

W-5

**PROCUREMENT OF CIVIL WORKS
THROUGH
REQUEST FOR QUOTATION
(RFQ)/SHOPPING PROCEDURES**

*(Lump sum and percentage rate tender)
(Two-Envelope with e-Procurement)
(For Contracts valued less than the equivalent of US \$ 100,000
each)*

**RFQ No: WBMIFMP/DPIU-HOWRAH/NCB-02/21-22/ ROAD
IMPROVEMENT_KANPUR, issued on 16.03.2022**

Name of work:

**“Improvement of Subsided portion of Madaria left bank road
near Kanpur, Udaynarayanpur Block in the district of Howrah,
under Howrah Irrigation Division, I&W Directorate, Govt. of
West Bengal”**

at the office of

**The Executive Engineer,
Howrah Irrigation Division,
DPIU-HOWRAH, WBMIFMP,
Onkarmal Jetia Road,
P.O.- Botanical Garden, P.S. Shibpur,
Howrah - 711103, West Bengal**

REQUEST FOR QUOTATIONS

Procurement of Works under RFQ/Shopping Procedures

E-Procurement Notice

(Two-Envelope with e-Procurement Bidding Process)

Memo No: 442

Date: 16/03/2022

Project: West Bengal Major Irrigation and Flood Management Project (WBMIFMP)

Contract title: “Improvement of Subsided portion of Madaria left bank Road near Kanpur, Udaynarayanpur Block in the District of Howrah, under Howrah Irrigation Division, I&W Directorate, Govt. of West Bengal”

RFQ No: WBMIFMP/DPIU-HOWRAH/NCB_02/21-22/ ROAD IMPROVEMENT_KANPUR

Applicable Procurement Guidelines/Regulations Date: “Procurement Regulations for IPF Borrowers, July 2016 Revised August 2018 and November 2018” (“Procurement Regulations”)

1. Government of India has received/has applied for/intends to apply for financing from the World Bank towards the cost of the **West Bengal Major Irrigation and Flood Management Project (WBMIFMP)** Project and intends to apply part of the proceeds of this credit to eligible payments under the contract for which this request for quotations is issued. The **The Executive Engineer, Howrah Irrigation Division, DPIU-HOWRAH, WBMIFMP** (*implementing agency*) invites quotations electronically from eligible bidders for construction of the following works.

Brief Description of the Works	Approximate value of Works (Rs.)	Period of Completion
“Improvement of Subsided portion of Madaria left bank Road near Kanpur, Udaynarayanpur Block in the district of Howrah, under Howrah Irrigation Division, I&W Directorate, Govt. of West Bengal”	Rs. 74,90,728.28 (Rupees Seventy Four Lakhs Ninety Thousand Seven Hundred Twenty Eight and Paise Twenty Eight only)	4 (Four) Months including all seasons

2. This e-Procurement notice includes the following documents¹ to facilitate preparation and submission of quotations, criteria for qualification, evaluation, and for award of contract; and relevant forms to be filled by the bidders. Implementing Agency has not issued a separate RFQ document for this purchase. The e-Procurement notice including the various documents and forms to be filled etc. can be downloaded free of cost by logging on to the website <https://wbtenders.gov.in>. The bidders would be required to register in the website which is free of cost.

¹ IA to modify the list of documents as required.

- i. Layout Drawings of the works;
 - ii. Structural Details;
 - iii. Detailed Bill of Quantities, with estimated rates and prices;
 - iv. Technical Specifications;
 - v. Instructions to Bidders;
 - vi. Qualification Information;
 - vii. Format for Submission of Quotation;
 - viii. Criteria for Evaluation and Award of Contract;
 - ix. Relevant Forms; and
 - x. Draft Contract Agreement format which will be used for finalizing the agreement for this Contract.
3. For submission of the bid, the bidder is required to have Digital Signature Certificate (DSC) from one of the Certifying Authorities authorised by Government of India for issuing DSC. Aspiring bidders who have not obtained the user ID and password for participating in e-procurement in this Project, may obtain the same from the website: <https://wbtenders.gov.in>.

Any bidder not having the DSC may obtain the same from NIC on payment of requisite fees, before the bid submission deadline.

4. Quotations, both Technical Part and Financial Part shall be submitted on <https://wbtenders.gov.in> on or before 14:00 hours on 07.04.2022. Any quotation or modifications to quotation received outside e-procurement system will not be considered. The electronic bidding system would not allow late submission of quotations. The 'Technical Part' of the Quotations will be opened online on 07.04.2022 at 15:00 hours, this can also be viewed by the bidders online. The electronic summary of quotation opening of technical part will be generated and uploaded online.
5. If the implementing agency's office happens to be closed on the date of opening of the Quotations as specified, the 'Technical Part' of the Quotations will be opened on the next working day at the same time. The Financial Parts of the Quotations shall remain unopened in the e-procurement system, until the subsequent online opening, following the evaluation of the Technical Parts of the Quotations.
6. Other details can be seen in the RFQ document. The implementing agency shall not be held liable for any delays due to system failure beyond its control. A Bidder requiring any clarification of the RFQ document may notify the Implementing agency online or may visit the office of the implementing agency at the address given below.

The address for communication is as under:

- A.1 **Name & Designation of Officer: The Executive Engineer, Howrah Irrigation Division, DPIU-HOWRAH, WBMIFMP, I & W Directorate, Government of West Bengal**
- A.2 **Official Address: Onkarmal Jetia Road, P.O.- Botanical Garden, P.S. Shibpur, Howrah - 711103, West Bengal**
- A.3 **Email: dpiu.howrah21@gmail.com**
- A.4 **Telephone: 033-26881521**

GOVERNMENT OF WEST BENGAL

PROJECT: West Bengal Major Irrigation and Flood Management Project (WBMIFMP)

NATIONAL OPEN COMPETITIVE PROCUREMENT

(Two-Envelope Quotationing Process with e-Procurement)
(For Lump Sum and Percentage Rate Tender in Civil Works)

NAME OF WORK: “Improvement of Subsidised portion of Madaria left bank road near Kanpur, Udaynarayanpur Block in the district of Howrah, under Howrah Irrigation Division, I&W Directorate, Govt. of West Bengal”

PERIOD OF DOWNLOADING OF BIDDING DOCUMENT ONLINE	FROM 18/03/2022 (18: 00HoursIST) TO 07/04/2022 (14:00 Hours IST)
LAST DATE AND TIME FOR RECEIPT OF CLARIFICATION BY BIDDERS	22/03/2022 UPTO 16:00 Hours (IST)
TIME AND DATE OF PRE-BID MEETING AT THE OFFICE OF THE EXECUTIVE ENGINEER, HOWRAH IRRIGATION DIVISION.	23/03/2022 AT 15:00 Hours (IST)
START DATE AND TIME FOR SUBMISSION OF BIDS	25/03/2022 AT 15.00 Hours (IST)
LAST DATE AND TIME FOR RECEIPT OF BIDS	07/04/2022 UPTO 14:00 Hours (IST)
*TIME AND DATE OF OPENING OF BIDS – TECHNICAL PART	07/04/2022 AT 15:00 Hours (IST)
VALIDITY REQUIRED FOR BANK GUARANTEE FOR BIDS SECURITY	AT LEAST UPTO 09/08/2022
TIME AND DATE OF OPENING OF BIDS - FINANCIAL PART	<i>The firms that qualify technically shall be notified subsequently for opening of the financial part of their bids.</i>
PLACE OF OPENING OF BIDS	<i>Office of the Executive Engineer, Howrah Irrigation Division, WBMIFMP Address: Onkarmal Jetia Road, P.O.- Botanical Garden P.S. Shibpur, Howrah, West Bengal Pin Code:711-103 Country: India, Telephone: 033-26881521 Electronic mail address:dpiu.howrah21@gmail.com</i>
OFFICER INVITING BIDS	<i>Executive Engineer, Howrah Irrigation Division, DPIU-HOWRAH, WBMIFMP</i>

**Should be the same as the deadline for submission of bids or promptly thereafter. The firms that qualify technically shall be notified subsequently for opening of the financial part of their bids.*

Instructions to Bidders

SECTION - A

1. Scope of Works

The **Executive Engineer, Howrah Irrigation Division, DPIU-HOWRAH, WBMIFMP** (*implementing agency & Employer*) invites quotations for the construction of works as detailed in the table given below

Brief Description of the Works	Approximate value of Works (Rs.)	Period of Completion
“Improvement of Subsided portion of Madaria left bank Road near Kanpur, Udaynarayanpur Block in the district of Howrah, under Howrah Irrigation Division, I&W Directorate, Govt. of West Bengal”	Rs. 74,90,728.28 (Rupees Seventy Four Lakhs Ninety Thousand Seven Hundred Twenty Eight and Paise Twenty Eight only)	4 (Four) Months including all seasons

The successful bidder will be expected to complete the works by the intended completion date specified above.

2. Qualification of the bidder

2.1. Qualification Information to be provided by the Bidder: the bidder shall provide information on his qualification which shall include: -

- (a) Total monetary value of works executed by him for each year of the last 3 years;
- (b) List of works (similar to the works described in Para 1) completed satisfactorily as a prime contractor during the last 3 years, enclosing certificates from the respective Employers in support of experience claimed along with the Employers’ contact numbers;
- (c) Report on his financial standing, along with last 3 years’ financial statements/Profit and Loss Statements; and
- (d) Details of any litigation, during the last 3 years in which the bidder is involved, the parties concerned, and disputed amount or award in each case (Give details of both completed and pending cases).

2.2. Qualification Criteria: to qualify for award of the contract, the bidder: -

1. Should have satisfactorily completed as a prime contractor at least one similar work of value not less than Rs. 60.00 Lakh (Sixty lakh) in the last three years;
[IA should insert value equivalent to 80% of the estimated cost of the work.]
3. **Eligibility – Conflict of Interest:** A Bidder (a) shall not participate in more than one Quotation; (b) shall not have conflict of interest as defined in the Bank’s Procurement Regulations/ Guidelines and (c) should not have been (i) temporarily suspended or debarred by the World Bank Group in compliance with the Bank’s Anti-Corruption Guidelines and its Sanctions Framework.
4. **Clarifications & Amendments:** If the Employer receives any request for clarification of this RFQ document, it will upload its response together with any amendment to this document, on the e-procurement portal for information of all Bidders. Bidders should check on the e-procurement system, for any amendments to this RFQ document.
5. **Quotation Prices**
 1. The quotation shall be for construction of the whole works as described in the Bill of quantities, drawings and technical specifications. Corrections, if any, in the quotation shall be carried out by editing the information before electronic submission on e-Procurement Portal.
 2. All duties, taxes and other levies payable by the contractor under the contract shall be included in the total price.
 3. The rates quoted by the bidder shall be fixed for the duration of the contract and shall not be subject to adjustment on any account.
 4. The rates should be quoted in Indian Rupees only.
 5. **Bid security @ 2% of works** value to be submitted in the form of Bank Guarantee from any scheduled bank in favour of **The Executive Engineer, Howrah Irrigation Division, DPIU-HOWRAH, WBMIFMP**. Original B.G. (EMD) for an amount of **Rs. 1,50,000/-** in favour of Executive Engineer, Howrah Irrigation Division will have to be submitted physically to the office of the Executive Engineer, Howrah Irrigation Division within the last date of Bid Submission i.e 07/04/2022 upto 14:00 Hours (IST) otherwise the Bid will be cancelled.
6. **Preparation of Quotations**
 - 6.1 The bidder is advised to visit the site of works at his own expense and obtain all information that may be necessary for preparing the quotation.
 - 6.2 Each bidder shall submit only one quotation. Bidders shall not contact other Bidders on matters relating to this quotation.

6.3 The quotation shall comprise two Parts, namely the Technical Part and the Financial Part. Both Parts shall be submitted online simultaneously.

6.4 The Technical Part of Quotation shall comprise the following:

- (a) **Letter of Quotation – Technical Part** as per Format given in Section B;
- (b) **Authorization:** Power of Attorney of signatory of Quotation (Paragraph 1.1 of Qualification Information);
- (c) **Annual Turnover:** Confirmation showing Annual Turnover in civil engineering construction works of similar nature in the last three financial years. [ITB Clause 2.1 (a)];
- (d) **Qualifications:**
 - (i) Qualification information and supporting documents relating to similar nature of works executed and payments received. (ITB Clause 2.1 (b) and paragraph 1.3 of Qualification Information);
 - (ii) Details of proposed sub-contractors; (Paragraph 1.4 of Qualification Information); and
 - (iii) Other details listed in Paragraphs 1.6 and 1.7 of the Qualification Information Form;
- (e) **Complete address** and contact details of the Bidder having the following information:

Name of Firm
Address for communication
Telephone No(s): Office
Mobile No.
Facsimile (FAX) No.
Electronic Mail Identification (E-mail ID)
- (f) The Technical Part of Quotation shall not include any financial information related to the Quotation price. Where material financial information related to the Quotation price is contained in the Technical Part of Quotation, the Quotation shall be declared non-responsive.

6.5 The Financial Part of Quotation shall comprise the following:

- (a) **Letter of Quotation - Financial Part;**
- (b) **Priced Bill of Quantities:** (using the BOQ uploaded with the RFQ document) wherein the rates shall be entered online.

6.6 Signing of Quotations: The name and position held by each person signing the quotation and related documents must be typed or printed below the signature.

6.7 Deadline for Submission of Quotations: Quotations must be uploaded online no later than the deadline for submission of quotations viz. time 14.00 (hours) and date 07.04.2022 (day, month, year), as per server time. A Bidder may modify its Quotation any number of times by using the appropriate option on the e-Procurement Portal, before the deadline for submission of Quotations.

6.8 Validity of Quotation: Quotation shall remain valid for a period not less than 45 days after the deadline date specified for submission.

7. Quotation Submission:

(a) The Letter of Quotation – Technical Part, and Letter of Quotation – Financial Part shall be filled, signed and scanned copies shall be uploaded along with the Priced Bill of Quantities that shall be entered using the Forms available online, without any alterations. All blank spaces shall be filled in with the information requested. Scanned copies of all other documents shall also be uploaded on the e-procurement website.

(b) All documents are required to be signed digitally by the Bidder. The System generates a Unique Quotation Identification Number, time stamped as per server time, as an acknowledgement for Quotation submission. Detailed guidelines for viewing and submission of Quotations online are given in the website.

8. Online Opening and Evaluation of Technical Parts of Quotations: The ‘Technical Part’ of the Quotations will be opened online on the specified date and time. This can also be viewed by the bidders online, and electronic summary of quotation opening of technical part will be generated and uploaded online. The Financial Parts of the Quotations shall remain unopened in the e-procurement system, until the subsequent online opening, following the evaluation of the Technical Parts of the Quotations.

- The Employer shall examine the technical part of the quotation to determine whether the quotation (a) has been properly signed (Clause 6.6); (b) meets the eligibility criteria (Clause 3); (c) is substantially responsive to the requirements of the RFQ document; and (d) meets the qualification criteria specified in ITB Clause 2.
- Only Quotations that are both substantially responsive to the RFQ document and meet all Qualification Criteria shall qualify for opening of the Financial Parts of their Quotations at the second online opening.
- Employer shall notify in writing those Bidders who have failed to meet the Qualification Criteria or whose Quotations were considered non-responsive to the requirements in the RFQ document, advising them that their Technical Part of Quotation failed to meet the requirements of the RFQ document; and that their Financial Part of the Quotation shall not be opened.
- Simultaneously Employer shall notify in writing those Bidders whose Technical Parts of Quotations have been evaluated as substantially responsive and meeting the Qualification Criteria that their Quotation has been evaluated as substantially responsive to the RFQ document and that their Financial Part of Quotation will be opened online at Date and time.

9. Online Opening and Evaluation of Financial Parts of Quotations: The ‘Financial Part’ of the Quotations will be opened online on the specified date and time. This can

also be viewed by the bidders online, and electronic summary of quotation opening of financial part will be generated and uploaded online.

- a) The Employer shall examine and confirm that Letter of Quotation – Financial Part and Priced Bill of Quantities are in accordance with the requirements specified in the RFQ document. If any of these documents or information is missing, the offer shall be rejected.
- b) During the evaluation of Financial Parts of Quotation, the substantial responsiveness of the Quotations will be further determined with respect to those RFQ conditions that were not examined in evaluation of Technical Parts of Quotations.

10. Award of contract

The Employer will award the contract to the bidder whose quotation has been determined to be substantially responsive and who has offered the lowest evaluated quotation price and who meets the specified qualification criteria.

10.1 Notwithstanding the above, the Employer reserves the right to accept or reject any quotations and to cancel the bidding process and reject all quotations at any time prior to the award of contract.

10.2 The bidder whose quotation is accepted will be notified of the award of contract by the Employer prior to expiration of the quotation validity period.

11. Performance Security

Within 15 days of receiving letter of acceptance, the successful bidder shall deliver to the The **Executive Engineer, Howrah Irrigation Division, DPIU-HOWRAH, WBMIFMP** (Employer) the performance security (either a bank guarantee or a bank draft in favour of the Employer) for an amount equivalent of 3 % of the contract price. The Performance Security shall be valid till the expiry of the period of maintenance of the work, specified in Clause 12. Failure of the successful Bidder to furnish performance security and to sign the agreement within the period stipulated shall constitute sufficient grounds for annulment of award and debarring the bidder from participation in bidding for works by the Employer for a period of one year, in which case the Employer may make the award to the next lowest evaluated bidder or seek quotations afresh.

12. Period of Maintenance:

The “Period of Maintenance” for the work is six months from the date of taking over possession or one full monsoon season whichever occurs later. During the period of maintenance, the contractor will be responsible for rectifying any defects in construction free of cost to the Employer.

13. Supply of all construction materials including cement and steel as per the specifications (ISI certification marked goods wherever available) shall be the responsibility of the contractor. Employer will not issue any material/equipment.

SECTION - B

- 1. Format for Qualification Information.**
- 2. Format for Submission of Quotation.**
- 3. Format of Letter of Acceptance.**

QUALIFICATION INFORMATION

1 For Individual Bidders

1.1 Principal place of business: _____

Power of attorney of signatory of Quotation.
[Attach copy]

1.2 Total value of Civil Engineering construction work performed in the last three years (in Rs. Lakhs)

	2018-19	_____
	2019-21	_____
	2020-21	_____

1.3 Work performed as prime contractor (in the same name) on works of a similar nature over the last three years.

<u>Project Name</u>	<u>Name of Employer</u>	<u>Description of work</u>	<u>Contract No.</u>	<u>Value of contract (Rs. Lakhs)</u>	<u>Date of issue of work order</u>	<u>Stipulated period of completion</u>	<u>Actual date of completion*</u>	<u>Remarks explaining reasons for delay and work completed</u>
---------------------	-------------------------	----------------------------	---------------------	--------------------------------------	------------------------------------	--	-----------------------------------	--

Existing commitments and on-going works:

Description of Work	Place & State	Contract No. & Date	Value of Contract (Rs. Lakhs)	Stipulated period of completion	Value of works* remaining to be completed (Rs. Lakhs)	Anticipated date of completion
(1)	(2)	(3)	(4)	(5)	(6)	(7)

* *Enclose a certificate from the Engineer concerned for completion as well as value of pending works.*

1.4 Proposed subcontracts and firms involved.

Sections of the works	Value of Sub-contract	Sub-contractor (name & address)	Experience in similar work
*	*	*	*
*	*	*	*
*	*	*	*
*	*	*	*

1.5 Evidence of access to financial resources to meet the requirements of working capital: cash in hand, lines of credit, etc. List them below and attach copies of supporting documents.

1.6 Name, address, and telephone, telex, and fax numbers of the Bidders' bankers who may provide references if contacted by the Employer.

1.7 Information on litigation history in which the Bidder is involved.

Name of the work	Agreement number/date	Name & address of Employer	Contract Value in Rs	Cause of dispute	Amount Disputed	Remarks showing present status

Letter of Quotation–Technical Part

The Bidder must prepare the Letter of Quotation on stationery with its letterhead clearly showing the Bidder's complete name and address. The italicized text is for Bidder's guidance in preparing these forms and shall be deleted from the final products.

Description of the Works*: **“Improvement of Subsidied portion of Madaria left bank Road near Kanpur, Udaynarayanpur Block in the district of Howrah, under Howrah Irrigation Division, I&W Directorate, Govt. of West Bengal”**

RFQ No.: **WBMIFMP/DPIU-HOWRAH/NCB_02/21-22/ ROAD IMPROVEMENT_KANPUR**

Our Reference: No..... Dated.....

To: **The Executive Engineer,
Howrah Irrigation Division,
DPIU-HOWRAH, WBMIFMP
I & W Directorate, Government of West Bengal
Onkarmal Jetia Road, P.O.- Botanical Garden,
P.S. Shibpur, Howrah - 711103, West Bengal**

Subject: **“Improvement of Subsidied portion of Madaria left bank Road near Kanpur, Udaynarayanpur Block in the district of Howrah, under Howrah Irrigation Division, I&W Directorate, Govt. of West Bengal”**

Reference : Letter No.....dated.....from.....

Sir,

1. We, the undersigned, hereby submit our Quotation in two parts, namely:

- (a) Technical Part; and
- (b) Financial Part

2. In submitting our Quotation, we make the following declarations:

- (a) **No reservations:** We have examined and have no reservations to the RFQ document;
- (b) **Conformity:** We offer to execute the subject work in conformity with the RFQ document and in accordance with the Period of Completion specified in Section A.;
- (c) **Quotation Validity Period:** Our Quotation shall be valid for the period of 45 days, from the deadline fixed for the Quotation submission;

- (d) **Eligibility:** We meet the eligibility requirements and have no conflict of interest, we are not participating in more than one quotation in this bidding process, and we have not been temporarily suspended or debarred by the World Bank.
- (e) **Fraud and Corruption:** We hereby certify that we have taken steps to ensure that no person acting for us or on our behalf will engage in any type of corrupt, fraudulent, collusive, coercive, or obstructive practices.
- (f) **ESHS/GBV Compliance:** We hereby undertake to comply with (i) the applicable Laws/ Rules/ Regulations for protection of environment, public health and safety; (ii) the regulatory authority conditions (if any) attached to any permits or approvals for the project; and (iii) the Management Strategies and Implementation Plan (MSIP) to manage the Environmental, Social (including sexual exploitation and abuse (SEA) and gender based violence (GBV)), Health and Safety (ESHS) risks, and ESHS Code of Conduct, (if any prescribed by the Employer), that will apply to us, our employees and all subcontractors.

Yours faithfully,

Authorized Signature : Date: _____

Name & Title of Signatory : _____

In the capacity of *[insert legal capacity of person signing the Letter of Quotation]*

Name of Bidder : _____

Address : _____

Dated on _____ day of _____, _____ *[insert date of signing]*

* ***To be filled in by the Employer before issue of the Letter of Invitation.***

** ***To be filled in by the Bidder, together with his particulars and date of submission at the bottom of this Form.***

Letter of Quotation–Financial Part

The Bidder must prepare the Letter of Quotation on stationery with its letterhead clearly showing the Bidder's complete name and address. The italicized text is for Bidder's guidance in preparing these forms and shall be deleted from the final products.

Description of the Works*: **“Improvement of Subsidied portion of Madaria left bank road near Kanpur, Udaynarayanpur Block in the district of Howrah, under Howrah Irrigation Division, I&W Directorate, Govt. of West Bengal”**

RFQ No.: **WBMIFMP/DPIU-HOWRAH/NCB_02/21-22/ ROAD IMPROVEMENT_KANPUR**

Our Reference: No..... Dated.....

To: **The Executive Engineer,
Howrah Irrigation Division,
DPIU-HOWRAH, WBMIFMP
I & W Directorate, Government of West Bengal
Onkarmal Jetia Road, P.O.- Botanical Garden,
P.S. Shibpur, Howrah - 711103, West Bengal**

Subject: **“Improvement of Subsidied portion of Madaria left bank road near Kanpur, Udaynarayanpur Block in the district of Howrah”**

Sir,

1. We, the undersigned, hereby submit the second part of our Quotation, the Financial Part including the Quotation Price and Bill of Quantities. In submitting our Financial Part we make the following additional declarations:

(a) **Validity:** Our Quotation shall be valid for the period of 45 days from the deadline fixed for the Quotation submission;

(b) **Quotation Price:** The total price of our Quotation including any unconditional discounts, offered in accordance with the Conditions of Contract is at percentage above / below the estimated rates, i.e., for a total Contract Price of –

Rs.** _____ [in figures]

Rs. _____ [in words];

- (c) **Commissions, gratuities and fees:** We have paid, or will pay the following commissions, gratuities, or fees with respect to the Bidding process or execution of the Contract: *[insert complete name of each Recipient, its full address, the reason for which each commission or gratuity was paid and the amount and currency of each such commission or gratuity. If none has been paid or is to be paid, indicate "none."]*

Yours faithfully,

Authorized Signature

Name & Title of Signatory _____

In the capacity of *[insert legal capacity of person signing the Letter of Quotation]*

Name of Bidder _____

Address _____

Dated on _____ day of _____, _____ *[insert date of signing]*

To be filled in by the Employer before issue of the Letter of Invitation.

**** *To be filled in by the Bidder, together with his particulars and date of submission at the bottom of this Form.***

**LETTER OF ACCEPTANCE
CUM NOTICE TO PROCEED WITH THE WORK**

(LETTERHEAD OF THE EMPLOYER)

Dated: _____

To: _____ [Name and address of the Contractor]

Dear Sirs,

This is to notify you that your quotation dated _____ for execution of the _____ for the contract price of Rupees _____ [amount in words and figures], is hereby accepted by us.

You are hereby requested to furnish performance security for an amount of Rs. _____ (equivalent to 3% of the contract price) within 15 days of the receipt of the letter. The Performance Security in the form of Bank guarantee or a Bank draft in favour of..... (Employer) shall be valid till the expiry of the period of maintenance i.e. up to _____. Failure to furnish the Performance Security will entail cancellation of the award of contract.

You are also requested to sign the agreement form and proceed with the work not later than _____ under the instructions of the Engineer, _____ and ensure its completion within the contract period.

With the issuance of this acceptance letter and your furnishing the required Performance Security, the contract, for the above said work, stands concluded.

Yours faithfully,

**Authorized Signature
Name and title of Signatory of Employer**

Draft Contract Agreement form for Construction through National Shopping

ARTICLES OF CONTRACT AGREEMENT

1.0 This deed of agreement is made in the form of agreement on _____ day _____ month _____ 20 ____, between the _____ (Employer) or his authorized representative (hereinafter referred to as the first party) and _____ (Name of the Contractor), S/O _____ resident of _____ (hereinafter referred to as the second party), to execute the work of construction of _____ (hereinafter referred to as works) on the following terms and conditions.

2.0 Contract Price

The total Contract Price for the works (hereinafter referred to as the “total price”) is Rs. _____ as reflected in Annexure - 1.

3.0 Payments under its contract:

Payments to the second party for the construction work will be released by the first party in the following manner:-

- 3.1 The Contractor shall submit to the Project Manager monthly statements of the estimated value of the work executed less the cumulative amount certified previously for a minimum value of executed works of INR 5.00 Lakhs.
- 3.2 The Project Manager shall check the Contractor’s monthly statement and certify the amount to be paid to the Contractor.
- 3.3 The value of work executed shall be determined by the Project Manager.
- 3.4 The value of work executed shall comprise the value of the quantities of work in the Bill of Quantities that have been completed.²
- 3.5 The value of work executed shall include the valuation of Variations and Compensation Events.
- 3.6 The Project Manager 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.
- 3.7 If the Contractor was, or is, failing to perform any ES obligations or work under the Contract, the value of this work or obligation, as determined by the Project Manager, may be withheld until the work or obligation has been performed, and/or the cost of rectification or replacement, as determined by the Project Manager, may be withheld until rectification or replacement has been completed. Failure to perform includes, but is not limited to the following:

² In lump-sum contracts, replace this paragraph with the following: “The value of work executed shall comprise the value of completed activities in the Activity Schedule.”

- (a) failure to comply with any ES obligations or work described in the Works' Requirements which may include: working outside site boundaries, excessive dust, failure to keep public roads in a safe usable condition, damage to offsite vegetation, pollution of water courses from oils or sedimentation, contamination of land e.g. from oils, human waste, damage to archaeology or cultural heritage features, air pollution as a result of unauthorized and/or inefficient combustion;
- (b) failure to implement remediation as instructed by the Project Manager within the specified timeframe (e.g. remediation addressing non-compliance/s).

Payments shall be adjusted for deductions for advance payments and retention. The Employer shall pay the Contractor the amounts certified by the Project Manager within 28 days of the date of each certificate. The proportion of payments retained (**Retention Money**) shall be **6% from each bill subject to the maximum of 5% of final contract price**. If the Employer makes a late payment, the Contractor shall be paid interest on the late payment in the next payment. Interest shall be calculated from the date by which the payment should have been made up to the date when the late payment is made at the prevailing rate of interest for commercial borrowing for

On signing of agreement : 10% of total cost, as interest free advance against receipt of an unconditional bank guarantee from the Contractor for an equivalent amount valid up to the Intended Completion Date, in the format attached.

3.8 Payments at each stage will be made by the first party:

- (a) on the second party submitting an invoice for an equivalent amount;
- (b) on certification of the invoice (except for the first installment) by the engineer nominated by the first party with respect to quality/quantity of works executed in the format in Annexure - 2; and
- (c) upon proper and justified utilization of at least 50 % of the previous installment and 100 % of any prior installment.
- (d) Payments shall be adjusted for deductions for advance payments, recoveries if any in terms of the contract, and taxes at source, as applicable under the law.
- (e) The advance (if availed by the contractor) shall be repaid with percentage deductions from the interim payments, commencing with the next Interim Payment at the rate of 20 percent of the amounts of all Interim Payment Certificates until the advance has been repaid, provided that the advance shall be completely repaid prior to the expiry of the Intended Completion Date. The Bank Guarantee shall remain effective until the advance payment has been fully repaid.

4.0 Notice by Contractor to Engineer

The second party, on the works reaching each stage of construction, issue a notice to the first party or the Engineer nominated by the first party (who is responsible for supervising the contractor, administering the contract, certifying the payments due to the contractor, issuing and valuing variations to the contract, awarding extensions of time etc.), to visit the site for certification of stage completion. Within 15 days of the receipt of such notice, the first party or the engineer nominated by it, will ensure issue of stage completion certificate after due verification.

5.0 Completion time

The works should be completed in **four months** from the date of this Agreement. In exceptional circumstances, the time period stated in this clause may be extended in writing by mutual consent of both the parties.

6.0 If any of the compensation events mentioned below would prevent the work being completed by the intended completion date, the first party will decide on the intended completion date being extended by a suitable period:

(a) The first party does not give access to the site or a part thereof by the agreed period.

(b) The first party orders a delay or does not issue completed drawings, specifications or instructions for execution of the work on time.

(c) Ground conditions are substantially more adverse than could reasonably have been assumed before issue of letter of acceptance and from information provided to second party or from visual inspection of the site.

(d) Payments due to the second party are delayed without reason.

(e) Certification for stage completion of the work is delayed unreasonably.

7. Any willful delay on the part of the second party in completing the construction within the stipulated period will render him liable to pay liquidated damages @ Rs.*_____per day which will be deducted from payments due to him. The first party may cancel the contract and take recourse to such other action as deemed appropriate once the total amount of liquidated damages exceeds 3 % of the contract amount.

(Note: The amount of liquidated damages per day should be determined between 0.05 to 0.1% of the contract value of the works per day and indicated here).

8.0 Duties and responsibilities of the first party

8.1 The first party shall be responsible for providing regular and frequent supervision and guidance to the second party for carrying out the works as per specifications. This will include written guidelines and regular site visit of the authorized personnel of the first party, for checking quality of material and construction to ensure that it is as per the norms.

8.2 The first party shall supply 3 sets of drawings, specifications and guidelines to the second party for the proposed works.

8.3 Possession of the site will be handed over to the second party within 10 days of signing of the agreement.

8.4 The Engineer or such other person as may be authorized by the first party shall hold meeting once in a month where the second party or his representative at site will submit the latest information including progress report and difficulties if any, in the execution of the work. The whole team may jointly inspect the site on a particular day to take stock of activities.

8.5 The Engineer shall record his observations/instructions at the time of his site visit in a site register maintained by the second party. The second party will carry out the instructions and promptly rectify any deviations pointed out by the engineer. If the deviations are not rectified, within the time specified in the Engineer's notice, the first party as well as the engineer nominated by it, may instruct stoppage or suspension of the construction. It shall thereupon be open to the first party or the engineer to have the deviations rectified at the cost of the second party.

9.0 Duties and responsibilities of the second party

9.1 The second party shall:

- (a) take up the works and arrange for its completion within the time period stipulated in Clause 5;
- (b) employ suitable skilled persons to carry out the works;
- (c) regularly supervise and monitor the progress of work;
- (d) abide by the technical suggestions/direction of supervisory personnel including engineers etc. regarding building construction;
- (e) be responsible for bringing any discrepancy to the notice of the representative of the first party and seek necessary clarification;
- (f) ensure that the work is carried out in accordance with specifications, drawings and within the total of the contract amount without any cost escalation;
- (g) keep the first party informed about the progress of work;
- (h) be responsible for all security and watch and ward arrangements at site till handing over of the building to the first party; and
- (i) maintain necessary insurance against loss of materials/cash, etc. or workman disability compensation claims of the personnel deployed on the works as well as third party claims.
- (j) Pay all duties, taxes and other levies payable by construction agencies as per law under the contract (First party will effect deduction (TDS) from running bills in respect of such taxes as may be imposed under the law).

10.0 Variations / Extra Items

The works shall be carried out by the second party in accordance with the approved drawings and specifications. However, if, on account of site conditions or any other factors, variations are considered necessary, the following procedure shall be followed:-

- (a) The second party shall provide the Engineer with a quotation for carrying out the Variation when requested to do so by the Engineer. The Engineer shall assess the quotation, which shall be given within seven days of the request before the Variation is ordered.
- (b) If the quotation given by the second party is unreasonable, the Engineer may order the Variation and make a change to the Contract Price which shall be based on Engineer's own forecast of the effects of the Variation on the Contractor's costs.
- (c) The second party shall not be entitled to additional payment for costs which could have been avoided by giving early warning.

11.0 Securities

The Performance Security (Bank Guarantee from a Nationalized or Scheduled Bank in India in the format attached) 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. The Performance Security shall be valid until a date 28 days from the date of issue of the Certificate of Completion in the case of a Bank Guarantee.

12.0 Termination

12.1 The Employer may terminate the Contract if the other party causes a fundamental breach of the Contract.

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

- (a) the contractor stops work for 28 days and the stoppage has not been authorized by the Engineer;
- (b) the Contractor has become bankrupt or goes into liquidation other than for a reconstruction or amalgamation;
- (c) 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;
- (d) the Contractor does not maintain a security which is required;
- (e) the Contractor has delayed the completion of the Works by the number of days for which the maximum amount of liquidated damages can be paid, as defined in the Clause 7 of this agreement

12.3 Notwithstanding the above, the Employer may terminate the Contract for convenience.

12.4 If the Contract is terminated the Contractor shall stop work immediately, make the Site safe and secure, and leave the Site as soon as reasonably possible.

13.0 Payment upon Termination

13.1 If the Contract is terminated because of a fundamental breach of Contract by the Contractor, the Engineer shall issue a certificate for the value of the work done less advance payments received up to the date of the issue of the certificate, less other recoveries due in terms of the contract, less taxes due to be deducted at source as per applicable law.

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

14.0 Dispute settlement

If over the works, any dispute arises between the two parties, relating to any aspects of this Agreement, the parties shall first attempt to settle the dispute through mutual and amicable consultation.

In the event of agreement not being reached, the matter will be referred for arbitration by a Sole Arbitrator not below the level of retired Superintending Engineer, PWD to be appointed by the first party. The Arbitration will be conducted in accordance with the Arbitration and Conciliation Act, 1996. The decision of the Arbitrator shall be final and binding on both the parties. The Arbitrator shall give his award/decision within 60 days of start of proceedings.

The Priced Bill of Quantities (Annexure 1), Format of Certificate (Annexure 2) and Specification and Drawings (Annexure 3) are attached.

Signed and delivered by Sri. _____ for and on behalf of the Contractor

In the presence of the Witness:

i)

ii)

SIGNATURE

Signed and delivered by Sri _____ Deputy Executive Engineer/Executive Engineer/Superintending Engineer _____ of _____ for an on behalf of the Government.

In the presence of the Witness:

i)

ii)

SIGNATURE

BILL OF QUANTITIES

RFQ No: WBMIFMP/DPIU-HOWRAH/NCB_02/21-22/ ROAD IMPROVEMENT_KANPUR

Name of work: “Improvement of Subsidied portion of Madaria left bank Road near Kanpur, Udaynarayanpur Block in the District of Howrah, under Howrah Irrigation Division, I&W Directorate, Govt. of West Bengal”
”

Sl. No.	Description of Work	Quantity	Unit	Estimated Rate/ Cost		Amount (in Rupees)
				In figure (Rs.)	In Words (Rupees)	
1.00	Earthwork in excavation in the canals / drainage channels / borrow pits /River bed / slope of bank as noted below as per designed section & throwing the spoils in layers of 25 cm. for making banks as per profile or to deposit the same in any other place within an initial lead of 30 metre and initial lift of 1.5 metre including breaking clods, rough dressing etc. complete as per direction of the Engineer-in-charge. (a) Ordinary soil / local soil / soil mixed with moorum or kankar / silt, dry or moist / slushy silt / sticky soil.	2567.55	Cum	123.30	INR One Hundred Twenty Three and Paise Thirty Only	316578.92
2.00	Supplying Jhaw / Eucalyptus bullah piles at work site, including dressing and making one end pointed. Note: Diameter of pile to be measured at a distance of 1.5m from the thicker end.					
2.01	17.50 cm av. Dia.	5760.00	Metre	302.03	INR Three Hundred Two and Paise Three Only	1739692.80
2.02	20.00 cm av. Dia.	2408.00	Metre	345.02	INR Three Hundred Forty Five and Paise Two Only	830808.16
3.00	Labour for driving Jhaw / Eucalyptus bullah piles by monkey in all sorts of soil including hoisting and placing piles in position, protecting the pile head with iron ring and cutting and shaping heads before and after driving and including hire and labour for necessary driving appliances and all tackles. Note: 1) Payment to be made on the length driven into the ground. Diameter to be measured at 1.5m. from the thicker end.					

3.01	iv) 17.50 cm av. Dia.	5760.00	Metre	126.69	INR One Hundred Twenty Six and Paise Sixty Nine Only	729734.40
3.02	(v) 20.00 cm av. Diameter	2227.40	Metre	134.61	INR One Hundred Thirty Four and Paise Sixty One Only	299830.31
4.00	Supplying, fitting, and fixing with iron nails half split bullah wailing pieces and cross pieces etc. complete with cost of all materials and carriage to site. (b) Width of thinner end above 15 cm. (i) Jhaw / Eucalyptus.	300.00	Metre	217.19	INR Two Hundred Seventeen and Paise Nineteen Only	65157.00
5.00	Earthwork in excavation in all kinds of soil for making embankments, repairs to the embankment, closing breaches etc. as per profile including supply and transporting the earth by truck or tractor or any other mechanical means on land , including loading, transporting, unloading and stacking with all lifts both ways and head load where necessary and depositing the same on embankments, channels, filling depressions in requisite profile, levelling as per direction of the Engineer-in-charge within a lead of, NB :- Measurement to be taken on the basis of stack measurement / prepost work section measurement after deduction of void as per norms. No extra payment will be made for stacking. A) Beyond 500 metre and up to 1.00 km	2634.43	Cum	313.69	INR Three Hundred Thirteen and Paise Sixty Nine Only	826394.35
6.00	Compacting earthwork in embankment in layers of 25 cm. by power roller or by any other mechanical means, like tractor driven sheep foot roller/ vibrating plate compactor earth rammer etc., (not at OMC) including necessary watering, labour charges, hire charges of all materials, tools & plants etc. and including cost and supply of all materials complete as per direction of the Engineer-in-charge. (Payment will be made on the basis of Pre-work & Post-work level)	2634.43	Cum	26.02	INR Twenty-Six and Paise Two Only	68547.87
7.00	Water Bound Macadam Sub Base by consolidating Jhama metal / Laterite chelly or stone metal / shingles of specific size in hard crust to requisite thickness (measured after compaction) in layers including screening of metals etc. as necessary, hand packing, sweeping, watering and rolling in stages with power roller to proper line, grade and camber, lighting, guarding & barricading and making necessary earthen bundh of one metre width on each side where necessary to protect edges and preparing the bed by necessary cutting or	157.05	Cum	2982.39	INR Two Thousand Nine Hundred Eighty Two and Paise Thirty Nine Only	468384.35

	<p>filling and rolling all complete including the cost of all materials and hire and labour charges of all men and machineries and compacting to the required density, as per Clause 404 of Specifications for Road & Bridge Works of MoRT&H (5th Revision).</p> <p>(i) For Construction of Sub Base by consolidating Jhama metal (63 mm to 45 mm) with moorum screening.</p>					
8.00	<p>Supplying at site and laying in position UV stabilized polypropylene woven geotextile of 430 gsm as filter, as per specification, including cost of preparing the bed, placing the geotextile as per profile with at least 15cm lapping, wherever required and anchorage at top, sewing / welding the overlapped portion, storage, and transportation by all means, complete as per direction of the Engineer-in-charge.</p> <p>Note: 1. Payment to be made on measurement of finished surface without lapping but including anchoring length at top. 2. Payment will be made subject to the result of 3rd Party Testing, to be done by the Engineer-in-charge departmentally. 3. This particular item is to be used in special cases, either in continuation of previous usage or after offering adequate justification from techno-economical angles.</p>	3754.08	Sqm.	273.75	INR Two Hundred Seventy Three and Paise Seventy Five only	1027679.40
9.00	<p>Supplying at site High Density Polyethylene (HDPE) bag of size 0.84 m x 0.38 m conforming to BIS: 14252: 2015 for bank protective works including all cost of cost of transportation on road by all means, including other incidental charges complete.</p> <p>Note: Payment will be made subject to the result of 3rd Party Testing, to be done by the Engineer-in-charge departmentally.</p>	1646.00	Each	24.89	INR Twenty Four and Paise Eighty Nine Only	40968.94

10.00	<p>Labour charges for filling HDPE bags with filler materials (earth/sand), machine stitching the open end of the bag with thread as per design and placing the same on slope or dumping from bank within initial lead of 30m and all lifts including carriage and hire charges of all materials and equipments but excluding the cost of filler materials as directed by Engineer-in-Charge.</p> <p>(Volume of earth/sand filled bag should not be less than 0.0328 cum).</p>	1646.00	Each	13.57	INR Thirteen and Paise Fifty Seven Only	22336.22
11.00	<p>Derived Rate Providing, laying, spreading and compacting stone aggregates of specific sizes to water bound macadam specification including spreading in uniform thickness, hand packing, rolling with vibratory roller 8-10 tonnes in stages to proper grade and camber, applying and brooming requisite type of screening / binding materials to fill up the interstices of coarse aggregate, watering including lighting, guarding, barricading and making necessary earthen bundh of one metre width on each side and preparing the bed by necessary cutting or filling, including cost of all materials and hire and labour charges of all men and machinery and compacting to the required density, as per Clause 404 of Specifications for Road & Bridge Works of MoRT&H (5th Revision).</p> <p>(i) Grading-I Aggregate (63 mm to 45 mm) Using Stone Screening Type A (13.2 mm) B. Manual Means</p>	16.88	Cum	3567.20	INR Three Thousand Five Hundred Sixty Seven and Paise Twenty Only	60214.34
12.00	<p>Grading-II Aggregate (53 mm to 22.4 mm) Using Stone Screening Type B (11.2 mm) B. Manual Means</p>	16.88	Cum	3706.54	INR Three Thousand Seven Hundred Six and Paise Fifty Four Only	62566.40
13.00	<p>Bituminous Macadam using Mobile Hot Mix Plant (Light Duty) Providing and laying bituminous macadam with Mobile Hot Mix Plant (Light Duty) using approved crushed aggregates of specified grading as per Table 500.4 premixed with bituminous binder, transported to site laid over a previously prepared surface at specified</p>	16.21	Cum	7299.50	INR Seven Thousand Two Hundred Ninety Nine and Paise Fifty Only	118324.90

	<p>laying temperature by means of approved and suitable arrangements to the required grade, level and alignment and rolled with suitable power roller for break down, inter-mediate and finished rolling as per specification to achieve the desired compaction including cost and carriage of stone materials and bitumen, hire charges of machinery and equipment, cost of fuel and lubricants and wages of operational staff, quality control complete as per Specifications for Road & Bridge Works of MoRT&H (5th Revision).</p> <p>B. For Grading II (19 mm nominal size, 50-75 mm thick.)</p>					
14.00	<p>Providing and applying primer coat with Cationic Bitumen Emulsion of approved grade conforming to IS: 8887-1978 and requisite quantity on prepared surface of granular base including cleaning of road surface and spraying primer using Mechanical means including cost and carriage of bitumen emulsion and all other incidental costs of work complete as per Clause 502 of Specifications for Road & Bridge Works of MoRT&H (5th Revision).</p> <p>(i) For WBM / WMM Surface: (with primer @ 0.70-1.0 kg/sqm)</p>	324.19	Sqm.	32.67	INR Thirty Two and Paise Sixty Seven Only	10591.29
15.00	<p>Providing and applying tack coat with Cationic Bitumen Emulsion of approved grade conforming to IS: 8887-1978 on the prepared surface cleaned with Hydraulic broom, moistening the surface including cost and carriage of emulsion, hire charges of machinery and labour, cost of fuel and lubricants all complete as per Clause 503 of Specifications for Road & Bridge Works of MoRT&H (5th Revision).</p> <p>(i) On Bituminous Surface (Using Bitumen Emulsion at the rate of 0.20 to 0.30 kg per sqm.)</p>	648.38	Sqm.	10.57	INR Ten and Paise Fifty Seven Only	6853.38
16.00	<p>Supplying and laying and placing of 150 mm thick FC Flexicell / Geocell for stabilizing the sub-grade of road work in all respect as per direction of Engineer in Charge including all except cost of filler material.</p>	285.00	Sqm.	530.83	INR Five Hundred Thirty and Paise Eighty Three Only	151286.55

17.00	<p>Plant Mix Method: Construction of granular sub-base by providing graded material, mixing in Wet Mix Plant at OMC, carriage of mixed material to work site, spreading in uniform layers with Motor grader on prepared surface in proper grade and camber, compacting with vibratory power roller to achieve the desired density, including lighting, guarding, barricading, including cost of all materials, machinery, tools and plants and cost of quality control complete as per Clause 401 of Specifications for Road & Bridge Works of MoRT&H (5th Revision).</p>	11400	Cum.	2820.27	INR Two Thousand Eight Hundred Twenty and Paise Twenty Seven Only	321510.78
18.00	<p>Providing, laying and rolling of Open - graded premix surfacing of 20 mm thickness composed of 13.2 mm (@ 0.018 m³ per m²) and 11.2 mm (@ 0.009 m³ per m²) size stone aggregates, including thoroughly cleaning of the surface, screening, cleaning and pre-heating stone chips and fully pre-coating the same either using viscosity grade paving bitumen or cut-back or emulsion, carrying the mixture by any suitable arrangements, laying the mixture uniformly over the surface, including line, grade and level to serve as wearing course on a previously prepared base, including mixing in Mobile Hot Mix Plant (Light Duty) and thoroughly rolling with a smooth wheeled roller 8-10 tonne capacity, finished to required level and grades including the cost and carriage of stone chips and matrix, heating the matrix, preheating the aggregates to required temperature and including the hire charges of Mobile Hot Mix Plant (Light Duty) and other machinery, pay of operators, cost of fuel and lubricants etc. complete to be followed by seal coat of either Type A or Type B as per Technical Specification Clause 508 for Rural Roads of MORD.</p>	324.19	Cum.	139.40	INR One Hundred Thirty Nine and Paise Forty Only	45192.09

19.00	<p>Providing and laying Premixed Seal Coat (Type B) with approved quality sand/grit @ 0.6 m³/ 100 m² and bitumen binder on thoroughly cleaned black top surface coated with tack coat, including heating and mixing cleaned sand/grit (100 % passing through 2.36 mm sieve and retained on 180 micron sieve) uniformly with bitumen binder, laying and spreading the mix at an uniform rate using suitable means, brushing the surface, if necessary, to ensure uniformity, followed by rolling with power roller including the cost and carriage of binder and aggregates, cost of heating the binder and aggregates and all other incidental charges, cost of fuel and lubricants, including hire charges of machineries, tools & plants required for construction and quality control complete as per Clause 511 of Specifications for Road & Bridge Works of MoRT&H (5th Revision).</p> <p>II By Manual Means With Hot Bitumen Binder (@ 6.80 kg / 10 sqm.)</p>	324.19	Cum.	48.14	INR Forty Eight and Paise Fourteen Only	15606.51
20.00	<p>Supplying Nylon cage netting 1 metre x 1 metre x 1 metre size with knot having mesh size 17.5 cm x 17.5 cm constructed with nylon thread (210 x 24) having tensile strength not less than 250 Kg. / sq. cm. including carriage, delivery and stacking at site inclusive of all taxes complete.</p>	150.00	Each	132.35	INR One Hundred Thirty Two and Paise Thirty Five Only	19852.50
21.00	<p>Labour charges for dumping and placing in position properly filled in Nylon crates with filled in gunny / poly cement bags (minimum 25 nos. having capacity 50 kg) with local earth or sand, sewing and tying the crate with nylon wire within a lead of 150 m. and all lifts in river slope or bed by cutting trenches up to 50 cm depth, if necessary, or by boat including cost of hire charges of boat, boatmen and other necessary equipment and also including cost of bags, carriage and charge of filling bags with earth / sand but excluding cost of nylon crate as per direction of the Engineer – in – Charge.NB:- Volume of each earth/ sand filled bags should not be less than 0.028 m³. Size of Nylon crate is 1 metre X 1 metre X 1 metre.(a) Where boats are not necessary.</p>	150.00	Each	472.84	INR Four Hundred Seventy Two and Paise Eighty Four Only	70926.00

22.00	Supplying to site empty cement polythene bags (capacity 50kg) in good condition including stacking, incidental charges etc. all complete. (Capacity 50 kg).	1446.00	Each	6.79	INR Six and Paise Seventy Nine Only	9818.34
23.00	Labour charges for filling empty cement gunny bag / polythene bag (capacity 50 kg) with all kinds of earth (wet or dry), sand or aggregates(stone / brick) and sewing as done in case of cement bags ,(tying with a knot after filling will not be accepted) , and stacking within a\ lead of 30 metre as per direction of Engr.-in-charge (cost is excluding the cost of any types of filling materials). NB:- Volume of earth/ sand filled bags should not be less than 0.028 cum/ bag.	1446.00	Each Bag	7.92	INR Seven and Paise Ninety Two Only	11452.32
24.00	Extra rate for item no above for each additional lead of 60 metre or part thereof beyond the initial lead of 30 metre. (Considering 5 leads)	1446.00	Each Bag	16.97	Sixteen and Paise Ninety Seven Only	24538.62
25.00	Earthwork in excavation in all kinds of soil for making embankments, repairs to the embankment, closing breaches etc. as per profile including supply and transporting the earth by truck or tractor or any other mechanical means on land , including loading, transporting, unloading and stacking with all lifts both ways and head load where necessary and depositing the same on embankments, channels, filling depressions in requisite profile, levelling as per direction of the Engineer-in-charge with in a lead of, NB :- Measurement to be taken on the basis of stack measurement / pre-post work section measurement after deduction of void as per norms. No extra payment will be made for stacking. (This rate is includes compensation for earth for land owned / arranged by the contractor @ Rs 25.00 per cum and royalty charges on earth @ Rs 18.00 per cum. The royalty will be paid to the agency on production of necessary documents in support of payment made towards the royalty. during initial payment of bill, a deduction @ Rs 18.00 per cum rate may be made) E) Beyond 4.00 km and upto 5.00 km	94.48	Cum.	352.15	INR Three Hundred Fifty Two and Paise Fifteen Only	33271.13
26.00	Supplying, spreading and compacting Sand to required thickness, in layers not exceeding 150 mm to proper gradient and camber, inundating each layer by water, and packing	15.84	Cum	1164.42	INR One Thousand One Hundred Sixty	18444.41

	and ramming layer by layer to achieve desired compaction, including lighting, guarding, barricading and making adequate earthen bundh where necessary, curing with water as per direction, mending cracks and depressions by ramming wherever necessary.				Four and Paise Forty Two Only		
					Total =	7416562.28	
27.00	Provisional Sum: Crop or any other compensation required for temporary occupation of land, for temporary storage of materials at worksite etc.	L.S.					74166.00
Gross Total Estimated Cost: Rs.						7490728.28	

We agree to execute the works in accordance with the approved drawings and technical specifications at percentage above/below the estimated rates, i.e., for a total Contract Price of Rs. (amount in figures) (Rs. amount in words).

Signature of Contractor

(Where there is a discrepancy between the amount in figures and words, the amount in words will prevail)

Annexure - 2

Format of certificate

Certified that the works up to ----- stage (as defined in Clause 3.1 of the Agreement) in respect of construction of ----- at ----- have been executed satisfactorily in accordance with the terms and conditions of the agreement and as per approved drawings and technical specifications

Signature

Name & Designation

(Official address)

Place:

Date:

Office seal

1.0 Preamble to the BOQ

1.1 INTRODUCTION

The Bill of Quantities (BOQ) shall be read in conjunction with the Instructions to Bidders, Technical Specifications and Drawings. The rates quoted shall be inclusive of cost of all materials, transportation and carriage of material upto works site, labour, plant and equipment, tools and tackles, safety gadgets, incidentals etc. as may be required for that particular item in the BOQ which is to be read in conjunction in the specification.

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 on 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. If such rates are not available in the Bill of Quantities, this will be treated as extra work and such rates and prices will be fixed by the Engineer / Project Manager as per the terms of the Contract.

Mode of measurement, if not specified elsewhere shall be followed as per available codes of practice published by the Bureau of Indian Standards (BIS).

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 temporary facilities, access, notices to maintain traffic prevailing in an accessible manner, as far as possible for similar flow existing and also including all construction of plant, labour, supervision, materials, erection, maintenance, insurance, overhead, profit, taxes and duties together with all general risk, liabilities and obligation set out or implied in the contract.

General directions and descriptions of work and materials are not necessarily repeated or summarized in the Bill of Quantities. The Bidder must refer to the relevant sections of the bid documents including specifications, data sheets and drawings before quoting rates in the Bill of Quantities.

Provisional Sum as included and so designated in the Bill of Quantities shall be expended in whole or in part at the direction and discretion of the Project Manager/ Engineer in accordance with the General Conditions of Contract. Payment for work under provisional item shall be payable for statutory requirement by other agencies (if required) and for any unforeseen items of work. Payment for statutory requirement by the external agencies as above will be made as per bill raised by the other agency + 7.5% as Contractor's service charges. However, approval of the agency and their rates shall be done by the Project Manager. Provisional Sum for other works, not covered under statutory requirements of other agencies stated above, will either be paid as per current Schedule of Rates of IWD/ PWD/ any other State /Central Government Department as may be applicable, without any additional service charge in case of scheduled items of works, or as per rates prescribed by other State Government Entities and accepted by the Project Manager + 7.5% as Contractor's service charges, in case of non-scheduled items. One such

pertinent item would be payment for testing of materials including all incidental charges, as directed by the Project Manager.

The amount kept under this head is as decided by the Project Manager. The Contractor shall not change this figure or quote of his own. The amount is subject to variation as per requirement of project with approval of the Project Manager.

The Team Leader of the Project Management Consultant (PMC) – WBMIFMP will be engaged as the Project Manager. For the purpose of this contract, the Project Manager or Engineer or Engineer – In – Charge will have the same meaning and connotation.

2.0 GENERAL

2.1 General Basis for Pricing,

2.1.1 The Bidder shall be deemed to have read and examined the Bid Documents as well as inspected the project site thoroughly to conceive the work in totality to quote against each item of work as given in the BOQ.

2.1.2 The Bidder shall be deemed to be fully conversant with the site conditions and the nature and complexity of the work to be undertaken and taking into account all eventualities which can arise before, during and after project execution.

2.1.3 It is to be expressly understood that the measured work is to be taken net (not withstanding any system or practice to the contrary) according to the actual quantities finished according to the drawings or as may be ordered from time to time by the Engineer and the cost calculated for the respective prices. Necessary manpower will have to be provided by the Contractor during measurement of works and setting out alignment of the works, for which no extra payment will be made.

2.1.4 Unless otherwise stated, all items shall be measured as executed as per drawing and specification and no allowance will be made for wastage, working space, bulking or shrinkage, and the like.

2.1.5 The quoted rates and prices shall also be inclusive of communication system vehicles for movement at site etc. No extra cost against such items will be paid.

3.0 Miscellaneous

3.1 Temporary power connections, telephones, construction and drinking water shall be arranged by the Contractor at his own cost and shall be deemed to be included in their quoted rates. Alternative power arrangement shall be made by Contractor without any extra charge.

3.2 All underground and over ground utility items shall have to be suitably supported during the construction phase by the Contractor so that the existing utility services are not damaged. No extra payment will be made on this account.

3.3 The Contractor shall keep plumbers, technicians and electricians ready for repair/ shifting of existing underground/ over ground utilities and for crisis management.

3.4 During progress of work, convenient access to adjacent premises shall be made by the Contractor. No extra payment will be made on this account.

3.5 For speedy progress of work in case of exigency, Contractor may have to do work round the clock at the instance of the Engineer/Project Manager. Arrangement for lighting and other safety requirements shall have to be done for night working. No extra payment shall be made to the Contractor except the items provided in the BOQ.

3.6 The rates quoted by the Contractor shall, unless otherwise specified, also include compliance of/ supply of the following:

- i) General works such as setting out, clearance of site before setting out and clearance of works after completion.
- ii) A detailed programme for the construction and completion of the work.
- iii) Samples of various materials proposed to be used on the work for conducting tests thereon as required as per the provisions of the Contract.
- iv) Any other item of work which is not specially provided in the Bill of Quantities (BOQ) but which is necessary for complying with the provisions of the Contract.
- v) All temporary works, formwork and false work.
- vi) Arrangement of a laboratory with facilities for testing and testing of various items of works as specified in relevant clauses.
- vii) Cost of in-built provisions for Quality Assurance.
- viii) Cost of labour hutment, site office.

3.8 **Extra items of work – If during the progress of work any extra items need to be carried out, which in the opinion of the Engineer/ Project Manager is essentially required to be executed, then the extra item shall be analyzed as follows:**

- i) Derived from rates of similar items of works stated in the tendered offer
- ii) In the event an extra item of work that cannot be derived from (i) above, the rates of extra / new items are to be analysed considering current market rates of all components including 8% overhead and 10% Contractor's profit and duly approved by the Project Manager.
- iii) If not specifically indicated in the items themselves, the rates appearing in this schedule are inclusive of cost of all supply, carriage, handling, fitting, fixing, toll charges, ferry charges etc. and all other incidental works involved in any floor, at any level including all necessary jointing materials, scaffolding to any height, hire charges of tools and plants, and all helping materials.

4.0 Scope of the Work:

The Government of India has received for financing of USD 290 million from the International Bank for Reconstruction and Development (IBRD) and Asian Infrastructure Investment Bank (AIIB) towards the cost of the **West Bengal Major Irrigation and Flood Management Project (WBMIFMP)** and intends to apply a part of the proceeds toward eligible payments under the contracts for construction of works as detailed below:

Name: - “Improvement of Subsided portion of Madaria left bank Road near Kanpur, Udaynarayanpur Block in the district of Howrah, under Howrah Irrigation Division, I&W Directorate, Govt. of West Bengal”

4.1 Project Background

The Damodar River originates from the Chhotonagpur Plateau at Latehar District in Jharkhand and flows through the districts of Latehar, Hazaribagh in Jharkhand and enters Purulia District in West Bengal which is the lowermost riparian State in Damodar Basin. Five reservoirs have been built on the Damodar and its tributaries in Jharkhand to moderate floods in the lower basin area in West Bengal and for irrigation. These are operated by Damodar Valley Corporation (DVC). The Damodar River bifurcates into two main branches, i.e. Mundeswari and Lower Damodar (Amta Channel) near the border of Burdwan and Hooghly Districts, and both the channels traverse through the districts of Hooghly and Howrah, and ultimately meet River Hooghly, which debouches into Bay of Bengal.

The irrigation network downstream of the Durgapur Barrage (West Bengal) was developed more than 6 decades ago and is now degraded. Dilapidated hydraulic infrastructure, loss of irrigation water due to seepage and silted distribution networks have reduced the system's efficiency and led to water scarcity, particularly at the tail reaches. As a result, the gap between irrigation potential created vis-à-vis utilized is increasing, despite adequate water availability (around 1,40,000 hectare-meter (ha-m) for 3,32,000 hectares (ha) of command area under Kharif irrigation on an average). This is only 20% of the total water availability at the barrage during monsoon. Tail end farmers are compelled to abstract groundwater, which increases the costs of cultivation. This trend increases when rainfall is erratic or insufficient.

4.2 Project Area:

The project area considering both irrigation and flood management aspects is as follows:

Irrigation Management:

Northern Boundary: River Ajoy at Purulia, Block Katwa-I, District Burdwan (Latitude 23°38'51"N).

Southern Boundary: Outfall of Nabinbabur Khal at Block Amta-I, District Howrah (Latitude 22°35'47"N).

Western Boundary: Durgapur Barrage on river Damodar at Block Barjora, District Bankura (Longitude 87°18'13"E).

Eastern Boundary: Howrah Burdwan Main Line of Eastern Railway at Nityanandapur, Block Balagarh, District Hooghly (Longitude 88°25'17" E)

Flood Management:

Northern Boundary: Bifurcation point of river Damodar into Mundeswari River and Amta Channel at Beguahana, Block Jamalpur, District Burdwan (Latitude 23°08'8.34"N).

Southern Boundary: Outfall of Amta Channel in river Hooghly, Block Shyampur-I, District Howrah (Latitude 22°20'59.76"N).

Western Boundary: Ichhapur at Block Khanakul-I, District Hooghly (Longitude 87°45'0.43"E).

Eastern Boundary: River Saraswati at Eklakhi, Block Chanditala-II, District Hooghly (Longitude 88°16'33.89"E).

The schematic drawing, brief project outlay, location and other particulars are available on the website www.wbiwd.gov.in in the link "WBMIFMP".

4.3 Project Objectives

WBMIFMP is a World Bank (WB) assisted Major Irrigation & Flood Management Project in association with Irrigation & Waterways Department (IWD), Government of West Bengal and Asia Infrastructure Investment Bank (AIIB) with an initiative to rejuvenate six decades old Damodar Valley Project (DVC) Canal System and moderate flooding through the Rivers Mundeswari and Damodar (Amta channel) in the districts of Paschim Bardhaman, Purba Bardhaman, Bankura, Hooghly and Howrah.

WBMIFMP aims to improve the existing irrigation network in the Damodar Valley Command Area (DVCA) within the State of West Bengal, to optimize conjunctive and sustainable use of ground and surface water across the DVCA in different irrigation seasons, and to reduce flooding in the Lower Damodar Sub-Basin (LDSB) in West Bengal.

4.4 Objective of this Assignment:

Madaria Left Bank Road near Kanpur Udaynarayanpur block of latitude 22°40'12'' and longitude 88°1'49'' in district of Howrah has been subsided for a length of about 70 m due to existence of soft layer in the vicinity of Madaria Khal near the site.

Thus, thoroughfare has been disrupted at this locality causing hardship to the inhabitants of the area and thereby disturbing economic activity at the local market area. To remove this difficulty, the subsided portion of the road is planned for required improvement through

technical intervention to manage subsidence prone characteristics of the area. Upon completion of the work, thoroughfare shall be restored as usual.

4.5 Key activities under the contract:

Irregularly subsided portion of the road shall be excavated up to a depth of 2.75m from existing undamaged top of road which is expected to go beyond bottom of visible multiple cracks in the soil. A regular base area thus obtained shall be driven by U/C bullah in a grid of 0.9 m by 0.9 m, for a total length of 6m of bullah piles.

Thereafter, geosynthetic filter with proper exchange shall be laid at an interval of about 0.5m as soil reinforcement and intervening space in between such layers shall be compacted by transported earth having required characteristics for road embankment.

Before developing different layers of road, geocell shall be laid for entire width which will subsequently be filled up with granular sub-base material of required specification. Then, 150mm thick layer of WBM with brick bats shall be laid which shall be overlaid by 150mm thick stone macadam. Then, 50mm thick bituminous macadam shall be laid and covered by premix and seal coat.

Besides, toe of road embankment shall be protected by U/C Bullah for a length of 150m and scoured portion shall be covered by HDPE bags and nylon crates.

Additionally, one temporary diversion road of WBM shall be constructed to facilitate undisturbed execution of work.

4.6 Duration of Contract: Four (4.0) months

Specifications

The Works shall be executed in accordance with these Specifications which comprises the following Sections:

- I. **Section A** - General Specifications
- II. **Section B** - Technical Specifications

I. SECTION A-GENERAL SPECIFICATIONS

A-1 General Specifications

A-1.1: Mobilisation of Contractor

From the date of signing of agreement, the contractor shall complete the following actions in a phased manner on priority basis as directed by Engineer.

1. The contractor shall furnish, in advance, a detailed work programme containing all activities upto the completion of Works. Supporting resources schedule shall also be submitted.
2. Complete construction, installation and commissioning of “Field Laboratory” including all the tests and test apparatus.
3. Mobilize all required Key Staff, Technicians, Labourers.
4. Mobilize all required equipment/ machinery including commissioning and trial run of all the Plant/ Machinery.
5. Complete the identification of Quarries and quality of available material.

A-1.2: Quality Control

The Contractor shall ensure that all the actions are taken to build in Quality Assurance (QA) in the planning, management and execution of works. The QA shall cover all stages of work such as setting out of works, selection of material, selection of method of works, selection of plant and equipment, deployment of staffs, quality control testing. The QA program shall cover as per standard documents such as relevant Indian Standard Codes including its Special Publications, IRC Codes including Special Publications and MORTH (Specifications for Road and Bridge Works). These shall broadly cover the QA aspects of all services rendered all items to be supplied and all activities to be performed including the temporary structures and equipment which will influence the quality of the completed works or the progress of the work.

A-1.3: Drawings:

The drawings provided in the Tender Documents shall be used for reference only. The Contractor shall study the nature of the work and ensure that the rates and prices quoted in the Bill of Quantities have due consideration of sites including its accessibility and storage space of storing materials, lower progress of work during monsoon and/or running irrigation and complexities of the actual execution/construction.

The contractor based on his surveys and investigation shall submit the working drawings (in soft and hard copies) for each activity in advance of the scheduled start date of the activity as per the approved work programme. The working drawing should clearly show the modifications, if any, with reference to the corresponding tender drawing. The Engineer shall review the working drawings including the proposed modification, if any, revise the drawing, if required, approve and issue the drawings to the Contractor in two copies of Good for Construction (GFC) drawings in advance of the scheduled start date of the activity.

Examination and/or approval by the Engineer of any drawings or documents submitted the Contractor shall not relieve the contractor of his responsibilities or liabilities under the Contract.

The tender rates/prices for the work shall be deemed to include the cost of preparation, supply and delivery of all the necessary working drawings, prints, soft copies which the Contractor is required to provide as per the requirement of the Contract.

A-1.4: Site Information

The information about the site of work and site condition provided in the tender document is given in good faith for guidance only but it shall be responsibility of the Contactor to satisfy himself regarding all aspects of the entire site conditions.

The locations of the works and the general site particulars are as shown in the index plan enclosed with the Tender Documents.

Whereas the right of way of the work sites shall be provided to the Contractor by the Employer the Contractor has to make his own arrangement for the land required by him for and areas for temporary stockpiling of materials, setting up his office, field laboratory, site for plants and equipment, maintenance and repair workshops, construction worker's camp, stores etc. The location of quarries and other sources from which naturally occurring materials are available, for guidance of the Contractor. It is assumed that the Contractor has inspected the quarries; borrow areas etc., in the vicinity of the working area before quoting his rates for the work to assess the availability of construction materials in required quantity and quality.

A-1.5: Setting out:

The Contractor shall establish working benchmarks tied with the reference bench marks within a fortnight after taking possession of the site. The reference benchmarks for the area shall be as indicated in the Contract Document or directed by the Engineer and the values of the same shall be obtained by the Contractor from the Engineer. Numbers of the working benchmarks shall be at one km. interval on both sides of the canal and also nearby important structures. Checks must be made on the benchmarks on every month and adjustment if any approved from the Engineer and recorded. An up-to-date list of all benchmarks including adjustments shall be maintained by the Contractor and a copy of the same mentioning location description, latitude – longitude, levels with actual photographs of the established benchmarks shall be submitted to the Engineers for their record.

The lines and levels of formation (foundation level of the hydraulic structure, Top level and toe levels of the protection works side slopes shall be carefully set out and frequently checked, care being taken to ensure correct cross section and gradient obtained everywhere.

In order to facilitate the setting out of the works the centerline of the canal & canal embankment/ hydraulic structure/protection works must be established accurately and approved by the Engineer. It must then be accurately referenced in a manner satisfactory to the Engineer at an interval of 60 m outside the limit of work area as directed by the Engineer with marker pegs and chainage boards. These marker pegs shall be maintained by the Contractor unless the work finished upto the satisfaction of the Engineer.

The Contractor will be sole responsible for safeguarding all survey monuments, bench marks, marking pegs etc. The engineer will provide the Contractor all necessary data for setting out centerline, toe line. All dimensions and levels shown on the drawings or mentioned in the document forming part of or issued under the contract shall be verified by the Contractor on the site and he shall immediately inform the Engineer in case of apparent error or discrepancies in levels or dimensions. The Contractor shall in connection with staking out, survey of canal & canal embankment and submit the longitudinal profile of canal & canal Embankment along the centerline and cross sections at the said intervals to the Engineer for approval.

Staking out shall be done by the experienced personal and field record will be maintained as directed by the Engineer. After obtaining approval from Engineer the work on earthwork may commence. The longitudinal sections and cross sections before the work and after the work will form the basis of measurement. There will be no separate payment for any survey work performed by the Contractor. The cost of these services shall be considered as being included in the rates of items of works in the Bill of quantities.

The work of setting out shall be deemed to be a part of general works preparatory action for the execution of work and no separate payment shall be made for the same.

II. SECTION B-TECHNICAL SPECIFICATIONS

General

All works shall be carried out according to technical specifications, of the latest amended / updated version of the Indian Standard Code(s) of practice, Specifications of USoR (I&WD) 2018, Specifications of SOR (Roads & Bridge works) –Volume III,2018, PWD (WB), Sanitary & Plumbing Works (Volume - II), 2017,PWD (WB) & SOR (building works) Volume I,2017 PWD (WB), I&WD, Mechanical Circle, SoR 2011. The Indian Standard specification and any work not covered there shall be carried out as per best practice adopted in this country according to the direction and satisfaction of the Engineer-in charge.

1. Earth Work

1.1. Setting Out

Before start of work centre line of the canal / embankment shall be marked by suitable and firm pegs each at about 30m interval in straight reaches. In the curved reaches of the canal the curve shall be laid out and top and bottom edges of excavation and toe of embankment shall be suitably peg marked. The centre line in such reaches shall be marked by pegs at an interval of 5 m to ensure smooth curve profile during excavation/filling. Distance pegs shall be constructed at 200 m interval at canal boundary for proper alignment.

All levels of canal profiles shall be referred to a specified and established firm benchmark not subject to subsidence/interference or disturbance. Temporary benchmark pillars shall be constructed at suitable locations for reference of levels during construction. Proper layout of the embankment / flood walls shall be marked with pucca reference pillars.

1.2. Clearing of Land

Before beginning the construction / repair of embankment, the land over which excavations/filling is to be done shall be cleared of all trees, bushes, vegetation, rubbish, roots, ant hills and any other objectionable material before excavation/filling. The cleared material shall be the property of the Government and its disposal shall be done in a manner as approved by the Engineer-in-Charge. The land so cleared shall be maintained free from any growth and vegetation during the period of construction.

In filling reaches, all holes and hollows whether originally existing or produced by digging up roots shall be filled with suitable earth well rammed and leveled off. The depth to which topsoil is removed shall be adequate to remove all perishable material and any soil which may become unstable on saturation or may interfere with the development of proper bond between the existing surface and new embankment. As per IS 4701, the depth of stripping as a guide for containing light grass cover shall be 5 to 7.5cm. It shall be 20cm for soil containing thick vegetation/agricultural land.

1.3. Excavation

Before commencement of the excavation in any reach the contractor shall inform and obtain the necessary instructions in writing from the Engineer-in-Charge.

The contractor shall excavate whatever material may be encountered up to the depth of excavation shown on the Cross-section of the channels. All material, thus excavated, shall be the property of the Government.

Excavation to be carried out shall strictly conform to the plans and levels shown on the profile of excavation in the Cross-sections. The bed of the canal will have a longitudinal gradient as given in L-section and will be kept level transversely. The side slopes shall also conform to those given in the drawings and shall be neatly finished. Any excavation below the prescribed bed level shall not be paid.

Excavation of internal section in branch canal/distributary shall be carried out by suitable earthmoving equipments/tractors. Excavation of internal section in minors may be done manually.

1.4. Dewatering and Bailing out water by Pump

Normally, open foundations shall be laid dry. Where water is met with in excavation due to stream flow, seepage, springs, rain or other reasons, the Contractor shall take adequate measures such as bailing, pumping, constructing diversion channels, drainage channels, bunds, depression of water level by well-point system, cofferdams and other necessary works to keep the foundation trenches dry when so required and to protect the green concrete/masonry against damage by erosion or sudden rising of water level. The bailing out water is to be carried out as per direction of the Engineer-in-charge. Approval of the Engineer shall, however, not relieve the Contractor of the responsibility for the adequacy of dewatering and protection arrangements and for the quality and safety of the works.

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

If it is determined beforehand that the foundations cannot be laid dry or the situation is found that the percolation is too heavy for keeping the foundation dry, the foundation concrete shall be laid under water by tremie pipe only. In case of flowing water or artesian springs, the flow shall be stopped or reduced as far as possible at the time of placing the concrete.

Pumping from the interior of any foundation enclosure shall be done in such a manner as to preclude the possibility of the movement of water through any fresh concrete. No pumping shall be permitted during the placing of concrete or for any period of at least 24 hours thereafter, unless it is done from a suitable sump separated from the concrete work by a watertight wall or other similar means. The pump installation capacity number (HP, Discharge and Head) must be approved by Engineer-in-charge in writing in a separate register to be issued by the department for such item.

At the discretion of the Contractor, cement grouting or other approved methods may be used to prevent or reduce seepage and to protect the excavation area.

The Contractor shall take all precautions in diverting channels and in discharging the drained water as not to cause damage to the works, crops or any other property.

The Payment will be made on the quantity of water calculated on the basis of initial and final water level measured before starting and completion of each day's work which necessitates a bailing/ pumping of water from the trench. The final level of water to be measured, will depend on the level at which the day's work will be taken up. The rate includes any seepage water that may percolate in the trench during pumping

1.5. Embankment

For the embankment construction /rehabilitation, the toe of the slope on each sides of the bank shall be Dag-Belled and marked by pegs firmly driven in the ground at interval of 20m. Profiles made by bamboos, earth and strings shall be setup for the guidance of workmen at 50m interval over straight reaches and about 25m. apart for curved reaches. A suitable allowance for settlement shall be made in setting up the profile for embankment.

Surface Preparation: The base of the extension portion of embankment shall be stripped and roots & other vegetation's shall be removed. The stripping operation is to be done up to the bottom of root zone of vegetation so that all roots are removed out of the surface. The stripping depth may vary at places depending upon type of vegetation growing on the area/slopes. The cost of all such stripping up to bottom of roots shall be deemed to be included in the unit rates of the excavations.

The slope of existing banks shall be benched. Benching of slopes shall be done with a little slope towards the inside of benches so as to give a good grip/bond to the embankment soil with the sub-grade. Unless otherwise specified, the benches shall be 0.3x0.6m on the front and rear slope of the embankment. Before benching, canal slopes shall be cleared of all roots, vegetation, rubbish etc. No separate payment shall be made for these and the rates quoted for raising the embankment is inclusive of these operations. The areas shall be pre-wet by sprinkling water before the construction of embankment commences. Unless otherwise specified, the water applied for pre-wetting the areas shall not be paid being considered included in the unit price per cubic meter bid in the bill of quantities for compacting the embankment.

Before laying soil on existing embankment, the slopes shall be properly cut and benched in steps not steeper than 1.5: 1.

1.6. Construction/Rehabilitation of Embankments and Disposal of Excavated Earth

Embankment shall be built in layers not exceeding 20cm to 25cm loose. Each layer will be laid horizontally in 30cm more than full width of the section and the banks and berms shall then be dressed after compaction in full width and to the required slope. The top of embankment shall be leveled and finished so as to be suitable for

roadway. Where provided, a cross slope of 1 in 80, outward to drain away rain waters may be given.

All material of excavation shall be disposed outside the embankment at designated disposal sites on either side of canal.

Contractor shall be responsible that no unwanted disposal is being made in the work area. Any such disposal shall be removed at his own cost to the satisfaction of Engineer-in-Charge. Similarly, the contractor shall ensure that there is no blockage of drains or damage to the canal and to the existing outlets of canal due to disposal of material. If anything found contrary, the contractor shall arrange to rectify at his own cost within the prevalent environmental regulations.

All surplus earth lying on embankments above designed bank level shall be removed by the contractor within a maximum period of 5 days.

1.7. Compaction Requirement

All surplus earth lying on embankments above designed bank level shall be removed by the contractor. Embankments shall be compacted, as shown on the drawings, to achieve the requirements laid down as under: -

Laying of earth on embankment:

The fill material shall be deposited in horizontal layers. The thickness of each horizontal layer before compaction shall normally be not more than 25 centimetres (loose layer), or as determined by the Engineer-in-charge and the layer shall be laid to full width of embankment. The thickness of layer shall be governed by the type of compaction equipment to be deployed based on the space available for compaction. The excavating and placing operation shall be such that the material when compacted will be blended sufficiently to secure minimum DBD of 90%. If the surface or any compacted layer of earth fill is too dry or too smooth to bond properly with the layer of material to be placed thereon, it shall be moistened and/or sacrificed in an approved manner to provide a satisfactory bonding surface before the next succeeding layer is placed.

Compaction of earth (Cohesive Material):

Prior to and during compaction, the embankment materials shall possess optimum moisture content as required in IS 4701(Latest addition). The embankment materials shall have optimum moisture content required for the purpose of compaction and this moisture content shall be fairly uniform throughout the layer. Optimum moisture content is the moisture content that corresponds to the laboratory maximum dry density determined in accordance with IS:2720 (Part-VII). In so far as practicable the moistening of the material shall be performed at the site of excavation, but such moistening shall be supplemented as required by sprinkling water at the site of compaction, if necessary. If the moisture content is greater than optimum for compaction, the compaction operations shall be delayed until such time as the material has dried to the optimum moisture content or to the level directed by Engineer-in-charge. The moisture content of soils shall be determined in accordance with IS 2720 (Part-II).

Compaction shall be done by 8-10 T power rollers/sheep foot rollers/vibratory power rollers/mechanical compactors (fuel or pneumatic operated)/mechanical tampers depending upon the extent of space available.

Density tests shall be made after rolling every layer. The dry bulk density of the soil in compacted embankment materials shall not be less than 90% of the maximum dry bulk density at optimum moisture content (proctor density) obtained in accordance with IS 2720 (Part-7).

The dry density of soil in field shall be determined in accordance with IS 2720 (Part-28), “Indian code of practice for determination of dry density of soil in place by sand replacement or by IS 2720 (Part-29) Indian code of practice for determination of dry density of soils in place by the core cutter method.”

Moisture content of soil shall be determined in accordance with IS 2720 (Part-2) Indian code of practice for determination of moisture content.

The above compaction tests will be conducted by contractor in the presence of the Engineer-in-charge or his representative at his cost and the contractor shall ensure specified compaction, till the Engineer-in-charge or his authorized representative is satisfied that the specified dry density at optimum moisture content is obtained and permits the laying of next layer.

Compaction of Cohesion less Materials:

Where compaction of cohesion less, free draining materials, such as sands and gravels is required, the materials shall be deposited in horizontal layers and compacted to the specified relative density. The excavating and placing operation shall be such that the materials when compacted will be blended sufficiently to secure specified relative density. Water shall be added to the materials as may be required to obtain the specified density by method of compaction being used.

As envisaged in clause 6.6.2.1 of IS 4701, the thickness of the embankment layer shall not exceed 25 centimeters (loose layer) before compaction, or as determined by the Engineer-in-charge, and it shall be spread over the full width of the embankment and compaction shall be done by tracks of crawler tractors or vibratory rollers or vibro compactors. Thickness of layer shall be suitably adjusted in accordance with the type of compaction equipment used, to achieve the specified density.

As envisaged in clause 6.6.3.1 of IS 4701 the relative density of the compacted material shall not be less than 70% when tested in accordance with IS 2720 (Part-15), “Indian code of practice for determination of density index (relative density) of cohesion less soils”.

Important Points for Rehabilitation of Existing Canal Embankments

For rehabilitation of old canal embankments, the following care shall be taken for proper bonding of the freshly laid soil with the old embankment.

All trees, bushes, roots and other vegetation growth from the existing embankment shall be removed.

The base of the extension portion of embankment shall be stripped and roots & other vegetation shall be removed. The stripping operation is to be done up to the bottom of root zone of vegetation so that all roots are removed out of the surface. The stripping depth may vary at places depending upon type of vegetation growing on the area/slopes, the cost of all such stripping up to bottom of roots shall be deemed to be included in the unit rates of the excavations.

The slope of existing banks shall be benched to depth of 15 cm. to 30cm., as per requirement at site for proper bonding of the freshly laid soil with the old embankment. The cost on this account shall be deemed to be included in the unit rates of the excavations.

Earthwork shall be done in layers of specified thickness. Clods must be broken.

Under no circumstances, the embankment shall be widened by material dumped from the top of the existing embankment.

Adequate quantity of moistening/watering shall be done at the junction of the freshly laid soil with the old embankment for proper bonding.

If initial moisture content in the soil is less than the optimum moisture content (OMC) water shall be sprinkled over the freshly laid layer before compaction. A tolerance of + 1% of OMC moisture content shall be permitted.

Where the width is sufficient/adequate, compaction shall be done mechanically by 8-10 tones power roller/vibratory power roller so as to achieve at least 90% of Procter density for cohesive soils and relative density of 70% for non cohesive soil. Where space is not sufficient for the deployment of 8-10 Tones Power Rollers, the earth work shall be compacted by deploying appropriate smaller dimensioned vibratory power rollers (of the same compacting effort as of the 8-10 Tones plain power rollers) or using mechanical compacters/pneumatic compacters (by reducing the thickness of layers to + 10-15cm) to achieve 90% proctor density.

In case of minor manual compaction may be done with permission of Engineer-in-charge.

Table 1: Tests and their frequencies for embankment construction

Sl.No.	Test	Frequency of test	Purpose	Test designation
1	Grain size analysis for classification	One test per day or periodically as directed by Engineer	To know the classification of soil actually put in embankment	IS : 2720- IV

2	Specific gravity	One test per day	To know the classification of soil actually put in embankment	IS : 2720-V
3	Field density and moisture content	One test in 300m ³ of earth work or in each layer laid on embankment	To determine the placement density and moisture content	
4	Standard Proctor test	One test per day for individual borrow area	To determine MDD (maximum dry density) and OMC (optimum moisture content) of the soil and compare the results with laboratory value	IS : 2720-VII
5	Moisture content	One test in each sample	To know the moisture content in the sample	IS : 2720-II
6	Relative density test	One test in 300m ³ of earth work placement	To know the relative density of cohesion less soil	IS : 2720-XIV

1.8. Earthwork in Excavation of foundation: (Ref. PWD, Building works, Para: point B under General Specification) All works shall be carried out in proper manner. Items of works not covered by the following shall be carried out as per best practice according to directions of the Engineer-in-Charge and to his satisfaction. Unless otherwise specified in this section or in the description of item, the cost of all stages of works mentioned hereunder shall be deemed to have been included in the rates of items provided in the Schedule. Foundation when excavated to the level shown in the drawing will be shown to the Engineer-in-Charge and if on account of bad ground or for any reason whatsoever he decides to go deeper with the foundation, the contractor shall excavate further to the depths required by the Engineer-in-Charge. In no case shall the foundation soling or concrete be laid prior to receiving orders to that effect from the Engineer-in-Charge or his authorised representative.

Excavating shall include throwing the excavated earth at least one meter or half the depth of excavation, whichever is more, clear of the edge. The excavated areas around the foundation of structures are to be filled up properly to the required levels with earth obtained from excavation or other materials as directed, well rammed with water and consolidated in layers not exceeding 150 mm. at a time. The quantity for this item of work will be measured on the basis of quantity of excavation paid for less the volume occupied by the structure in foundation.

2.0 Installing Geo textiles:

2.1 Site Preparation: -

Clear and grade the installation area. Before installation of the geotextile, the site must be cleared of large and sharp stones, tree stumps or any other objects that could damage the geotextile. Cut trees and shrubs flush with the sub grade. Removal of topsoil and vegetation mat is not necessary but is recommended where practical. Excessively soft spots or voids may be unsuitable for geotextile installation. Fill these areas with select material and compact prior to geotextile installation. The problem area may be enhanced by using a geotextile at bottom of the excavation prior to backfilling. If heavy construction equipment is used, driving on the geotextile must be avoided.

2.2. Deployment of the Geotextile: -

Unroll the geotextile on the prepared sub grade in the direction of construction traffic. Hold the geotextile in place with pins, staples, fill material or rocks. Adjacent rolls shall overlap in the direction of the construction. Depending on the strength of the sub grade, the overlaps may have to be sewn.

2.3. Placement of the Aggregate: -

Place the aggregate over firm subgrades by back dumping aggregate onto the geotextile and then spreading it with a grader. For weaker subgrades, dump onto previously placed aggregate and then spread the aggregate onto the geotextile. On weaker subgrades, a sufficient layer of aggregate must be maintained beneath all equipment while dumping and spreading to minimize the potential of localized subgrade failure. Avoid traffic directly on the geotextile. When using construction equipment on the aggregate, try to avoid any sudden stops, starts or sharp turns. Maintain a minimum lift thickness of 15 cm except in cases of low volume roads. Compact the aggregate to the specified density using a drum roller. Fill any ruts with additional aggregate and compact as specified.

In addition to the application and function to be covered by the geotextile, it is important to consider the following:

Before installation, check if the packing foil is complete. If not, check the geotextile roll for damage due to UV radiation or mechanical impacts.

Before installation of the geotextile, the site must be cleared of large and sharp stones, tree stumps or any other objects that could damage the geotextile.

Secure the geotextile from wind forces, for example by placing small bags with sand on the fabric to hold it in place.

If heavy construction equipment is used, driving on the geotextile must be avoided.

If several rolls of geotextile are used for the installation, joint overlaps shall be made correctly either by sewing or by using adequate overlaps, depending on the application and soil conditions. Prior to covering, the geotextiles must be inspected to ensure that the geotextile has not been damaged during installation.

2.4. Joints and overlaps: -

In installations where more than one roll of geotextile is used, the joint overlaps shall be made either by sewing or by using adequate overlaps.

The requirements to the joints depend on the application and soil conditions in question.

The larger the deformations which can be expected, the greater the requirements for the overlap. The table given below can be used as a guideline. The requirements are specified for typical road applications. For larger hydraulic structures, the minimum overlap shall never be below 500 mm and is often required to be minimum 1 metre.

Overlap requirements/ASSHTO M288

Table 2

Soil CBR	Minimum overlap
Greater than 3	300 - 450 mm
1 - 3	0.6 - 1 m
0.5 - 1	1 m or sewn
Less than 0.5	Sewn

Sewing is a good alternative to overlapping, especially when the required overlaps are quite large, for example close to and above 1 m. Sewing can be carried out using different types of threads and seams. It is therefore important that the quality of the seam. This is typically done by testing the seam according to EN ISO 10321 “Geosynthetics - Tensile test for joints/seams by wide-width strip method”.

2.5. Specifications

2.5.1. Specification of woven geotextile as filter materials

Table 3: Specification of woven geotextile as filter materials

SI No.	Property	Unit	Test Method	MARV
1	Weight	Gsm	ASTM D 5261	430
2	Tensile Strength Warp/Weft	KN/M	IS: 1969	70/70
3	Elongation at specified Tensile Strength. Warp/Weft	%	IS: 1969	27/25

4	Trapezoidal Tearing Strength Warp/Weft	N	ASTM D 4533	1500/1500
5	Puncture Strength	N	ASTM D 4833	1200
6	Water Flow	Lit/m2/Sec	ASTM D 4491	25
7	AOS	mm	ASTM D 4751	0.425
8	U.V. Resistance after 500 hrs	% strength retained	ASTM D 4355	>= 80

2.5.1.1. Sampling and Testing

Geotextiles must be tested by the Client / Engineer-in-charge at accredited or well-equipped laboratories (e.g. BITRA, CIPET, Jadavpur University, etc.) having all testing facilities prescribed above. Cost of such testing, deemed to be 3rd Party Testing would have to be borne by the Engineer -in-charge and the responsibility of taking samples, and sending to laboratories shall entirely be vested on him, for which necessary provision for cost shall be made in the estimate, but may not be included in the BOQ of contract. This apart, the contractor also shall furnish Manufacturer's Test Certificates (MTC) from either own laboratory or from accredited laboratories stated above. No payment shall be released without MTC and full payment shall not be released until results of 3rd Party Testing are made available. In case of noncompliance of the results of 3rd Party Testing with the specified parameters, the Engineer-in-charge shall make payment at reduced rate on pro-rata basis as stated below.

Criteria	Reduced rate of payment
Strength	@ 10% (for each criterion)
Thickness	@ 50%

The sampling and testing frequency must be in accordance with the following Table 12:

Table: 4

Batch or order size (sqm) defined as the lot size	No. of samples representing the lot
Initial 10,000 sqm or part thereof	1
Each subsequent 10,000 sqm or part thereof	1

2.5.1.2. Identification and Storage

The geotextile rolls must be clearly labelled showing, manufacturer, month and year of manufacture, batch identification mark and any other information as required by the law in force.

Geotextiles must be stored under protective cover or wrapped with a waterproof, opaque UV protective sheeting to avoid any UV damage prior to installation.

Geotextiles must not be stored directly on the ground or in any manner in which they may be affected by heat. The method of storage must be in accordance with the recommendations set by the manufacturer.”

Table 5: Specification of High-Density Polyethylene (HDPE) Woven Bags

SI No.	Property	Unit	Test Method	Expected value
1	Length	cm	IS 14252	84 + 2
2	Width	cm	IS 14252	38 – 1
3	Ends per dm and Picks per dm		IS 14252	40+1
4	Mass of sack (without tying cord)	gm	IS 1964	55+2
5	Average Breaking Strength of fabric, Min (Ravelled strip method, 325mm x 70mm), Warp way / Weft way	N(kgf)	IS 1969	750(76)+6
6	Average breaking strength of bottom seam, Min (Ravelled Strip method)	N (kgf)	IS 9030	314(32)
7	Elongation at break of fabric (Ravelled Strip method), both ways	%	IS 1969	20
8	Average breaking strength at break of UV stabilized HDPE fabric after been exposed to UV radiation and weathering (after 192 hours), Min	%	IS 14252	50
9	Ash content, Max	%	IS 14252	2.2

2.5.1.3. Sampling and Testing

Sampling and testing of the HDPE woven bags shall be in accordance with relevant provision of IS: 14252:2015 or other Codes mentioned in that Code. Procedures described for making payment in relation to sampling and testing shall be similar to the provisions of 3.6.1.1 stated hereinbefore.

2.5.1.4. Printing Packaging and Marking

Printing, packaging and marking shall be in accordance with the provision of Clause 5 of IS: 14252:2015. Each bag shall carry the following: (a) Manufacturer’s name and logo (b) BIS Standard Mark (c) Manufacturer’s BIS License Number (d) Month of manufacture.” No bag shall be accepted without the above information

3.0. Bullah Piling Work

Bullah piles shall be strong, straight and free from knots, holes and cracks. No joints in bullah piling is admissible except written permission from the Engineer-in-charge. Extra length required for lapping and cost of supplying of nuts, bolts and rings will not be paid for. The diameter of piles will be measured at a distance of 1.50metrefrom the thicker end. The driving of bullah piles will be done either in the river / channel bank or in the bed of the river / channel under tidal condition and stagnant or flowing condition of river etc. in all kinds of soil. The rate of supply is inclusive of sharpening the thinner end of the bullah and length shall be measured after sharpening shaping, and numbering. The piles will have to be driven vertically true to plumb along the alignment and upto required depth. The top of piles will have to be maintained more or less in the same level or as directed. The rate of driving is inclusive of hire charges of hoisting and driving arrangement, staging, scaffolding, floating arrangement like boats etc. Driven length shall be measured by deducting the exposed length from the supply length. The rate is inclusive of shaping of toe, protection of head and hire charges of necessary driving appliances and tools, boat or pontoon and scaffolding. No payment will be made for exposed portion of bullah. No pile shoe will be used if the driving is possible upto the required depth without the shoe and the decision of the Engineer-inCharge shall be final in this respect.

During taking out bullah piling, payment shall be made over previously considered driven length only. The rate of taking out includes hire charges of scaffolding, chain pulley block, rope drum, floating arrangement and all other accessories.

4.0 ROAD WORKS

4.1 Water Bound Macadam Sub-Base/Base (cl. 404 of MORT&H)

4.1.1 Scope

This work shall consist of clean crushed aggregates mechanically interlocked by rolling and bonding together with screening, binding material where necessary and water laid on a properly prepared subgrade/sub-base/base or existing pavement, as the case may be and finished in accordance with the requirements of these Specifications and in close conformity with the lines, grades, cross-sections and thickness as per approved plans or as directed by the Engineer.

4.1.2 Materials

4.1.2.1 Coarse Aggregates

Coarse aggregates shall be either crushed or broken stone, over burnt (Jhama) brick aggregates or any other naturally occurring aggregates such as kankar and laterite of suitable quality. Materials other than crushed or broken stone shall be used in sub-base courses only. If crushed gravel /shingle is used, not less than 90 percent by weight of the gravel/shingle pieces retained on 4.75 mm sieve shall have at least two fractured faces.

The aggregates shall conform to the physical requirements set forth in **Table 400-8**. The type and size range of the aggregate shall be specified in the Contract or shall be as specified by the Engineer. If the water absorption value of the coarse aggregate is greater than 2 percent, the soundness test shall be carried out on the material delivered to site as per IS: 2386 (Part 5).

Table 6 : Physical Requirements of Coarse Aggregates for Water Bound Macadam for Subbase/Base Courses (*Table 400-8 of MORT&H*)

S.No.	Test	Test Method	Requirements
1)	Los Angeles Abrasion value or Aggregate Impact value	IS:2386(Part4) IS: 2386 (Part-4) or IS:5640*	40 percent (Max) 30 percent (Max)
2)	Combined Flakiness and Elongation Indices (Total) **	IS: 2386(Part-1)	35 percent (Max)

Aggregates which get softened in presence of water shall be tested for Impact value under wet conditions in accordance with IS: 5640.

The requirement of flakiness index and elongation index shall be enforced only in the case of crushed broken stone.

In case water bound macadam is used for sub-base, the requirements in respect of Los Angeles Value and Aggregate Impact Value shall be relaxed to 50 percent and 40 percent maximum respectively.

4.1.2.2 Over burnt (Jhama) Brick Aggregates

Jhama brick aggregates shall be made from over burnt bricks or brick bats and be free from dust and other objectionable and deleterious materials. This shall be used only for road stretch when traffic is low.

The coarse aggregates shall conform to one of the Gradings given in Table 400-9 as specified.

4.1.2.3 Screenings

Screenings to fill voids in the coarse aggregate shall generally consist of the same material as the coarse aggregate. However, where permitted, predominantly non-plastic material such as moorum or gravel (other than rounded river borne material) may be used for this purpose provided liquid limit and plasticity index of such material are below 20 and 6 respectively and fraction passing 75 micron sieve does not exceed 10 percent.

Table 7: Grading Requirements of Coarse Aggregates (Table 400-9 of MORT&H)

No.	Size Range	IS Sieve Designation	Passing
1)	63 mm to 45 mm	75 mm	100
		63 mm	90-100
		53 mm	25-75
		45 mm	0-15
		22.4 mm	0-5
2)	53 mm to 22.4 mm	63 mm	100
		53 mm	95-100
		45 mm	65-90
		22.4 mm	0-10
		11.2 mm	0-5

Grading Percent by weight

Note: The compacted thickness for a layer shall be 75 mm.

Screenings shall conform to the grading set forth in Table 400-10. The quantity of screenings required for various grades of stone aggregates are given in Table 400-11. The Table also gives the quantities of materials (loose) required for 10 m² for sub-base/base compacted thickness of 75 mm.

The use of screenings shall be omitted in the case of soft aggregates such as brick metal, kankar, laterites, etc. as they are likely to get crushed to a certain extent under rollers.

4.1.2.4 Binding Material

Binding material to be used for water bound macadam as a filler material meant for preventing raveling shall comprise of a suitable material approved by the Engineer having a Plasticity Index

(PI) value of less than 6 as determined in accordance with IS:2720 (Part-5).

The quantity of binding material where it is to be used, will depend on the type of screenings. Generally, the quantity required for 75 mm compacted thickness of water bound macadam will be 0.06-0.09 m³ per 10 m².

Table 8: Grading for Screenings (Table 400-10 of MORT&H)

Grading Classification	Size of Screenings	IS Sieve Designation	Percent by Weight Passing the Sieve
A	13.2 mm	13.2 mm	100
		11.2 mm	95-100
		5.6 mm	15-35
		180 micron	0-10
B	11.2 mm	11.2 mm	100
		9.5 mm	80-100
		5.6 mm	50-70
		180 micron	5-25

Table 9: Approximate Quantities of Coarse Aggregates and Screenings Required for 75 mm Compacted Thickness of Water Bound Macadam (WBM) Sub-Base/Base Course for 10 m² Area (Table 400-11 of MORT&H)

Classification	Size Range	Compacted Thickness	Loose Qty.	Screenings			
				Stone Screening		Crushable Type such as Moorum or Gravel	
				Grading Classification & Size	For WBM Sub-base/Base Course (Loose Quantity)	Grading Classification & Size	Loose Qty.
Grading 1	63 mm to 45 mm	75 mm	0.91 to 1.07 m ³	Type A 13.2 mm	0.12 to 0.15 m ³	Not uniform	0.22 to 0.24 m ³
-do-	-do-	-do-	-do-	Type B 11.2 mm	0.20 to 0.22 m ³	-do-	-do-
Grading 2	53 mm to 22.4 mm	75 mm	-do-	-do-	0.18 to 0.21 m ³	-do-	-do-

The above-mentioned quantities should be taken as a guide only, for estimation of quantities for construction etc.

Application of binding materials may not be necessary when the screenings used are of crushable type such as moorum or gravel.

4.1.3 Construction Operations

4.1.3.1 Preparation of Base

The surface of the sub-grade/sub-base/base to receive the water bound macadam course shall be prepared to the specified grade and camber and cleaned of dust, dirt and other extraneous material. Any ruts or soft yielding places shall be corrected in an approved manner and rolled until firm surface is obtained.

Where the WBM is to be laid on an existing metalled road, damaged area including depressions and potholes shall be repaired and made good with the suitable material. The existing surface shall be scarified and re-shaped to the required grade and camber before spreading the coarse aggregate for WBM.

As far as possible, laying water bound macadam course over existing bituminous layer may be avoided since it will cause problems of internal drainage of the pavement at the interface of two courses. It is desirable to completely pick out the existing thin bituminous wearing course where water bound macadam is proposed to be laid over it.

4.1.3.2 Inverted Choke / Sub-surface Drainage Layer

If water bound macadam is to be laid directly over the sub-grade, without any other intervening pavement course, a 25 mm course of fine sand shall be spread on the prepared sub-grade before application of the aggregates is taken up. In case of existing silty or clayey sub-grade, it is advisable to lay 100 mm insulating layer of fine sand on top of the sub grade, the gradation of which will depend upon whether it is intended to act as a drainage layer as well. As a preferred alternative to inverted choke, appropriate geosynthetics performing functions of separation and drainage may be used over the prepared sub-grade as directed by the Engineer. Section 700 shall be applicable for use of geosynthetics.

4.1.3.3 Lateral Confinement of Aggregates

For construction of WBM, arrangement shall be made for the lateral confinement of aggregates. This shall be done by building adjoining shoulders along with WBM layers. The practice of constructing WBM in a trench section excavated in the finished formation must be completely avoided.

Where the WBM course is to be constructed in narrow widths for widening of an existing pavement, the existing shoulders should be excavated to their full depth and width up to the sub-grade level except where widening specifications envisages laying of a stabilised sub-base using in-situ operations in which case the same should be removed only up to the sub-base level.

4.1.3.4 Spreading Coarse Aggregates

The coarse aggregates shall be spread uniformly and evenly upon the prepared sub-grade/sub-base in the required quantities from the stockpiles to proper profile by using templates placed across the road about 6 m apart, in such quantities that the thickness of each compacted layer is not more than 75 mm. In no case shall these be dumped in heaps directly on the area where these are to be laid nor shall their hauling over a partly completed base be permitted. Wherever possible, approved mechanical devices such as aggregate spreader shall be used to spread the aggregates uniformly so as to minimize the need for manual rectification afterwards.

No segregation of coarse aggregates shall be allowed and the coarse aggregates, as spread shall be of uniform gradation with no pockets of fine material.

The surface of the aggregates spread shall be carefully checked with templates and all high or low spots remedied by removing or adding aggregates as may be required. The surface shall be checked frequently with a straight edge while spreading and rolling so as to ensure a finished surface as per approved drawings.

The coarse aggregates shall not normally be spread more than 3 days in advance of the subsequent construction operations.

4.1.3.5 Rolling

Immediately following the spreading of the coarse aggregates, rolling shall be started with three wheeled power rollers of 80 to 100 KN capacity or tandem or vibratory rollers of 80 to 100 KN static weight. The type of roller to be used shall be approved by the Engineer based on trial run.

Except on super elevated portions and carriageway with unidirectional cross-fall, where the rolling shall proceed from inner edge to the outer, rolling shall begin from the edges gradually progressing towards the center. First the edge/edges shall be compacted with roller running forward and backward. The roller shall then move inward parallel to the center line of the road, in successive passes uniformly overlapping preceding tracks by at least one-half width.

Rolling shall be carried out on courses where coarse aggregates of crushed/ broken stone are used, till the road metal is partially compacted. This will be followed by application of screenings and binding material where required in Clauses 404.3.6 and 404.3.7.

However, where screenings are not to be applied as in the case of aggregates like brick metal, laterite and Kankar for sub-base construction, the compaction shall be continued until the aggregates are thoroughly keyed. Rolling shall be continued and light sprinkling of water shall be done till the surface is well compacted. Rolling shall not be done when the sub- grade is soft or yielding or when it causes a wave-like motion in the sub-grade or sub-base course.

The rolled surface shall be checked transversely with templates and longitudinally with 3 m straight edge. Any irregularities, exceeding 12 mm, shall be corrected by loosening the surface, adding or removing necessary amount of aggregates and re-rolling until the entire

surface conforms to the desired camber and grade. In no case shall the use of screenings be permitted to make up depressions.

Material, which gets crushed excessively during compaction or becomes segregated, shall be removed and replaced with suitable aggregates.

4.1.3.6 Application of Screenings

After the coarse aggregates have been rolled to Clause 404.3.5, screenings to completely fill the interstices shall be applied gradually over the surface. These shall not be damp or wet at the time of application. Dry roiling shall be done while the screenings are being spread so that vibrations of the roller cause them to settle into the voids of the coarse aggregates. The screenings shall not be dumped in piles but be spread uniformly in successive thin layers either by the spreading motions of hand shovels or by mechanical spreaders, or directly from tipper with suitable grit spreading arrangement. Tipper operating for spreading the screenings shall be equipped with pneumatic tyres and operated so as not to disturb the coarse aggregates.

The screenings shall be applied at a slow and uniform rate (in three or more applications) so as to ensure filling of all voids. This shall be accompanied by dry rolling and brooming with mechanical brooms, hand brooms or both. In no case shall the screenings be applied so fast and thick as to form cakes or ridges on the surface in such a manner as would prevent filling of voids or prevent the direct bearing of the roller on the coarse aggregates. These operations shall continue until no more screenings can be forced into voids of the coarse aggregates. The spreading, rolling, and brooming of screenings shall be carried out in only such lengths of the road which could be completed within one day's operation.

4.1.3.7 Sprinkling of Water and Grouting

After application of screenings, the surface shall be copiously sprinkled with water, swept and rolled. Hand brooms shall be used to sweep the wet screenings into voids and to distribute them evenly. The sprinkling, sweeping and rolling operation shall be continued, with additional screenings applied as necessary until the coarse aggregates have been thoroughly keyed, well-bonded and firmly set in its full depth and a grout has been formed of screenings. Care shall be taken to see that the sub-base or sub-grade does not get damaged due to the addition of excessive quantities of water during construction.

In case of lime treated soil sub-base, construction of water bound macadam on top of it shall be taken up after curing as per Clause 402.3.9 and as directed by the Engineer.

Application of binding material: After the application of screenings in accordance with Clauses 404.3.6 and 404.3.7, the binding material where it is required to be used (Clause 404.2.7) shall be applied successively in two or more thin layers at a slow and uniform rate. After each application, the surface shall be copiously sprinkled with water, the resulting slurry swept in with hand brooms, or mechanical brooms to fill the voids properly, and rolled during which water shall be applied to the wheels of the rollers, if necessary, to wash

down the binding material sticking to them. These operations shall continue until the resulting slurry after filling of voids, forms a wave ahead of the wheels of the moving roller.

4.1.3.8 Setting and Drying

After the final compaction of water bound macadam course, the pavement shall be allowed to dry overnight. Next morning hungry spots shall be filled with screenings or binding material as directed, lightly sprinkled with water if necessary and roiled. No traffic shall be allowed on the road until the macadam has set. The Engineer shall have the discretion to stop hauling traffic from using the completed water bound macadam course, if in his opinion it would cause excessive damage to the surface.

The compacted water bound macadam course shall be allowed to completely dry and set before the next pavement course is laid over it.

4.1.3.9 Reconstruction of Defective Macadam

The finished surface of water bound macadam shall conform to the tolerances of surface regularity as prescribed in Clause

However, where the surface irregularity of the course exceeds the tolerances or where the course is otherwise defective due to sub-grade soil mixing with the aggregates, the course to its full thickness shall be scarified over the affected area, reshaped with added material or removed and replaced with fresh material as applicable and re-compacted. The area treated shall not be less than 10 sq.m. In no case shall depressions be filled up with screenings or binding material.

4.2. BITUMINOUS MACADAM (cl. 504 of MORT&H)

This work shall consist of construction in a single course having 50 mm to 100 mm thickness or in multiple courses of compacted crushed aggregates premixed with a bituminous binder on a previously prepared base to the requirements of these Specifications. Since the bituminous macadam is an open-graded mix, there is a potential that it may trap water or moisture vapour within the pavement system. Therefore, adjacent layer (shoulders) should have proper drainage quality to prevent moisture-induced damage to the BM. 5.1.2. Materials 5.1.2.1. Bitumen The bitumen shall be viscosity graded paving bitumen complying with Indian Standard Specification for paving bitumen, IS:73 or as specified in the Contract. The type and grade of bitumen to be used would depend upon the climatic conditions and the traffic. Guidelines for selection of bitumen are given in Table 500-1 of MoRT&H.

4.2.1. Coarse Aggregates: The coarse aggregates shall consist of crushed rock, crushed gravel or other hard material retained on 2.36 mm sieve. It shall be clean, hard, durable and cubical shape, free from dust and soft organic and other deleterious substances, and are to be procured from authorized quarries/ vendors. The aggregate shall satisfy the physical requirements specified in Table 500-6. Where crushed gravel is proposed for use as aggregate, not less than 90 percent by weight of the crushed material retained on 4.75 mm sieve shall have at least two fractured faces resulting from crushing operation. Before approval of the source, the aggregates shall be tested for stripping. Where the Contractor's selected source of aggregates have poor affinity for bitumen, as a condition for the approval

of that source, the bitumen shall be treated with approved anti-stripping agents, as per the manufacturer's recommendations, without additional payment.

4.2.2. Fine Aggregates: Fine aggregates shall consist of crushed or naturally occurring mineral material, or a combination of two, passing 2.36 mm sieve and retained on 75-micron sieve. It shall be clean, hard, durable, free from dust and soft organic and other deleterious substances. Natural sand shall not be used in the binder course. Sand is to be procured from authorized quarries/ vendors

Table 10: Physical Properties of Coarse Aggregate (MoRT&H 500-6)

Property	Test	Requirement	Test method
Cleanliness	Grain analysis size	Max. 5% passing 0.075 micron	
Particle shape	Combined Flakiness and Elongation Indices	Max. 35%	IS:2386 Part I
Strength	Los Angeles Abrasion Value or Aggregate Impact Value	Max. 40%	IS:2386 Part I
	Aggregate Impact Value	Max. 30%	IS:2386 Part IV
Durability	Soundness (Sodium Magnesium) or Sodium Sulphate	5 cycles	
	Sodium Sulphate	Max. 12%	IS:2386 Part IV
	Magnesium Sulphate	Max. 18%	IS:2386 Part V
Water absorption	Water absorption	Max. 2%	IS:2386 Part V
Stripping	Coating and stripping of Bitumen Aggregate	Min. Retained Coating 95%	IS:6241
Water sensitivity	Retained Tensile Strength	Min. 80%	AASHTO283

*If the minimum retained tensile strength falls below 80 percent, use of anti-stripping agent is recommended to meet the minimum requirements.

4.2.3. Aggregate Grading and Binder Content: The combined grading of the coarse aggregates and fine aggregates, when tested accordance with IS:2386 Part 1, wet sieving method, shall conform to limits given in Table 500-8. The type and quantity of bitumen and appropriate thickness is also given in Table 500-7.

4.2.4. Proportioning of Material: The combined aggregate grading shall not vary from the lower limit on one sieve to the higher limit on the adjacent sieve to avoid gap grading. The aggregate may be proportioned and blended to produce a uniform mix complying with the requirements in Table 500-7. The binder content shall be within a tolerance of ± 0.3 percent by weight of total mix when individual specimens are taken for quality control tests in accordance with the provisions of Section 900. 5.1.3. Construction Operation

4.2.5. Weather and Seasonal limitations the provisions of Clause 501.5.1 MoRT&H shall apply.

Table 11: Aggregate Grading and Bitumen Content (MoRT&H 500-6)

Grading	1	2
Nominal maximum aggregate size*	40mm	19 mm
Layer thickness	80 -100 mm	50 -75 mm
IS Sieve size (mm)	Cumulative % by weight of total aggregate passing	
45	100	
37.5	90-100	
26.5	75-100	100
19		90 -100
13.2	35-61	56 -88
4.75	13-22	16 -36
2.36	4-19	4-19
0.3	2-10	2-10
0.075	0-8	0-8
Bitumen content ** percent by mass of total mix	3.3**	3.4**

*Nominal maximum aggregate size is the largest specified sieve size upon which any of the aggregate material is retained.

*Corresponds to specific gravity of the Aggregate being 2.7. In case aggregates have specific gravity more than 2.7, bitumen content can be reduced proportionately. Further, for regions where highest daily mean air temperature is 30°C or lower and lowest daily mean air temperature is (-)10 Degree Celsius or lower, the bitumen content may be increased by 0.5 percent

4.2.6. Preparation of the Base: The base on which bituminous macadam is to be laid shall be prepared, shaped and compacted to the required profile in accordance with Clauses 501.8 and 902.3 as appropriate, and a prime coat, shall be applied in accordance with Clause 502 where specified, or as directed by the Engineer. The surface shall be thoroughly swept clean by a mechanical broom, and the dust removed by compressed air. In locations where mechanical broom cannot get access, other approved methods shall be used as directed by the Engineer.

4.2.7 Tack Coat: A tack coat in accordance with Clause 503 of MoRT&H shall be applied as required under the Contract or as directed by the Engineer.

4.2.8. Preparation and Transportation of the Mix: The provisions of Clauses 501.3 and 501.4 of MoRT&H shall apply.

4.2.9. Spreading: The provisions of Clause 501.5.3 of MoRT&H shall apply.

4.2.10. Rolling Compaction shall be carried out in accordance with the provisions of Clauses 501.6 and 501.7 of MoRT&H.

Rolling shall be continued until the specified density is achieved, or where no density is specified, until there is no further movement under the roller. The required frequency of testing is defined in Clause 903 of MoRT&H.

4.2.11 Surface Finish and Quality Control of Work: The surface finish of the completed construction shall conform to the requirements of Clause 902 of MoRT&H. For control of the quality of materials and the works carried out, the relevant Provisions of Section 900 shall apply.

4.2.12. Protection of the Layer: The bituminous macadam shall be covered with either the next pavement course or wearing course, as the case may be, within a maximum of forty-eight hours. If there is to be any delay, by the Contractor the course shall be covered by a seal coat to the requirement of Clause 512 before opening to any traffic. The seal coat in such cases shall be considered incidental to the work and shall not be paid for separately.

4.2.13. Arrangements for Traffic during the period of construction: The arrangements for traffic shall be made in accordance with the provisions of Clause 112.

4.2.14 Measurement for Payment Bituminous macadam shall be measured as finished work in cubic meters, or by weight in metric tons, where used as regulating course, or square meters at the specified thickness as indicated in the Contract or shown on the drawings, or as otherwise directed by the Engineer.

4.2.15 Rate: The contract unit rate for bituminous macadam shall be payment in full for carrying out the required operations as specified. The rate shall include cost for all components listed in Clause 501.8.8.2 of MoRT&H.

4.3 FLEXICELL / GEOCELL:

Flexicell is a lightweight yet strong, 3D honeycomb-like cellular confinement system, which Offers unique, eco-friendly solutions for various civil engineering challenges. Engineered for Diversity, FlexiCell can be utilized in various sectors such as roads, railways, ports and Others.

Material Properties		
Polymer Density (ASTM D 1505) Environmental Stress Crack (ASTM D 1693)	g/cm ³ HRS	0.920 — 0.965 > 3500
Carbon Black Content (ASTM D 1603)	%	Min 1.2 — 2.0
Nominal Sheet Thickness (ASTM D 5199)	mm	Min 1.52
Material	Compound of various Polyethylene and additives	
Texture	Polyethylene strip consists of multiple rhomboidal indentations, over the entire strip area on both sides of the strip. The indentations have a Surface Density of 11 to 15 per cm ² .	
Perforations	Polyethylene strip is perforated with horizontal rows of maximum 10 mm Diameter holes. Cell perforations area is less than 12% of cell surface area.	

Cell/ Section Properties

Property	Unit	FC330	FC360	FC445	FC660	FC712
Weld Spacing	mm	330	360	445	660	712
Cell Depth	mm	75	100/150	125	150	200
Expanded Cell Area (± 5%)	Width	244	261	320	488	508
	Length	210	228	287	436	475
Expanded Cell Area (± 5%)	cm ²	250	291	460	1000	1206
Nominal Expanded Section (± 5%)	Width	2.51	2.71	3.24	4.83	5.07
	Length	3.15	3.38	4.30	6.54	7.12
Nominal Expanded Section Area	m ²	07.9	09.0	13.9	31.5	36.0
Cell Depth						
Seam Properties	mm	75	100/150	125	150	200
Seam Peel Strength	N	1065	1420/2130	1775	2130	2840
(EN ISO 13426-1 method B-Peeling test)						

FLEXITUFF GEOFIL "W" series Geotextiles are Woven from High Strength Multifilament Polypropylene yarns. They are mainly used for Reinforcement, Filtration and Separation functions in a highly alkaline & acidic environment & having properties of UV resistance and biological & chemical degradation resistance to the required extent.

PROPERTIES		TEST METHOD	UNIT	ROLL TYPICAL VALUE
MASS PER UNIT AREA		ASTM D5261	GSM	430
TENSILE STRENGTH	WARP	ASTM D 5035 or IS 1969	kN/m	100
	WEFT			100
ELONGATION AT BREAK	WARP		%	25
	WEFT			25
TRAPEZOIDAL TEAR STRENGTH	WARP /WEFT	ASTM D4533	N	2500 / 2500

GRAB TENSILE STRENGTH	WARP /WEFT	ASTM D4632	N	2600 / 2500
APPARENT OPENING SIZE (AOS)		ASTM D4751	Micron	300
INDEX PUNCTURE		ASTM D4833	N	1200
CBR PUNCTURE STRENGTH		ASTM D6241	N	9000
WATER FLOW RATE (100 mm)		ASTM D4491	L/m ² /s	25
UV RESISTANCE @ 500 Hrs.		ASTM D4355	%	>80
ROLL DIMENSIONS (L x W)		Standard	Mtr.	100 x 5

5.0 Backfilling

Holes and depressions caused by dismantling operations shall be backfilled with excavated or other approved materials and compacted to required density as directed by the Engineer.

6.0 Safe Disposal of Materials

All materials obtained by dismantling shall be the property of Government. Unless otherwise specified, materials having any salvage value shall be placed in neat stack of like materials within the right of way, as directed by the Engineer with all lifts and up to a lead of 1000m.

Pipes that are removed shall be cleaned and neatly piled on the right of way at points designated by the Engineer with all lifts and lead up to 1000m.

Structural steel removed from old structures shall, unless otherwise specified or directed, be stored in a neat and presentable manner on blocks in locations suitable for loading. Structures or portions thereof, which are specified in the Contract for re-erection, shall be stored in separate piles.

All materials obtained from dismantling operations, which, in the opinion of the Engineer, cannot be used or auctioned, shall be disposed of as directed by the Engineer with all lifts and up to a lead of 1000m.

BANK GUARANTEE FOR ADVANCE PAYMENT

To: _____ [name of Employer]
_____ [address of Employer]
_____ [name of Contract]

Gentlemen:

In accordance with the provisions of the Conditions of Contract, sub-clause 3.1 of the above-mentioned Contract, _____ [name and address of Contractor] (hereinafter called "the Contractor") shall deposit with _____ [name of Employer] a bank guarantee to guarantee his proper and faithful performance under the said Clause of the Contract in an amount of _____ [amount of guarantee]¹ _____ [in words].

We, the _____ [bank or 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 objection on our part and without his first claim to the Contractor, in the amount not exceeding _____ [amount of guarantee]³ _____ [in words].

We further agree that no change or addition to or other modification of the terms of the Contract or of 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 modification.

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.

Yours truly,

Signature and seal: _____
Name of Bank/Financial Institution: _____
Address: _____
Date: _____

³ An amount shall be inserted by the bank or financial institution representing the amount of the Advance Payment, and denominated in Indian Rupees.

PERFORMANCE BANK GUARANTEE
(To be given from a nationalized or scheduled bank in India)

To: _____ [name of Employer]
_____ [address of Employer]

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

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

AND WHEREAS we have agreed to give the Contractor such a Bank Guarantee;

NOW THEREFORE we hereby affirm that we are the Guarantor and responsible to you, on behalf of the Contractor, up to a total of _____ [amount of guarantee]¹ _____ [in words], such sum being payable in the types and proportions of currencies in which the Contract Price is payable, and we undertake to pay you, upon your first written demand and without cavil or argument, any sum or sums within the limits of _____ [amount of guarantee]¹ 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 us with the demand.

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

This guarantee shall be valid until 28 days from the date of expiry of the Defects Liability Period.

Signature and seal of the guarantor _____
Name of Bank _____
Address _____
Date _____

Form of Bid Security - Bank Guarantee

[Guarantor letterhead or SWIFT identifier code]

Bank Guarantee No.....[insert guarantee reference number]

Date.....[insert date of issue of the guarantee]

WHEREAS, _____ [name of Bidder]⁴ (hereinafter called "the Applicant") has submitted his Bid dated _____ [date] or will submit his Bid for the construction of _____ [name of Contract] (hereinafter called "the Bid") under Request for Bids No.....[insert number] (hereinafter called "the RFB")

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 _____ ⁵for which payment well and truly to be made to the said Employer the Bank binds itself, his successors and assigns by these presents.

SEALED with the Common Seal of the said Bank this _____ day of _____ 20_____.

THE CONDITIONS of this obligation are:

1. If after Bid opening the Applicant (a) withdraws his bid during the period of Bid validity specified in the Letter of Bid, ("the Bid Validity Period"); or (b) does not accept the correction of the Bid Price pursuant to ITB 36;

Or

2. If the Applicant having been notified of the acceptance of his bid by the Employer during the period of Bid validity:
 - a fails or refuses to execute the Contract Agreement in accordance with the Instructions to Bidders, if required; or
 - b fails or refuses to furnish the Performance Security, in accordance with the Instruction to Bidders.

⁴Insert name of the Bidder, which in the case of a joint venture shall be (a) the name of the joint venture that submits the bid if the JV has been constituted into a legally enforceable JV, or (b) the names of all future members of the JV as named in the letter of intent to execute the JV Agreement submitted by the bidder along with its bid.

⁵The Applicant 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 19.1 of the Instructions to Bidders.

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 four conditions, specifying the occurred condition or conditions.

This Guarantee will remain in force up to and including the date _____²⁶days after the deadline for submission of Bids as such 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 OF THE BANK _____

WITNESS _____

SEAL _____

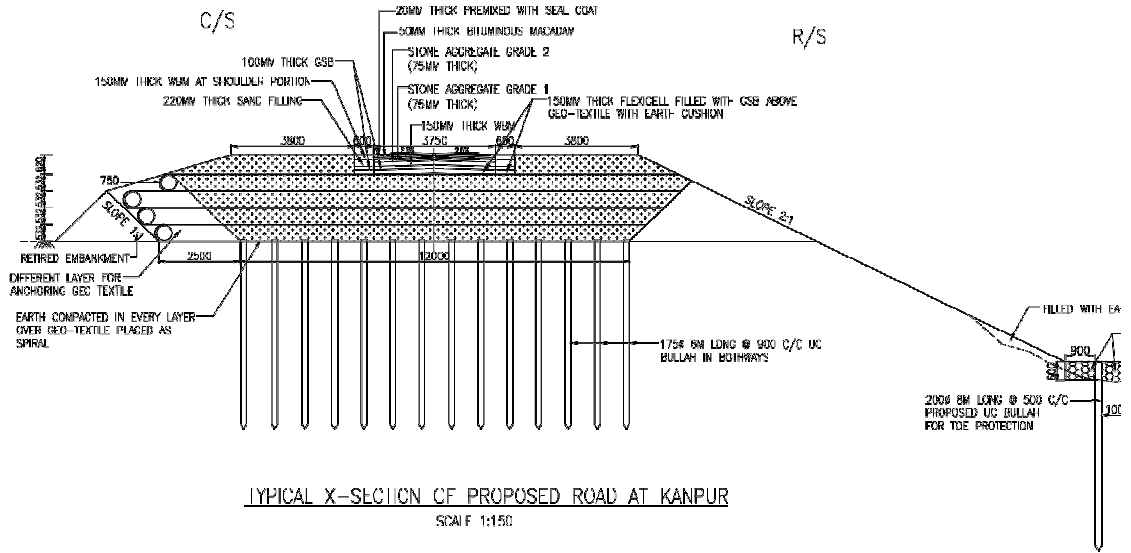
[Signature, Name, and address]

Note: All italicized text (including footnotes) is for use in preparing this form and shall be deleted from the final product.

²⁶45 days after the end of the validity period of the Bid

DRAWING FOR IMPROVEMENT OF SUBSIDED PORTION MADARIA LEFT BANK ROAD NEAR KANPUR, UDAYNARAYANPUR BLOCK IN THE DISTRICT OF HOWRAH

Notes :
 General:-
 1. All Dimensions Are in Mill
 Levels Are in Meters Unless



Sd/-
 Executive Engineer
 Howrah Irrigation Division
 DPMU- Howrah , WBMIFMP