4.0 Brief Description of Work :-

(i) Work to be executed / scope. The work to be executed under the project is as under:

Installation of various instruments at Lakhanka and Hamirpara Irrigation Scheme

(ii) Principal details of work

Works to be performed for the various items are in Schedule-B. The above information only general out line and does not in any way limit, the performance of all work and supply of plant machinery, all labours and materials necessary for completing the work as shown in approved working drawing and mentioned in specifications. The set of drawings supplied with tender are only the general drawing to indicate nature of work, construction details for various cross drawings. No extra payment or claim on account of any additional or alternation in working drawings shall be admissible.

5.0 Labour:-

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

6.0 Housing:-

Area being highly rural there is no local housing arrangements 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 54 of the tender.

7.0 Water Supply:-

The contractor shall have to make his own arrangements of water supply for this work. Use of fresh water for work will be allowed free of cost of the contractor from the river length flowing in construction area and area transferred Water Resources Department. Pumping, purification, storage tank, pipe line etc. for the said purpose will be arranged by the contractor at his own cost.

8.0 Drainage:-

Suitable and adequate arrangements shall have to be made by the contractor for drainage of drain 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 and seepage from his colony. The labour layout system 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 shall be excluded from the camp & the work. If in the

opinion (which shall not be questioned) of the Engineer-in-charge any employee or agent of the contractor in miss behavior and / or causes obstructing in the proper execution, the contractor shall on receipt of the instruction of do so remove him from the premises

10.0 Medical Aid:-

There is no dispensary on project site, however, there is a Government hospital at Bhavnagar at 10 K.M. from work site. The services of this hospital will be available to contractor's staff and labour on payment of required charges may be required to be paid.

11.0 Electrical Power:-

The contractor at his or her own cost shall arrange power supply. The department guarantees no power supply or if possible, the electric supply available at dam site will be provided to the contractor if demanded on no loss no profit basis from the existing supply point.

12.0 Roads:-

The contractor shall construct and maintain the inspection roads and roads for all purpose required during construction at his own cost. There will however, be no change for any reasonable use of any road constructed by Government of site of work.

13.0 Post Telegraphs and Telephone:-

A post office is 10 Kms away from work site. Contractor shall make their own arrangement for telephone if required.

14.0 Bank Facilities:-

Branches of State Bank of India and other schedule Bank are available at 10 Kms away from work site

15.0 Supply of Petrol & Diesel:-

The Petrol pump available at 1 Kms away from work site

16.0 Materials:-

The contractor shall have to make his own inquiries availability of required materials and other materials required for construction of work and accordingly he shall quote the rates.

Signature of Contractor

**Deputy Executive Engineer
Irrigation Sub division
Bhavnagar**

**Executive Engineer
Bhavnagar Irrigation Division
Bhavnagar**

SPECIFICATIONS OF PRINCIPAL MATERIALS

SECTION-III

CHAPTER-II

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 are inclusive of all materials inclusive of all lifts and leads for the material unless otherwise specified in detailed specification.

M-s1 WATER :-

- 1.1 Water used for mixing and curing of cement / lime mortar or concrete shall not be salty or brakish and shall be clean, reasonably clear and free from objectionable quantities of silt and traces if oil, acid and injurious alkali, salts, organic matter and other deleterious materials which will either weaken the mortar or concrete or cause effloresces or attack the steel in R.C.C. water shall be obtained from sources approved by the Engineer-in-charge. Sources of water shall be maintained at such a depth and the water shall be withdrawn in such a manner as to exclude silt, mud, grass or other foreign materials. Containers for transport, storage and handling of water shall be clean container for transport, storage and handling of water shall be clean water. Water shall conforming to IS 456:2000 as per necessary test carried out.
- 1.2 Potable water is generally considered satisfactory for mixing and curing mortar or concrete.
- 1.3 Under ground water shall be checked before using it in mortar or concrete because of the presence of dissolved salts and chemicals which affects setting time and strength of concrete & Mortar.
- 1.4 Sea and sewage water shall not be used.
- 1.5 Water formed satisfactory for mixing shall also suitable for curing concrete and mortar. However water used for curing shall not produce any objectionable stain or unsightly deposit on the concrete or mortar surface. The presence of tannic acid or iron compounds shall objectionable.
- 1.6 Water shall chemically tested at GERI,/ Other Govt. approved Lab. before being used it in mixing and curing in concrete or mortar once for approval of source of supply subsequently only in case of doubt and change in source of supply. The test results shall be as per permissible limit laid in IS : 456-2000

Table-1

Permissible limit for solids in water

I.S. : 456-2000 (Specifications) I.S. 3625 (Part 17, 18, 24, 32 Test method)

Sr. No.	Particulars of tests & I.S. Code for method of testing	Permissible limit Max.	Remarks.
1	Organic solids (I.S. : 3025 (Part-18)	200 mg/l	Frequency of sampling and testing shall be once for source of supply of subsequently in case of doubt and change in source.
2	Organic Solids (I.S.: 3025 (Part-18)	3000 mg/l	
3	Sulphates (As SO ₃) (I.S. : 3025 Part-24)	400 mg/l	
4	Chlorides (as CL) (I.S. 3025 Part-32)	2000 mg/l for P.C.C. and 500 mg/l for R.C.C.	
5	Suspended matter (I.S. 3025 Part-17)	2000 mg/l	
6	P.H. Value	Not less than 6	

M-2 CEMENT :-

- 2.1 Only 53 Grade ordinary Portland cement of reputed major cement plant conforming to IS : 269-2015 shall be used for entire work under the tender in all aspects. Mini plant cement shall not be allowed in any cases.
- 2.2 The contractor shall have to make his own arrangement to procure the cement bearing trade-mark or trade name, Grade of cement, type of cement, Name of manufacturer, Lot No., ISI (BIS) Mark, Net weight, etc. directly from the manufacturers or authorized dealer. The contractor shall have to make arrangement to load, cart and unload the cement to the site of work at his own cost. For verification of such purchase, the contractor shall have to produce all the original TAX- INVOICE or "RETAIL INVOICE" bearing GSTIN No. of seller and Buyer, Name of Agency, Name of work site, details of cement (Type and Trade Name), Quantity of cement, Net weight, separately shown GST levied and other details etc. What so, applicable as required as per Govt. rules, along with the testing details to the Engineer-in-charge of the work. The sectional officer of the work after verification of TAX-INVOICE or Retail Invoice as detailed above shall accepted the cements and thereafter entry shall be made to stock register from time to time for each receipt of cement and immediately intimate to sectional officer of quality control to take sample for testing of cement. Sectional officer of the work shall have to make entry either in stock register or in cement consumption register detailing date of receipt, Qty. of cement, type of cement, Lot No. trade name and sample taken for testing along with date of sampling.

2.3 TESTING OF CEMENT :-**2.3.1 Physical Analysis :-****TABLE NO : 1****Physical Requirements for 53 Grade ordinary Portland cement.****I.S. 269-2015 (Specifications) (Clause-7 Table No.3 P.No.4)****I.S. 4031-1968 (Physical tests)**

Sr. No.	Physical Properties	Requirements as per I.S. 269-2015
1	Fineness (Specific Surface Area)	Not less than 225 M ² /Kg
2	Compressive Strength	
(a)	03 days (72 ± 1 h)	Not less than 27 Mpa (N/mm ²)
(b)	07 days (168 ± 2 h)	Not less than 37 Mpa (N/mm ²)
(c)	28 days (672 ± 4 h)	Not less than 53 Mpa (N/mm ²)
3	Setting time (vacate apparatus)	
(a)	Initial	Not less than 30 minutes
(b)	Final	Not less than 600 minutes
4	Soundness	
(a)	By Le Chatelier method	Note more than 10mm
(b)	By Autoclave test	Not more than 0.8%

5	Consistency of Standard cement paste (Standard consistency)	The quantity of water required to produce a paste of standard consistency to be used for determination of water content of mortar for the compressive strength tests and for the determination of soundness and setting time.
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2.3.1.1 Frequency of Sampling and test shall be as below :-

TABLE No.2

Sr. No.	Quantity of Cement	Nos. of sample	Nos. of Test	Remarks
1	2	3	4	5
1	Up to 50 MT	1	1	Same lot
2	50-100 MT	2	2	Same lot
3	100-200 MT	3	3	Same lot
4	201-300 MT	4	4	Same lot
5	301-500 MT	5	5	Same lot
6	501-800 MT	6	6	Same lot
7	801-1300 MT	7	7	Same lot
8	For each large consignment	8	8	Same lot

N.B. : If different lots found in cement Qty. as described in Col. No.2 of Table No.2 one sample from each lot shall be taken for Testing, minimum sample & Test shall be as per Table No.1 therefore sectional officer of work shall be enter lot No. against quantity of each lot in the stock register for each receipt from time to time. Sample shall be taken random.

2.3.2 Chemical Requirements :-

TABLE NO. 3

Chemical Requirements for 53 Grade ordinary Portland cement

I.S. 269-2015 (Specifications) (Clause-6.1 Table No.2 P.No.3)

I.S. 4032-1985 (Chemical analysis)

Sr. No.	Characteristic	Requirement
1	Ratio of percentage of lime to percentage of silica, alumina and iron oxide when calculated by the formula $\frac{\text{CaO} - 0.7 \text{ SO}_3}{2.8\text{SiO}_2 + 1.2\text{Al}_2\text{O}_3 + 0.65\text{Fe}_2\text{O}_3}$	Not greater than 1.02 and not less than 0.80
2	Ratio of percentage of alumina to that of iron oxide.	Not less than 0.66
3	Insoluble residue, percent by mass	Not more than 4
4	Magnesia, percent by mass	Not more than 6

5	Total sulphur content calculated as sulphuric anhydride (SO ₃) percent by mass	Not more than 3.5
6	Total loss on ignition	Not more than 4 percent

All chemical test required as per IS : 4032-1985 shall be carried out for one test per ten tests sample of above Para 2.31 i.e. for physical tests

- 2.4 The cement not satisfying the criteria as per IS : 269-2015 for 53 Grade OPC shall be rejected and contractor shall have to remove it from site immediately.

2.5 Field Test :-

The quality of cement shall be confirmed through physical & chemical test as prescribed in relevant IS in laboratory. These however taken time. However to quickly ascertain the quality of cement, some field test of indicative natures as like visual examination (Packing of bags), colour, Texture, initial setting time, Ball test, Float test etc. as described in GERI circular No.1 of 1986 issued vide GERI, Vadodara Letter No.MT-II/Cement/8321546 of 1986 and 10-3-1986 shall be conducted as guidelines to identify doubtful variety of cement. The doubtful cement when so identified shall be got tested in the laboratory on priority to confirm quality as per IS.

- 2.6 Large stocks of cement shall not be kept at the work but only sufficient quantity shall be kept to assure continuity of the work. The contractor shall have to provide and maintain efficiently water proof storage sheds for cement on the site of work. It shall be stacked on the platform 30 cm above the floor level and cement shall be covered with tarpaulin or any other impervious materials for covering in order to protect the cement bags from moisture. The tax shall be made at one mt. away from wall and distant between two stacks shall be kept also 1.00 mt. so as to count easy.
- 2.7 The cement bags shall be neatly stacked in an orderly manner so as to afford easy access and count. Deteriorated cement shall not be allowed for use.
- 2.8 A regular day to day account of cement received and used on the work together with the particular of the work and quantity of the work in which it was used, shall be maintained in ink separately by the responsible representative of the department and shall be signed at the end of the day's work by the department representative as well as contractor after proper verification in accounting be shown to the inspecting officer when asked for. In addition to above responsible representative of the department shall be maintained the register for consumption of cement as per circular issued vide GOG. ID circular No.CMT/2384/IB-60/25/H Dtd. 30-3-1984.
- 2.9 The contractor shall provide a double locking arrangement for the store and the key for one lock will remain with the Engineer-in-charge of the work or his authorized agent. Cement stored for more than 90 days according to Lot No. showing week, month, year shall not be used unless retested and found satisfactory. During the monsoon period cement shall be retested every month ensure quality.
- 2.10 The contractor shall provide at the site of work satisfactory storage for not less than 3 months average consumption of cement on work and shall keep the cement store in a manner that will satisfy the Engineer-in-charge.
- 2.11 The arrangements of storage and utilization of cement shall be such that to ensure the utilizations of cement in the order of its arrival at the stores, the contractor shall maintain satisfactory up to date records which would at any time show the dates of receipts and proposed utilization of cement lying in the stores at site. Cement shall be used in the "first in first out" method.
- 2.12 The Engineer shall at all times have access to the stores and the site of contractor and shall have authority to check and examine the method of storage, records, accounting and security provided by the contractor. The contractor shall comply with the instruction that may be made by Engineer in this connection. The contractor shall further at all time satisfy the Engineer on demand by the production of records of books of submission of return and Performa or by other proofs that may be demanded

that the cement brought being used for the purpose for which it is brought and contractor shall at all times keep his records up to date of enable Engineer to apply such checks as he may be desire to impose.

- 2.13 The cement shall not be stored for unduly long period. It should be handled in such a way as to impair its strength or useful characteristics.
- 2.14 The Engineer-in-charge or his authorized agent will have the authority to verify the stock and check on the consumption in any manner he thinks proper.
- 2.15 Cement should be measured by weight with MT or Kg as the unit.

M-3 FINE AGGREGATES (SAND) :-

General :-

All fine aggregate shall confirm to IS; 383-2016 Natural sand from river shall be used only after screening and washing.

Sand for use in concrete work shall be natural sand; sand shall be clean, well graded, hard, durable and gritty particles free from injurious amount of dust, clay, silt, kanker, nodules, soft or flaky particles, shale, organic matter, loam, mica or other deleterious substances and shall be approved by the Engineer. The maximum size of particles shall be limited to 4.75mm. 100% Sand should be passed through 10mm IS sieve.

TABLE No. 4

Limits of Deleterious Materials

IS: 383-2016 (Specifications) (Clause 5.2.1 Table No.2 P.No.3)

IS: 2386 (Part-I, II)-1963 (Method of Testing)

Sr. No.	Deleterious substances and Method of test.	Fine Aggregate percentage by weight Maximum (Uncrushed)	Coarse Aggregate percentage by weight maximum (Crushed)
1	2	3	4
1	Coal and lignite IS : 2386 (Part-II) 1963	1.00	1.00
2	Clay lumps IS : 2386 (Part-II) 1963	1.00	1.00
3	Materials finer than 75 Micron IS Sieve. IS : 2386 (Part-I) 1963	3.00	3.00
4	Soft fragments IS : 2386 (Part-II) 1963	--	-
5	Shale IS : 2386 (Part-II) 1963	1.00	--
6	Total of percentage of all deleterious materials (except mica) including Sr. No.1 to 5 for Col.3 & 4	5.00	5.00

TABLE-5**Gradation of Fine Aggregate****IS : 383-2016 (Specification) (Clause No.6.3 Table No.9 P.No.7)****IS : 2386 (Part-I)-1963 (Method of testing)**

Sr. No	I.S. Sieve	Percentage(%) passing for			
		Grading Zone-I	Grading Zone-II	Grading Zone-III	Grading Zone-IV
1.	10mm	100	100	100	100
2.	4.75mm	90-100	90-100	90-100	90-100
3.	2.36mm	60-95	75-100	85-100	95-100
4.	1.18mm	30-70	55-90	75-100	90-100
5.	300 Micron	15-34	35-59	60-79	80-100
6.	300 Micron	5-20	8-30	12-40	15-50
7.	150 Micron	0-10	0-10	0-10	0-15
8.	F.M.	4-2.71	3.37-2.11	2.78-1.71	2.25-1.35
9.	F.A. Type	Coarse	Medium	Fine	Very Fine

- Note :-** (1) Grading becomes progressively finer & from Zone-I to IV.
- (2) Tolerance : Where the grading falls outside the limit of any (Zone-II & III) Grading zone of sieves other than 600 micron IS sieve by a total amount > (Should not be more than) 5% i.e. Sum of sieve at Sr No. 1,2,3,4,6,7 out sides (Lower & upper) the limits of grading Zone-II & Zone-III > 5%
- (3) The ratio F.A./C.A. should be reduced progressively.
- (4) Fine aggregate complying with the requirements of any grading zone in above table is suitable for concrete. It is recommended that very fine aggregate conforming Zone-IV should not be used in reinforced cement concrete.

3.2 Quality of Fine Aggregate :-

3.2.1 Deleterious Materials : Aggregate shall not contain any harmful material such as pyrites, coal, lignite, mica, shale, or similar laminated material, clay, alkali, soft Fragments sea shells and organic impurities in such quantity as to affect the strength or durability of concrete. Aggregate to be used for reinforced concrete shall not contain any material liable to attack the steel reinforcement. Aggregate which are chemically reactive with alkalis of cement are harmful as cracking may take place.

3.2.2 Limit of Deleterious materials :-

The maximum quantity of deleterious material in fine aggregate (natural sand) shall not exceed the limits specified in Table-1 of IS : 383-2016 when tested in accordance with IS : 2386-1963. However the Engineer-in-charge at his discretion may relax some of the limits, Total deleterious substances like coal and lignite clay lumps, material finer than 75 micron IS sieve (Silt content less than 3%) shale etc. shall not be more than 5% including silt content for uncrushed natural sand.

3.2.3 Grading of Fine aggregate and Fineness Modulus (F.M.) :-

The grading of fine aggregates when determined as described in IS:2386 (Part-I) 1963 shall be within the limits given in table: 4 of IS 383-2016 and shall be described as fine aggregates grading zones I, II, III and IV for concrete work. The F.M. of sand shall have ranging between 4.00 and 2.11 ($2.11 < \text{F.M.} < 4.00$).

4.00) subject to the sand being well graded, Gradation and F.M. of sand for masonry mortar & plaster shall be as per IS : 2116-1980 and IS: 1542-1992 respectively. For proper grading coarse & fine sand may be blended.

- 3.2.4 **Silt content :-** The silt content shall not exceed 3% as per IS: 383-2016 when tested in accordance with IS: 2386 (Part-I) 1963. The particular of tests, frequency and Acceptance criteria are shown in table below :

TABLE-6

Fine Aggregate (Sand)

IS : 2386 (Part-1 to 8) (Test Method) IS : 383-2016 (Specifications)

Sr. No.	Particulars of Tests & IS Code for Method of testing.	Frequency	Acceptance Criteria
1	Gradation & F.M. IS : 2386 (Part-I) 1963	1-Test per 150 M ³ Concrete work.	(i) for Concrete IS: 383-1970 (ii) For Masonry mortar IS: 2116-1980. (iii) For Plaster IS: 1542-1992
2	Specific Gravity (SPG) & water absorption, IS: 2386 (Part-3) 1963	Once for approval of source of supply subsequently in case of doubt and change in source.	As per relevant specification & design.
3	Silt content. IS:2386 (Part-I) 1963	1-Test per 150 M ³ Concrete work.	Not more than 3%
4	Alkali Aggregate Reactivity.	Once for approval of source of supply subsequently only in case of doubt and change in source.	As per relevant specification & design.

Initially before work commenced the entire test as mentioned in above Table-1 shall be carried out at GERI or approved institute or approved private laboratory. The source of sand shall have to specify by contractor and shall be got approved jointly by Engineer-in-charge.

The gradation of materials from any one source shall not vary in composition beyond the range of value that governs in selecting source of supply. For determining the degree of uniformity, determination of gradation & F.M. shall be made upon representative samples furnished by the contractor from such source as he propose to use. Fine aggregate from any one source having a variation in F.M. greater than ± 0.20 from the average F.M. of representative

sample submitted by the contractor shall be rejected or may be accepted subject to such change in the proportion of aggregate as the Engineer may direct.

If contractor desires to change of source prior approval of Engineer-in-charge shall have to be got well in advance and Engineer-in-charge shall give approval after satisfaction on additional test carried out.

3.3 Storage :-

The fine aggregate should be stacked carefully on a clean hard surface so that it will not get mixed up with deleterious foreign material.

Sand shall not be stocked in high conical heaps so that segregation of heavier particles by sliding down may be prevented. It shall be placed in layers not thicker than those resulting from lorry loads dumper on the same place.

3.4 Measurement :-

When required to be measurement shall be by volume with Cu.mt. as the unit. No deduction shall be made for the voids.

M-4 COARSE AGGREGATE (CRUSHED METAL) :-

Coarse aggregate shall be of machine crushed stone (Crushed metal) of black trap basalt. Coarse aggregate shall be hard, strong, dense, durable, clean of proper gradation and free from skin and coating likely to prevent proper adhesion of mortar or concrete (Adherent coating) and free from veins and free from injurious amount of disintegrator pieces, alkali, vegetable matter and other deleterious substance.

The coarse aggregate shall generally be cubical in shape and as far as possible flaky, elongated, scoriaceous pieces shall be avoided. It shall generally comply with the provisions of IS: 383-2016. Aggregate most of which is retained on 4.75 mm IS sieve and containing only so much finer material as is permitted as per IS: 383-2016.

4.1.1 Size of aggregate (Provision in IS:456:2000) :-

The nominal maximum size of coarse aggregate should be as far as possible within the limit specified but in no case greater than one fourth ($1/4$) of the minimum thickness of the member for plain cement concrete and in addition to this for reinforced cement concrete in can be placed without difficulty so as to surround all reinforcement thoroughly and fill the corner of the form. For most work 20mm aggregate is suitable where there is no restriction to the flow of concrete in to section 40mm restriction to the flow of concrete in to section 40mm or larger size may be permitted. In concrete element with thin section, closely space reinforcement or small cover, consideration should be given to the use of 10mm nominal maximum size, Read to above para size of aggregate should be determined as follow.

4.1.2 For plain cement concrete (PCC) :

(i) The nominal maximum size of Aggregate $\rightarrow \frac{1}{4} \times$ Minimum thickness of member

4.1.3 For reinforced cement concrete (RCC) :

(i) The nominal maximum size of Aggregate $\rightarrow \frac{1}{4} \times$ Minimum thickness of member

\rightarrow The minimum clear distance

Between main bar – 5 mm.

OR

\rightarrow The minimum cover to the
Reinforcement – 5mm.

Whichever is smaller.

4.1.4 The Minimum and maximum size of the aggregates may be between 4.75mm to 80mm. (about $3/16$ " to 3") & shall be well graded.

The range in grading of coarse aggregate shall be as follow.

(i) 40m – 80mm (Or 63mm) (Approximate $1\frac{1}{2}$ " to 3" (or $2\frac{1}{2}$ ")

(ii) 20mm x 40mm (-do 0III" ($3/4$ ") to $1\frac{1}{2}$ ")

(iii) 10mm – 20mm (Approximately 0III" ($1/2$ ") to 0III" ($3/4$ ")

(iv) 4.75 mm – 10mm Grit as available in market.

Engineer-in-charge may give relaxation to range in grading according to availability in market.

4.2 Quality of coarse Aggregate :-

4.2.1 Deleterious materials & its limit :-

Deleterious material as described and its acceptance criteria for crushed metal shall be as per IS: 383-

2016 when tested according to IS: 2386 (Part-II)-1963, IS: 2386 (Part-I)-1963. In no case total of percentage of all deleterious materials finer than 75 micron IS sieve (Silt content) more than 5% by weight i.e.

Deleterious material (Coal and lignite, clay, slums) including silt content (3%) shall not be more than 5%.

4.2.2 Gradation :-

Graded coarse aggregates shall be supplied in the nominal size as per IS: 383-2016 or as per relevant specification provision.

The particular of tests, frequency and acceptance criteria are shown in Table-7 below.

TABLE-7

Coarse Aggregate (Crushed Metal)

IS : 2386 (Part-1 to 8) if method of test

IS : 383-2016 (Specifications) (Clause No.5.4)

Sr. No.	Particulars of Tests & IS Code for Method of testing.	Frequency	Acceptance Criteria
1	Gradation IS : 2386 (Part-I) 1963	1-Test per 150 M ³ Concrete or as per specification.	As per relevant specification provision.
2	Sp. Gravity (SPG) & water absorption (WA) IS: 2386 (Part-3) 1963	Once for approval of source of supply subsequently in case of doubt and change in source.	SPG generally 2.5 to 3.0 & WA 1.0% to 1.50%
3	Flakiness & elongation Indices. IS:2386 (Part-I)-1963	Once for approval of source of supply subsequently in case of doubt and change in source.	30% maximum
4	Impact value IS:2386 (Part-4)-1963	-do-	As per IS:383-2016 (i) Concrete – Wearing surface – 30% Max.(Wt) (ii) Overlaid surface 45% Max. (Other than(i))
5	Alkali Aggregate Reactivity.	Once for approval of source of supply subsequently only in case of doubt and change in source.	As per relevant specification & design.

NB :- The kind of test to be got tested, out of above-mentioned various test shall be carried out on the decision of D.E.E. (Q.C.) looking to function and nature of concrete and its usability after work.

4.3 Field Test :-

The material coming out of the IS : sieve shall be in the grade ranging from 40mm to 4.75mm as specified or as determined as per IS:456-2000. (MSA as specified in specification or as determined as per IS : 456-2000). Each grade 40 mm, 40 mm– 20 mm, 20mm-10 mm, 10mm-4.75mm (Grit) which ever applicable according to MSA shall be stacked separately. The stack shall be considered as approved only if it conforms the following criteria.

- (1) The material retained on IS sieve corresponding to the upper limit of size of stack not exceeding 15% by weight.
- (2) The material passing through the IS sieve corresponding of the lower limit of size of stack not exceeding 15% by weight.
- (3) The sum of (1) and (2) above shall not exceed 20% by weight.

The gradation register shall be maintained at site. The frequency of test shall be 1-test per 150 m³ concrete work.

4.4 Storage :-

The aggregate of different sizes shall be stacked or batched or stored separately and handle in such a manner as to prevent inter mixing of different size of aggregates required separately for grading purpose. NO foreign materials shall be allowed to be mixed up with aggregates. It shall be covered to prevent mixing of dust etc. They shall be washed clean before use. The aggregates shall be stacked in one shape of frustum of pyramid of standard size as per code of practice or as directed by Engineer-in-charge.

4.5 Measurement :-

When required to be measured the measurement shall be by volume with Cum. as the unit. No deduction shall be made for voids.

Table-8
Specification of single size Coarse Aggregate
IS:383-2016 (Clause-6.1 & 6.2 Table No.7 P.No.6)

IS sieve Designation	Percentage passing for single size Aggregate					
	MSA 63mm	MSA 40mm	MSA 20mm	MSA 16mm	MSA 12.5mm	MSA 10mm
80 mm	100	-	-	-	-	-
63 mm	85-100	100	-	-	-	-
40 mm	0-30	85-100	100	-	-	-
20 mm	0-5	0-20	85-100	100	-	-
16 mm	-	-	-	85-100	100	
12.5 mm	-	-	-	-	85-100	100
10 mm	0-5	0-5	0-20	0-30	0-45	85-100
4.75 mm	-	-	0-5	0-5	0-10	0-20
2.36 mm	-	-	-	-	-	0-5

Table-9
Size of coarse aggregate for mass concrete

I.S. 383-2016 (Clause-6.1.1 Table No.8 P.No.7)

Sr. No.	Class and size	I. S. Sieve designation	Percentage Passing
1	Very Large 150- 80mm	160mm	90 to 100
		80mm	00 to 10
2	Large 80 – 40mm	80mm	90 to 100
		40mm	00 to 10
3	Medium 40 – 20mm	40mm	90 to 100
		20mm	00 to 10
4	Small 20 – 04.75mm	20mm	90 to 100
		04.75mm	00 to 10
		0.236mm	00 to 02

M-5 THERMO MECHANICALLY TREATED BARS (TMT BARS):

The thermo mechanically treated, popularly known as TMT shall conform to IS-1786. The steel shall be procured by the contractor and grade of steel shall be Fe-500. The contractor shall make suitable arrangement for storage of the steel at site. In any circumstances steel produced by re-rolling mills shall not be allowed to use. The steel shall be free from loose mill scale, rust oil, grease, or any other harmful matter. The contractor shall have to procure steel bars directly from manufacturers having BIS certification or its authorized dealer. The contractor shall have to produce original voucher / bill (Retail invoice or Tax Invoice). For the same along with physical and chemical test report whenever asked by engineer in charge for the same.

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

TABLE – A (IS-1786-2008)

STRENGTH GRADE & DESIGNATION	MECHANICAL PROPERTIES			BEND TEST		REBEND TEST	
	YIELD STRESS (YS)	TENSILE STRENGTH (TS)	ELONGATION %, Min, on gauge length 5.65 square root A, Where A is the cross sectional area of the least piece.	Up to & including 20mm. dia.	Over 20mm. dia.	Up to & including 10mm. dia.	Over 10mm. dia.
	N/mm ²	N/mm ²		≤	≤	≤	≤
1	2	3	4	5	6	7	8
Fe500	500	8 % more than the actual 0.2% Proof Stress/Yield Stress but not less than 545 N/mm ²	12	Mandrel Dia.=4 mm	Mandrel Dia.=5 mm	Mandrel Dia.=7 mm	Mandrel Dia.=8 mm

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

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

TABLE-B (IS-1786-2008)

CONSITITUENT	PERCENTAGE MAXIMUM			As Per IS-1786 2008 Cl. 4.2.1 PERMISSIBLE VARIATION AS FOLLOWS
	Fe 415	Fe 500	Fe550	% max
Carbon	0.3	0.3	0.3	0.02
Sulphur	0.06	0.055	0.055	0.005
Phosphorus	0.06	0.055	0.05	0.005
Sulphur & phosphorus	0.11	0.105	0.1	0.010

TESTING: Testing of steel shall be done for each size of bars and frequency mentioned below of steel in government or government approved laboratory, to known the physical properties of steel bars, like Nominal mass, 0.2 percentage proof stress/yield stress, Elongation percentage, Tensile strength, Bend and re-bend. The Charges for the same shall be recovered from RA/FINAL BILL of the contractor.

TABLE-E (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 tonnes or part thereof	One sample from each 40 tonnes or part thereof
10 mm to 16 mm inclusive	One sample from each 35 tonnes or part thereof	One sample from each 45 tonnes or part thereof
Over 16 mm	One sample from each 45 tonnes or part thereof	One sample from each 50 tonnes or part thereof

The steel shall be either cold twisted or hot rolled or thermo mechanically treated and shall confirm to IS: 1786. The steel shall be free from loose mill scale, rust oil, grease, or any other harmful matter.

TESTING CHARGES:

The testing charges shall be recovered from RA/FINAL BILL of the contractor as per Condition.

MEASUREMENT: For the purpose of payment, the bar shall be measured correct up to 10mm in length Unit weight of bars shall be computed as per weight given in IS-1786-2008.

Specification for Indian steel or at the rate specified below:

TABLE-D (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	28	4.83
8	0.395	32	6.31
10	0.617	36	7.99
12	0.888	40	9.86
16	1.58		
20	2.47		
25	3.85		

M-6 BLACK STONE (RUBBLE)

The stone shall be of good quality hard stone. The stone shall be hard, sound, durable and free from defect like segregation, Seams, cracks, cavities, sand holes, flaws injurieveins, patches of loose or soft materials, weathered portion and other structural defects to affect their soundness and strength. The stone with round surface shall not be used. The source of the stone of required quality shall be got approved from the Engineer-in-charge well before carting the same to work site. The contractor shall have to arrange to cart, load, unload, stacks, the same to the site of work at his own cost from specified lead weathered skin maximum up to 2 mm thickness shall be allowed on one face of the stone only and shall not be more than 33 % of total number of stone to be used No stone shall weigh less then 15 Kg. The dimension of stone to be used shall not be less than 15 Cm on any one of the face.

Stone for pitching, Masonry etc. :

Stone to be used for pitching, masonry and such other application shall be of good quality. The stone shall be from the fresh rock and not weathered. Pieces of stone that have been damaged by blasting, driving, wages, heating etc. Shall not be allowed. The type of rock shall be identified according to characteristics given in Table -1 of page No. 4,5,6,7 of IS:1123-1975. In case of doubt guidance can be obtained from engineering properties of the rock given in Table-1 IS:1123-1975 . For identification of rock the sample shall be examined either by visual inspection or by macroscopically for its color, texture, structure and mineral constituents. Stone to be used for pitching and masonry shall be tested for water absorption The water absorption of stone shall not exceed limit of 5 % of dry weight after being kept in water for 24 Hours.

Frequency of sampling and testing:

As the quantity of item of pitching work and masonry is comparatively small, hence stone required for pitching work shall be goat approved from Engineer-in-charge prior to use. No testing of stone shall be required. However field test like size of stone, weight of stone, water absorption etc. shall be tested for approval of source of supply.

M-7 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 1.63 mm 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-8 P.V.C. PIPE :

P.V.C. pipe shall confirm to I.S. 4985. PVC pipe shall be of ISI mark with minimum 4.0 Kg/Cm² Pressure quality.

M-9 FILTER MATERIAL :

The filter material shall consist of clear, sound and well graded natural sand and gravel/ crushed metal.

M-10 BITUMEN FOR MISCELLANIOUS MINOR JOBS OTHER THAN ROAD WORKS:

The bituminous pad or bitumen cork board shall be pre-moulded fiber board impregnated with bituminous materials to render it durable and rot proof. It shall be easily compressible and shall recover nearly to its original thickness after releasing the compression.

The bituminous pad shall be of the required size and standard measures and should conform to IS: 1838 – 1983. The pad shall be cut to the required size and placed in positions firmly so that it shall not be displaced at the time of concreting. The bituminous pad shall consist of large pieces. Assembly of smaller pieces to make up to required size shall not be permitted to be used.

The grade of bitumen shall be 80/100 unless specified in detail technical specification of the item of work. The contractor shall produce manufacturer's certificate along with testing result, if asked for the same by Engineer –in-Charge.

M-11 PVC WATER STOP

The water stop should be fabricated from a plastic compound. The basic resin of which shall be polyvinyl chloride. The compound shall contain additional resins, plasticizers, inhibitors or other materials such that when material is compounded, it shall meet the requirements given in IS 15058.

Requirements for PVC water stop

Sr.No.	Characteristic	Requirements
1	Tensile strength, Min.	13.8 Mpa.
2	Elongation, Min.	285%
3	Hardness (Shore A), Min.	65
4	Water absorption, present by mass, Max.	0.6
5	Cold bend temperature at which samples does not crack, Min	-25°C
6	Accelerated Extraction Test :	
	a) Tensile strength, Min	10.3 Mpa
	b) Elongation, Min	280%
7	Stability in effects of alkalies test :	
	a) weight increase at 7 days, present by mass, Max	0.25
	b) weight decrease at 7 days, present by mass, Max	0.10
	c) change in hardness at 7 days (Shore A)	+5
	d) weight increase at 7 days, Max	0.40%
	e) weight increase at 7 days, Max	0.30%
	f) Dimension change	+1%

The typical shape and dimension of PVC water stops as per design drawing approved by departments or as per IS Code 15058. PVC water stop shall bear I.S.I. mark.

PVC water stop shall be provided at joints in body wall of weir of spillway junction at pier and body wall contraction joints between two monoliths of a structure i.e. as per IS 15058.

The arrangement of water stop and installation at joints in body wall of weir of spillway junction at pier and body wall contraction joints of the weir shall be as per IS 15058.

**SIGNATURE OF
CONTRACTOR**

**DEPUTY EXECUTIVE ENGINEER
IRRIGATION SUB. DIVISION
BHAVNAGAR**

**EXECUTIVE ENGINEER
BHAVNAGAR IRRIGATION DIVISION
BHAVNAGAR**

GENERAL SPECIFICATION OF CONCRETE

SECTION-III
CHAPTER – III.

GENERAL SPECIFICATION OF CONCRETE

1.0 SCOPE OF WORK :-

The work covered by this chapter consists of cast in situ M-15 grade plain cement concrete (Weigh batching) for check dam furnishing all materials required, equipment, machineries, labours for manufacture of concrete, transport, placing, form work, finishing, curing etc. and inclined sleepers and performing all the functions necessary for and ancillary to the work related by contractor.

2.0 MATERIALS :-

As per Section-V, Chapter-II of specification of Principal Materials.

- | | |
|---|-----|
| * Water shall confirm to specification | M-1 |
| * Cement shall confirm to specification | M-2 |
| * Fine Aggregate (Sand) –do-- | M-3 |
| * Coarse Aggregate (Crushed Metal)-do- | M-4 |

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 BATCHING :

mechanical weigh batching attached with concrete mixer “flori” (self loading concrete mixer) shall be allowed. The quantity of both cement and aggregate shall be determined by mass, water shall be weighted or measured by volume in a calibrated tank. All ingredient of concrete shall be taken by weight proportion as per concrete mix design finalized.

Except where it can be shown to the satisfaction of the Engineer-in-charge that supply of properly graded aggregate of uniform quality can be maintained over a period of work, the grading of aggregate shall be controlled by obtaining the coarse aggregate in different sizes and blending them in the right proportions when required, the different sizes being stocked in separate stock piles. The material should be stock piled for several hours preferably a day before use. The grading of coarse and fine aggregate should be checked as frequently as possible. The frequency for a given job being determined by the Engineer-in-charge to ensure that the specified gradient is maintained.

The accuracy of the measuring equipment (like weigh batcher) shall be within ± 2 percent of the quantity of cement being measured and within ± 3 percent of the quantity of aggregate, admixture (if considered in mix design) and water being measured proportion / Type and grading of aggregates shall be made by trial in such a way so as to obtained densest possible concrete. All ingredients of the concrete should be used by mass only.

Volume batching shall be allowed only where weigh-batching is not practical and provided accurate bulk densities of materials to be actually used in concrete have earlier been established. Allowance for bulking shall be made in accordance with IS: 2386 (Part-III). The mass volume relationship should be checked as frequently as necessary, the frequency for the given job being determined by Engineer-in-charge to ensure that the specified grading is maintained.

Volume batching shall not be resorted without prior consent of the Engineer-in-charge who may allow this at his sole discretion when the quantity of concrete work and the rate of its placement and so small as not to vary the use of complete batching equipment.

It is important to maintain the water cement ratio constant at its correct value accordance with concrete mix design finalized. To this end determination of moisture contents in both

fine and coarse aggregates shall be made as frequently as possible. The frequency for a given job being determined by the Engineer-in-charge according to weather conditions. The amount of the added water shall be adjusted to compensate for any observed variations in the moisture contents. For the determination of moisture content in the aggregates IS: 2386 (Part-3) shall be referred to. To allow for the variation in mass of aggregate due to variation in their moisture content, suitable adjustments in the masses of aggregates shall also be made. In the absence of exact data, only in the case of nominal mixes, the amount of surface water may be estimated from the values given in table below.

Table

Sr. No.	Aggregate	Approximate Quantity of surface water	
		Percent by Mass	l/m3
1.	Very wet sand	7.5	120
2.	Moderate wet sand	5.0	80
3.	Moist sand	2.5	40
4.	Moist gravel or crushed rock coarser the aggregate, less the water if will carry.	1.25 – 2.5	20-40

No substitutions in materials used on the work or alterations in the established proportions (CMD or NMC) except as permitted in previous two para as described above shall be made without additional tests to show that the quality and strength of concrete are satisfactory. In the absence of any automatic weigh batches, weighing shall be done only by means of providing and using steel measuring boxes shall have adjustable bottom to allow for daily variation in moisture properties of the fine and coarse aggregates. Enough boxes shall be provided separately for each ingredients as approved by Engineer-in-charge.

The contractor shall have to provide the weigh batchers of the requisite capacity to maintain the required progress on different item of work, calibration of weight batcher shall be carried out prior to use it and from time to time in presence of a Govt. representative nominated by Engineer-in-charge to check the accuracy of the measuring devices. The frequency of such test for establishment of accuracy shall be determined by the Engineer-in-charge. Unless otherwise directed, tests shall be made once in one or two weeks at random. The contractor shall provide standard test weights and other necessary equipment required for checking the operation performance of each scale or other measuring device. The contractor shall make such adjustment, repairs or replacement as may be necessary to meet with the requirement specified by the Engineer-in-charge for accuracy for measurement.

5.0 MIXING :

Concrete shall be mixed in a portable automatic electronic batching plant or flori . The ingredients shall be fed in to the mixer simultaneously. A portion of water (5% to 10%) shall be fed first and an equal quantity shall follow the introduction of other materials. The remaining water shall be added uniformly and simultaneously when all other materials are in the mixer. Mixer shall not be loaded in excess of its rated capacity. The mixer shall be fitted with water measuring devices. The mixing shall be continued until there is a uniform distribution of the materials and the mass is uniform in colour and consistency. If there is segregation after unloading from the mixer, the concrete should be remixed.

For guidance, the mixing time shall be at least 2 min. For other type of more efficient, mixers, manufacturer's recommendations shall be followed. Workability should be checked at frequent interval. The freshly mixed concrete should be finally placed in position within 30 minutes.

The freshly mixed concrete should be tested for slump, unit weight, compressive strength and may also tested mixer uniformity, test, yield test, air content etc. Mixer shall be examined daily for change in condition due to accumulation of hard concrete or mortar or due to wear of blades. No mixer shall be changed in excess of its rated capacity for mixing or agitations. The size of batch mixed in that mixer

may be reduced, until upon testing a uniformly.

Whenever mixing is done at higher elevation (> 1.5 m) chutes former of plain G.I. sheets with its end provided with deflector. Inclination of the chute shall be so adjusted that segregating does not take place. Chutes shall be washed and clean as and when necessary.

6.0 Transporting and Handling:

After mixing concrete shall be transported to the form work as rapidly as possible by method which will prevent the segregation or loss of any of the ingredients or ingress of foreign matter or water and maintaining the required workability.

Conveying method and equipment shall be approved by the Engineer-in-charge not below the rank of Deputy Executive Engineer.

When mixing concrete from drum of mixer poured through chute (Plain G.I. sheet inclined properly) away from form work shall be remixed and then after conveyed to form work. Newly mix concrete is susceptible to segregation if dropped through height. The unrestrained dropping of concrete on apex of a pile also results in coarser particles segregating and concentrating at the toe of the slope. Unrestrained dropping, chuting and horizontal flow of concrete should not permitted.

Minimum handling and persistent precautions should be observed to prevent segregation and to see that concrete remains a cohesive mass.

During hot or cold weather, concrete shall be transported in deep containers other suitable methods to reduce the loss of water by evaporation in hot weather and heat loss in cold weather may also be adopted.

7.0 PREPARATION FOR PLACING CONCRETE:

Specification laid down in IS-456 & 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.

8.0 PLACING OF CONCRETE:

Specification laid down in IS-456 & 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 rehandling. The concrete shall be placed and compacted before initial setting of concrete commences and should not be subsequently disturbed. Method of placing should be such as to preclude segregation. Care should be taken to avoid displacement of reinforcement or movement of formwork. As a general guidance, the maximum permissible free fall of concrete may be taken as 1.50mt.

9.0 CLASSIFICATION :-

For all items of concrete in any portion of the structure or its associated works, shall be of 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 are 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 Table:- AA, given below are tentative and for general guidance only.

The design mix for different grade of concrete to be used, will be furnished by the department.

Table-AA

Sr. No.	Grade Of Cement Concrete	MSA.	Min. Avg. Compressive Strength Of 3-Specimen AT FIELD ON 15 X 15 X 15 Cms. Cubes.	Min. Avg. Compressive Strength Of 3-Specimen AT LAB. ON 15 X 15 X 15 Cms. PRELIMINARY TEST CUBES.	MIN. CEMENT LEVEL REQ. AS PER IS PCC / RCC.	CEMENT LEVEL CONSIDER IN THE RATE PCC / RCC.	MAX. W/C. RATIO PCC / RCC.	REMARKS.
1	2	3	4.	5.	6.	7.	8.	9.
		mm.	kg/cm ² at 28 days.	kg/cm ² at 28 days.	kg/cum.	kg/cum.		
1	M-15.	40	180	212	210	280	0.64	For P.C.C. moderate expose condition.

NOTES :-

- 1 Concrete works classified as above shall be designed with reference to the field strength shown in above table. Other requirements shall have to be adjusted to obtain this strength in each case incl. cement level. indicated in above table
- 2 Compressive strength mention in column no-4 is based on characteristic compressive strength compliance requirement given on table-11 page no-30 of IS-456-2000.And it is the average characteristic compressive strength of three specimens.
- 3 Compressive strength mentioned in column no-5 is based on para-9.2.2 (page no-22) of IS-456-2000 (The target mean strength of concrete Mix should be equal to the characteristic strength plus 1.65 times the std. deviation). Standard deviation of 3.5 is taken for M-10 & M-15,4.0 is for M-20 & M-25, and 5.0 is for M-30 as per IS-456,Page-23,Table-8
- 4 The test result of the sample shall be the average of the strength of three specimens. The individual variation should not be more than(+)or(-)15 percentage of the average.
- 5 The characteristic strength compliance requirement mentioned in column No-4 and target mean strength mentioned in column No-5 are based on 'GOOD QUALITY CONTROL' and MODERATE exposer condition.
- 6 For every one kg of cement required to be reduced than that of stated in column No-7 of Table-AA in each case based on approved laboratory design mix/nominal mix, the recovery shall be made at Rs. **6.78 Per kg.** of cement. And for every one kg of cement required to be added than that of stated in column No-7 of Table-AA, in each case based on approved laboratory design mix/nominal mix, NO EXTRA payment shall be made.
- 7 Curing period shall be 21 days (min.) for OPC / PPC Cement.
- 8 Above details are primarily given for the guidance of contractor while quoting there tender rate and is only informative for the general requirement of concrete.

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

11.0 PROPORTIONS FOR NOMINAL MIX CONCRETE :-

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

TABLE : BB SAMPLING AND STRENGTH OF NOMINAL MIX CONCRETE

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

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 born by the department.

12.0 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-AA column-4 & 5 respectively. Mix design done earlier not prior to one year may be considered adequate for later work provided there is no change in source and quality of the materials.

The design mix shall be carried out in Govt. laboratory (GERI) / Govt. approved private Laboratory / Govt. Polytechnic collage at the cost of the **Contractor** as per IS-10262.

13.0 FORMS FOR CONCRETE:

IS-457 shall be applicable.

GENERAL :

- i) The forms for concrete work shall have sufficient strength and rigidity to hold and to with stand the pressure of fresh concrete during compaction, incl. live 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 deterioration 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.

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.

iv) CLINING 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.

v) ERRECTION OF FORMS :

Where forms for continuous surface are placed in successive units, the forms shall fit tightly over the complete surface, so as to prevent leakage of mortar from the concrete and to maintain accurate alignment of the surface. Forming of block joints to the concrete portion shall be done carefully to ensure 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.

vi) 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, walk ways, 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.

14.0) 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.

15.0) 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 CONEAL 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

16.0 SAMPLING AND STRENGTH OF DESIGNED CONCRETE MIX/NOMINAL MIX. (Provision of IS: 457-1957)

General :

Samples from fresh concrete shall be taken as per IS: 1199 and cubes shall be made, cured and tested at 7 days and 28 days in accordance with IS: 516.

Sampling procedure :

A random sampling procedure shall be adopted .

Frequency : (IS : 457-1957)

The minimum frequency of sampling of concrete of each grade for compressive strength shall be in accordance with the following

Quantity of concrete in the work, m ³	Numbers of samples.
(i) Approximately each 380 m ³ of mass plain cement concrete.	One sample for 7-days and one sample for 28-days per shift per mixing unit per day.
(ii) Approximately each 190m ³ of mass Reinforced cement concrete / one's per day.	----- do -----

Test Specimen :-

Three test specimens shall be made for each sample for testing at 7-days and 28 days.

Test Results of sample :

The test results of the sample shall be the average of the strength of three specimens. The individual variation should not be more than $\pm 15\%$ of the average. If more, the test results of the sample are invalid.

17.0 INSPECTION OF FOUNDATION BEFORE CONCRETE PLACEMENT:

Following care shall be taken for rock surface, soil surface & concrete surface.

Rock Surface :

- Check lines & levels, obtain clearance of geologist.
- Inspect with hammer for hollow sound.
- Remove loose rock.
- Clean with air and water jets under pressure.
- Keep surface wet for 24 hrs before placement of concrete.
- Ensure adequate drainage or dewatering or caulking for leaks.

Soil Surface :

- Remove loose or soft patches.
- Moisture the surface to a depth of about 15 cm for 24 hrs before placement of concrete.
- Do tamping or rolling.

Concrete Surface :

- Remove loose material.
- Existing concrete should be wet sand blasted & washed thoroughly.
- Completely dried immediately prior to placement.

18.0 CONSTRUCTION JOINTS AND COLD JOINTS:-

Joints are a common source of weakness and therefore it is desirable to avoid them. If this is not possible, their number shall be minimized. Concreting shall be carried out continuously up to construction joints. The position and arrangement of which shall be indicated by the designer. Construction joints should comply with IS 11817.

Construction joints shall be placed at accessible locations to permit cleaning out of laitance, cement slurry and unsound concrete, in order to create rough / uneven surface. It is recommended to clean out laitance and cement slurry by using wire brush on the surface of joints immediately after initial setting of concrete and to clean out the same immediately thereafter. The prepared surface should be in a clean saturated surface dry condition when fresh concrete is placed, against it.

In the case of construction joints at location where the previous pour has been cast against shuttering the recommended method of obtaining a rough surface for the previously poured concrete is to expose

the aggregate with a high pressure water jet or any other appropriate means.

Fresh concrete should be thoroughly vibrated near construction joints so that mortar form the new concrete flows between large aggregate and develop proper bond with old concrete.

Where high shear resistance is required at the construction joints, shear keys may be provided.

Sprayed curing membranes and release against should thoroughly removed from joint surfaces.

19.0 CHIPPING AND ROUGHENING OF CONCRETE SURFACE:

At construction joints where fresh concrete is to be placed on old settled concrete, the surface of construction joints shall be clean rough and dry when covered with fresh concrete. Concrete surface upon or against which fresh additional concrete is to be placed shall be chipped off and roughened to a depth not more than 2 cm. After being roughened, the surface of the concrete shall be cleaned thoroughly of all loose fragments, dirt, lime and other objectionable materials and shall be sound and hard and in such conditions as to assume good mechanical bond between old and new concrete. All concrete which is not hard, dense and durable shall be removed to the depth required to secure a satisfactory surface. Cost of work of chipping, roughening and all above treatment at construction joints shall be deemed to have been included in the rate tendered for the item of concrete.

20.0 REPAIRS OF CONCRETE:

Repairs of concrete shall be performed by skilled workers. Repairs of imperfections in formed concrete shall be completed as soon as practicable within 24 hours after the removal of forms. Concrete that is damaged from any cause and concrete that is honey combed, fractured or other wise defective and concrete with excessive surface depressions must be removed and built up to bring the surface to the prescribed lines or shall be removed and replaced by dry patching mortar or concreting without any extra cost.

Where bulges and abrupt irregularities protrude outside the limits specified on formed surface, the protrusions shall be reduced both by hammering and griding so that the surface irregularities are brought within the specified limits.

Dry pack filling shall be used for holes that have surface dimensions smaller than the depth of holes left by the removal of fastener from the ends of form tie rods for grout inert holes and for narrow slots, cut for repairs of cracks. Dry pack mortar or concrete filling shall be resorted as directed by Engineer-in-charge.

All patching shall be done with extreme care so that patches will not be noticeable from a distance of 20m colored cement as an ingredient of the patching mortar shall be used if necessary, to produce patches of same colour as the adjoining concrete.

Dry Pack Mortar:

Repairs operation shall be preceded by a careful inspection to see that the hole is thoroughly clean and lightly wet but with a small amount of free water on the interior surface. The surface shall than dusted lightly and slowly with cement by means of a small dry brush until all surfaces are covered and darkened by the absorption of water by the cement. There shall be no dry cement in the hole when packing begins and such cement if present shall be removed. The hole shall not be painted with neat cement grout.

Dry pack mortar shall consist a mixture of 1 part of cement to 2 part of sand by volume that will pass IS sieve No.120, white cement will be used in sufficient quantity to produce uniform colour matching with that of surrounding concrete at points wherever desired by the Engineer.

For packing concrete holes a lean mix of 1:3 or 1:3 1/2 shall be used only enough water shall be used to produce a mortar which when used will stick together on being moulded in to a ball by slight pressure of hand and will not extrude water but will have the hand dump.

Proper compaction in layer wise shall be carried as directed by Engineer-in-charge. The holes shall not be overfilled and finishing shall be completed at once by the float of a hand wood piece against the fill and striking it several good blows. Finishing tools shall not be used and water shall be used to facilitate finishing.

21.0 CURING:

Curing is defined as maintenance of humidity and temperature of freshly placed concrete during definite period following finishing assuring satisfactory hydration of cementitious material and proper hardening of the concrete. The curing period depends upon type of cement, weather condition, wind speed, stripping time, sections of concrete, method of curing etc. Improper curing results in formation of surface shrinkage cracks, loss of strength, increase in permeability, spoilage of surface finishing, decrease durability and quality of concrete is affected. Moist curing, membrane curing are normally used. Former is predominantly used.

- (1) Concrete surface shall be kept moist continuously (day & night for 24 hours a day) for 14 days (curing period 14 days) as prescribed and directed.
- (2) Application of water shall begin after 12 hours of its placement or as directed by Engineer-in-charge.
- (3) Water shall be sprinkled over centering till its removal.
- (4) Cure horizontal surface of concrete with pond formation, Ponds shall be frequently filled of water. Jute soaked in water shall be used for vertical and slant surface of concrete. Water shall be frequently sprinkled over jute (bags or mats)
- (5) Curing arrangement shall be made under direction of the engineer.
- (6) Ensure that all exposed surface including sides, edges, and corners shall continuously moist throughout the curing period.

Curing Protection:

- (1) All concrete shall be protected against injury until final acceptance.
- (2) Unhardened concrete shall be protected from heavy rains and flowing water.
- (3) No fire or excessive load shall be permitted near or indirect contact with the concrete at any time during curing period.
- (4) All conduits and other opening shall be bulk hided during construction period to prevent free circulation of air and resultant drying of concrete.
- (5) Exposed finished surface of freshly laid concrete shall be protected from direct rays of the sun for at least first three days after placement, such protection shall be made effective as soon as practicable after placing of uniformed concrete or after the removal of forms of formed concrete.
- (6) Exposed concrete shall also be kept moist for at least 72 hours period to the placing of additional concrete up to the joints

22.0 PREVENTING HAIR CRACKS:

Hair cracks are usually the result of concentration of water finds at the exposed concrete surface caused by over manipulation during finishing operations. Such cracking is aggravated by untimely finishing and by too rapid drying & cooling when the humidity is so low as to cause cracking of the finished surface before it can be covered without damage. The surface shall be moistened and kept temporarily wet with a fine spray of water so as to wash the surface but not to form pools on it. Since chilling of the green concrete increase its tendency to crack, it is desirable that the water used for preliminary moistening not too cold and shall preferably be warmer than concrete.

Over working the surface and the addition of water / cement to aid in finishing shall be avoided. The resulting laitance will have impaired strength and durability and will be particularly vulnerable to freezing and thawing under wet conditions.

23.0 SEEPAGE WATER ENCOUNTER IN FOUNDATION: (CONCRETING)

When seepage water meets in foundation following care shall be taken under direction of Engineer-in-charge. No extra payment shall be made for that.

- (1) Make arrangement of continuously dewatering according to amount of seepage water.
- (2) As far as possible block the seepage way & reduce the flow of water.
- (3) Cofferdam or forms shall be sufficiently tight to ensure still (calm) water if practicable.
- (4) Reduce water cement ratio by adding more cement, cement content shall be at least 350 Kg/m³ of concrete i.e. rich concrete mix shall be used.
- (5) Vibration of very wet mixes (due to seepage water) shall also be avoided.

- (6) Concrete cast under water should not fall freely through the water, otherwise it may be leached and become segregated.
- (7) Concrete shall be deposited continuously until it is brought to the required height (No construction joint allowed) while depositing, the top surface shall be kept as nearly level as possible and the formation of seams avoided.
- (8) The methods to be used for depositing concrete under water shall be one of the as stated in IS: 456-2000 clause-14.2.4 on Page No.28.
- (9) To minimize the formulation of laitance, great care shall be exercised not to disturb the concrete as far as possible while it is being deposited.

24.0 QUALITY CONTROL RELATED :

Contractor shall have to provide skilled labourers, 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 equipments etc.

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 componants 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.

NOTE :

At least one sample shall be taken from each shift, where concrete is produced at continuous production unit, such as RMC plant. or as instructed by engineer in charge. The 28 days field and laboratory average compressive strength shall not be less than that mention in table-AA above.

SLUMP TEST :

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

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 deptt, 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 .

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.

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.

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.

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.

25.0 CONCRETING UNDER SPECIAL CONDITIONS:

- (a) Underwater Concreting: Concreting shall be carried as per above clause under heading “seepage water encounter in foundation”.
- (b) Hot weather concreting: Dampen the sub grade and forms, place concrete at the lowest practicable temperature, start curing early, use cold water or ice as a part of mixing water.
- (c) Cold weather concreting : Prevent concrete from freezing, concrete should be placed at temperature not lower than 50°C, maintain curing condition which fosters normal strength development without excessive heat, keep surface at a temperature that may not cause early freezing or seriously prolog hardening.

No extra payment shall be made to contractor for concreting under special condition as stated above.

26.0 RECORDS AND REPORTS:

A systematic joint record in the form approved by Engineer-in-charge shall be maintain to record the details regarding use of cement, number of mixes of concrete and of mortar used on works, rejected mixes, Location (Name of structure component with chainage and levels) in which concrete or mortar used and quality records like F.M., silt content and gradation of sand, gradation of crushed metal, weight / volume batching, test for fresh concrete (Slumps) and for cube specimens for compressive strength, weight of cubes etc. These records shall be signed by the Engineer or his authorized representative on the site. Compare results with standards if the contractor fails to scrutinize and verify the entries and sign the joint record, the record as scrutinized, verified and signed by the Engineer or his representative shall be taken final and binding on the contractor.

Ensure monthly summary reports giving compliance of instructions recorded in work order book.

27.0 TOLERANCE FOR CONSTRUCTION:**GENERAL:**

The intent of this paragraph is to establish tolerances that are consistent with modern construction practices, yet governed by the fact that permissible deviation will have no adverse effect on the structural action or operational function of the structure.

Where tolerances are not stated in the specifications or drawing for any individual structure or feature thereof, permissible deviations will be interpreted in conformity with the provision of this paragraph.

The contractor shall construct all concrete structures to the exact lines, grades and dimensions established. However inadvertent variation from the established lines, grades and dimensions will be permitted to the extent set forth herein provided that the Engineer reserves the rights to diminish the tolerances set forth herein for such tolerance which impairs the structural action or operational function of the structure. The notation of the drawings of specific maximum tolerance in connection with any dimension shall be considered as a supplemental to the tolerance specified herein.

Rejected work shall be remedied or removed and replaced at the expense if any by the contractor.

Tolerance in Dam and Appurtenant Works:

- 1) All Structures:
 - I) Variation of constructed lines outline from established position in plans.

In 6 m	10 mm
In 12 m	25 mm
 - II) Variations of dimensions of individual structural features from established position. In 6 m or more 30 mm
(in buried construction :- Twice the above amount).
- 2) Tolerances for placing reinforcement steel
 - (a) Variation of protective covering.
 - (I) below 50 mm cover 5 mm
 - With 50 mm cover 10 mm
 - Above 50 mm cover 12 mm
 - (II) Variation from indicated 25 mm
 - Spacing

28.00 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

29.0 MEASUREMENT AND PAYMENT:

Measurement and payment of concrete shall be made on basis of the actual volume of the concrete for the grade as placed within the lines as specified or as otherwise directed by the engineer-in-charge according to all the provisions mentioned above. No deduction shall be made for the space occupied by reinforcement and other metal work, electric conduit line etc. The reinforcement steel and other embedded metal parts shall be separately paid 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 installations like electric conduits, etc. All labour, materials, plants etc. involved in providing cement slurry and mortar on rock surface and construction joints etc. shall be deemed to be included in the unit rate to be paid for concrete. The work pertaining to labour anchorage for erection of horizontal and vertical of necessary supports, templates etc. will have to be carried out by the contractor as per separate items.

The rate is also inclusive of erection and removal of form work and centering, if any, required for the work due to change in design of the structure etc.

The rate includes concreting with best types for work required in the cases of block out and grooves. No extra payment shall be made for this.

**SIGNATURE OF
CONTRACTOR**

**DEPUTY EXECUTIVE ENGINEER
IRRIGATION SUB. DIVISION
BHAVNAGAR**

**EXECUTIVE ENGINEER
BHAVNAGAR IRRIGATION DIVISION
BHAVNAGAR**

Item wise Technical Specification

Name of Work: Installation of various instruments at Lakhanka and Hamirpara Irrigation Scheme

Item No. - 1

Providing, Supplying, installing, testing, and commissioning of a V-Notch Weir (Mechanical Flow Measuring Device) for measuring low flow seepage in dams. The device shall have a notch angle of 22.5°, 45°, 60°, or 90° depending on discharge range, a stainless-steel SS-304 / SS-316 plate with thickness of 3-5 mm, and be suitable for measurement ranges of approximately 0-50 L/s depending on notch angle. The weir shall have ±1% full-scale reading accuracy, operate under 5-100% humidity, temperature -20°C to +60°C, and provide corrosion protection through anti-corrosion finish. Complete in all respects as directed by the Engineer-in-Charge.

(1)90° V-NOTCH-20 X 40 Section 15 Lit/Sec

(A) mechanical flow measuring device (V-Notch & rectangular weir)

Supplying, installing, testing, and commissioning of a mechanical flow measuring device (V-Notch & rectangular weir) for measuring low flow seepage in dams. The device shall have a notch angle of 22.5°, 45°, 60°, or 90° depending on discharge range, a stainless-steel SS-304 / SS-316 plate with thickness of 3-5 mm, and be suitable for measurement ranges of approximately 0-100 L/s depending on notch angle. The weir shall have ±1% full-scale reading accuracy, operate under 5-100% humidity, temperature -20°C to +60°C, and provide corrosion protection through anti-corrosion finish. Complete in all respects as directed by the Engineer-in-Charge.

• V-Notch Wier

Parameter	Technical Specification
Instrument Name	V-Notch Weir (Triangular Weir)
Type	Mechanical Flow Measuring Device
Notch Angle	22.5°, 45°, 60°, or 90° depending on discharge range
Plate Material	Stainless Steel SS-304 / SS-316
Plate Thickness	Minimum 3 mm to 5mm
Measurement Range	Suitable for low flow seepage measurement (between 0.015 m ³ /s to 0.03 m ³ /s)
Corrosion Protection	Stainless steel plate with anti-corrosion finish

Installation Procedure

1. Site Selection: Select a suitable location at the downstream toe of the existing dam where seepage naturally emerges and can be easily collected.
2. Collection and Conveyance: Arrange a small channel or line from downstream toe drain/filter drain to collect the intercepted seepage and convey it safely to the measuring unit. Ensure seepage water is properly directed into the basin without turbulence or bypass flow.
3. Installation of Weir: Fix the V-notch/rectangular weir plate at the outlet of the chamber in a vertical position. Ensure it is properly aligned, level, and leak-proof.
4. Head Measuring Arrangement: Provide a hook gauge or point gauge upstream of the weir (at a distance $\geq 4H$) with a stilling well for accurate measurement of head.

5. Sealing and Finishing: Seal all joints using cement mortar or waterproofing material so that no leakage or bypass flow occurs.
 6. Calibration: Calibrate the setup using the Weir Discharge Equation to determine discharge accurately.
 7. Protection Measures: Provide covers, screens, or housing to protect the setup from debris, damage, and weather effects.
- Observation and Maintenance: Mark reference levels and maintain regular observations, inspection, and cleaning to ensure reliable performance.

Measurement & Payment

Measurement shall be made on a per number (each) basis

Item No. - 2

Providing, installing and commissioning permanent Ground Control Point (GCP) Settlement Marker comprising MS base plate (250×250×5 mm conforming to IS 2062), GI riser pipe 25 mm dia (medium class as per IS 1239), sand filling (clean river sand, loose), optional PVC/GI outer casing (min 100 mm dia), precast concrete cover (M20, 500×500×50 mm with central hole), MS/GI reference cap, and painting in black & white checkerboard pattern using weather-resistant enamel paint, complete with excavation, installation, alignment, and all materials, labour, tools, and accessories, suitable for survey works using Total Station / drone survey, complete as per specifications and direction of Engineer-in-Charge.

Providing, installing and commissioning permanent Ground Control Point (GCP) Settlement Marker comprising MS base plate (250×250×5 mm conforming to IS 2062), GI riser pipe 25 mm dia (medium class as per IS 1239), sand filling (clean river sand, loose), optional PVC/GI outer casing (min 100 mm dia), precast concrete cover (M20, 500×500×50 mm with central hole), MS/GI reference cap, and painting in black & white checkerboard pattern using weather-resistant enamel paint, complete with excavation, installation, alignment, and all materials, labour, tools, and accessories, suitable for survey works using Total Station / drone survey, complete as per specifications and direction of Engineer-in-Charge.

Providing, installing, protecting, and monitoring surface settlement markers in earthen dam embankment to measure vertical settlement of fill and foundation.

Sr. No.	Description	Specification
1.	Base Plate Material:	Mild Steel conforming to IS 2062 Size: 250 mm × 250 mm × 5 mm thick Finish: Anticorrosive paint / galvanization Central coupling: Welded socket for 25 mm pipe
2.	Riser Pipe	Material: GI pipe (Medium class as per IS 1239) Diameter: 25 mm Length: As required (extendable with threaded couplers) Joints: Threaded with proper alignment
3.	Sand Filling	Type: Clean river sand Properties: Non-cohesive Silt content < 5% Free from organic matter Placement: Loose (no compaction)
4.	Outer Casing (Recommended)	Material: PVC / GI Diameter: 100 mm (min) Function: Protect sand column and pipe
5.	Precast Concrete Cover	Grade: Minimum M20 Size: 500 mm × 500 mm × 50 mm thick Central hole: 100 mm diameter (minimum)
6.	Paint	Top surface painted in black & white checkerboard pattern (4 squares) Weather-resistant enamel paint High contrast for drone visibility
7.	Annular Filling (Inside Cover)	Material: Clean loose sand Condition: No grout / mortar permitted
8.	Reference Cap	Material: MS / GI Fixed at top of riser pipe Marked point for leveling

Installation Procedure

Pre-Installation Survey and Layout

Site Selection: Identify installation points on lines parallel to the dam center line at intervals of 50 m to 100 m.

Placement Strategy: Ensure lines are established at the edge of the dam's top width, at the edges of berms, or at suitable intervals along the slope.

Foundation Stability: If the foundation soil is not firm, markers must be placed at the toe of the dam and at distances of 50 m and 100 m from the toe.

Upstream/Downstream Distribution: Markers should be installed on both slopes, with the exception of upstream locations that remain submerged year-round.

Establishment of Reference Base Line

Control Line Setup: A reference base line must be established on firm ground completely outside the area of movement influenced by reservoir and embankment loads.

Positional Determination: The precise coordinates of all markers fixed on the embankment must be determined by survey with reference to this established base line.

Mechanical Installation

Sand Bedding: Prepare the base with 10–20 mm thick sand bedding.

Base Plate Installation: Place the MS plate horizontally, check the level using a spirit level, and record the initial RL (benchmark reference).

Riser Pipe Fixing: Connect the 25 mm GI pipe to the base plate, ensure vertical alignment (plumb), and secure the threaded connection properly.

Sand Column Formation: Provide casing if required. Fill the surrounding area with loose sand, ensuring no compaction, uniform filling, and no intrusion of embankment soil.

Embankment Construction: Place fill in layers and extend the riser pipe using couplers. Maintain verticality and avoid any bending or displacement.

Precast Cover Installation: Install the precast concrete block at crest level, ensuring the central hole aligns with the pipe and that there is no direct contact between the pipe and concrete.

Annular Sand Filling: Fill the gap between the pipe and the hole with loose sand; do not compact or grout.

Cap Fixing & Marking: Fix the reference cap and apply chainage marking along with the identification number.

Protection: Provide temporary barricading during construction and ensure clear visibility of the checkerboard marking.

Monitoring & Readings

Monitoring shall be carried out using an auto level or total station, with reference to a permanent benchmark.

Readings shall be taken weekly during construction. During the initial impounding stage, monitoring shall be conducted on a weekly or fortnightly basis.

For long-term observation, readings shall be recorded monthly or quarterly.

Measurement & Payment

Measurement shall be made on a per number (each) basis

shall include the cost of the plate, pipe, sand, casing, and concrete cover, along with installation and initial readings.

Key Notes:

The pipe shall not be restrained at any point.

The sand shall remain loose throughout its service life.

The concrete cover is intended solely for protection and shall not act as a structural connection.

Checkerboard marking shall be provided to improve visibility during drone surveys.

Item No. 3

Providing & laying in position 'NOMINAL MIX' cement concrete using cement sand and crushed aggregate by machine mix incl. necessary formworks, centering, scaffolding compaction by mechanical vibrator curing as directed with all lead & lift etc.

C) Concrete grade 1:2:4 and MSA-40mm (Graded)

1.0 Materials: -

Water shall conform to M-1, Cement shall conform to M-2, Sand shall conform to M-3 aggregates 40 to 63 mm. nominal size shall conform to M-4.

2.0 Workmanship: -

2.1 GENERAL:

Cement concrete in M-15 grade shall be carried out for all components of Protection Wall. The material to be used for concrete M-15 grade shall be applicable as per specification of principal materials laid under Section-V, Chapter-II. As per Item MSA-40 mm proposed for M-15 grade cement concrete. The proportion and gradation of all material shall be as proposed in concrete mix design M-15 finalized as per general technical specification, chepter III, para 2.4.. General specification of concrete as laid in Section-V, Chapter-III shall apply. Concrete work shall have to be carried out as per detailed drawing and instruction of Engineer-in-charge.

2.2 SCOPE OF WORK:

The scope of work for doing C.C. under this item includes concrete M-15 with use of cement, sand and coarse aggregates with all labours, use of equipments and machineries etc. along with necessary centering, form work erecting and compaction with use of needle vibrators together with finishing the exposed surface of concrete work to obtain dense and compact surface and curing up to specified period etc. complete.

2.3 Mixing: -

The concrete shall be mixed in a weigh batching mixing plant at the site of work. Mechanical mixer may however be allowed for smaller quantity of work if approved by the Engineer - in - charge. The mixing in mechanical mixer shall be done for a period 1 to 2 minutes. The quantity of water shall be sufficient to produce a dense concrete of required workability for the purpose.

2.4 Transporting and placing the concrete: -

The concrete shall be handled from the place of mixing to the final position in not more than 15 minutes by the method as directed and shall be placed in to its final position, compacted and finished within 30 minutes of mixing with water i.e. before the setting commences.

2.5 Compacting: -

The concrete shall be rammed with Needle vibrator and rapidly to get the required compaction and to allow all the interstices to be filled with mortar.

2.6 Curing: -

Curring shall be carried out as per chapter III, General specification of concrete para 13.0

3.0 MODE OF MEASUREMENT: -

Measurement shall be taken on cubic meter basis of completed work by c/s method.

The work shall be measured as length, breath & depth limiting the dimension as per sanctioned drawing as directed in writing by the Engineer-in-charge. The payment shall be made on cubic meter basis.

UNDERTAKING ON STATEMENT OF COMPLIANCE OF CLAUSE 3.2

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

Business (Name of Firm)

Address

Hereby declare, that for the work of

.....

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

Signature of Bidder

Place:.....

Date:.....

**UNDERTAKING FOR ENGAGING TECHNICAL STAFF &
MACHINERIES**

I/We.....

Age..... (Name of Firm).....

Business..... 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:.....