



Government of India
Ministry of Road Transport & Highways
(S&R (P&B) Section)

Transport Bhawan, 1, Parliament Street, New Delhi- 110001

Dated :04.03.2024

To

1. The Chief Secretaries of all the State Governments/ UTs.
2. The Principal Secretaries/ Secretaries of all States/ UTs Public Works Department/ Road Construction Department/ Highways Department (dealing with National Highways and other centrally sponsored schemes).
3. The Chairman, National Highways Authority of India, G-5 & 6, Sector-10, Dwarka, New Delhi-110 075.
4. The Managing Director, NHIDCL, PTI Building, New Delhi-110001.
5. The Director General (Border Roads), Seema Sadak Bhawan, Ring Road, New Delhi- 110 010.
6. All Engineers-in-Chief and Chief Engineers of Public Works Department of States/ UTs/ Road Construction Department/ Highways Departments (dealing with National Highways and other centrally sponsored schemes).
7. The Secretary General, Indian Roads Congress
8. The Director, IAHE, NOIDA, UP
9. All CE-ROs, ROs and ELOs of the Ministry.

Subject: Guidelines for identification and implementation of real-time Health Monitoring of Bridges using Sensors

Madam/Sir,

Condition assessment of the bridges is an important requirement for carrying out preventive maintenance and repair/rehabilitation/retrofitting/reconstruction of a bridge in time to avoid traffic disruptions and untoward incidents due to failure of bridges. Bridge investigation starts with desk study of drawings, reports of damages, past history of repair, etc. Investigation is generally carried out in two stages i.e., a visual survey to assess the overall integrity of the bridge followed by detailed instrument aided investigation (non-destructive, semi-destructive) to determine the extent and severity of deterioration. However, for important bridges/major bridges, the parameters like strain, deflection, vibration, tilt, displacement, temperature, corrosion and scour through appropriate indicators are to be collected as per requirements, using various types of sensors embedded/installed in the bridges and analyzed using suitable software tools/models to determine the condition of the bridge. Such real time data collection and monitoring can be permanent with continuous data collection where sensors are embedded/installed in the major/innovative bridges & bridges located

in highly saline/polluted environment either at the time of construction or subsequently installed during operation stage. In some cases, continuous/discrete (at fixed intervals) type of data collection and monitoring can be undertaken on real time basis by suitably installing sensors in different parts of the bridges permanently or for short duration.

2. In the light of the above, it has been decided to undertake real-time Health Monitoring of different categories of bridges on National Highways using appropriate Sensors as per the following guidelines. Matrix of instrumentation covering the type of sensors to be used, location of installation of the sensor, type of measurement for different categories of bridges under different climatic conditions is at **Annexure**.

3. While preparing DPRs for proposed bridges at Sl. no. 1 to 5 of the Annexure, the DPR consultant shall finalise exact type, numbers and locations of Sensors and include the same in the cost estimates /scope of work in the schedules. Determination of exact type, number and locations of Sensors for existing bridges at Sl. no. 6 and 7 of the Annexure shall be finalised and got approved from ADG in Roads Wing of the MoRTH /Member in NHAI/Director (Technical) in NHIDCL as the case may be.

4. Model RFP for continuous monitoring for bridges at Sl. no. 7 of Annexure is enclosed. Technical Specifications/framework of Sensors, Data Acquisition System, Data Transmission System and software tools for analysis mentioned in the RFP shall be substantially followed for bridges at Sl. no. 1 to 6 of the Annexure. Model RFP for discrete monitoring for bridges at Sl. no. 6 of Annexure is under preparation and will be shortly circulated.

5. Methodology for installation/embedment of Sensors shall be undertaken by the contractor as per manufacturer's guidelines with approval from concerned RO of MoRTH/NHAI/NHIDCL.

6. Data Acquisition System is a very important hardware in the process. As it depends on number, lay out and types of Sensors as well as particular make, only broad parameters have been given in the Technical Specifications. For any specific issues, concerned RO of MoRTH /NHAI/NHIDCL will take advise from Expert Committee before approval of the Data Acquisition System. The Expert Committee will comprise of concerned ADG of Roads Wing of MoRTH/Member of NHAI/Director(Tech) of NHIDCL & CE (S&R), MoRTH and an outside expert to be decided by CE (S&R), MoRTH.


7. *There is no standardized analysis tool available presently for monitoring different parameters and for different topologies of the bridges. Contractor is free to propose software tool of his choice for analysing the data collected through sensors to furnish outcome deliverables like extent of deterioration in the strength of different components of the bridge, extent loss / deterioration in the cables/reinforcement/prestressing tendons, extent of additional stresses / forces / moments induced in the bridge components due to rotation, tilt etc., and consequent requirements for strengthening / rehabilitation extent of scouring ,*

extent of deterioration in the bearings etc., and requirements of corresponding corrective actions. Concerned ROs of MoRTH /NHAI/NHIDCL will take a advice from the Expert Committee mentioned in para 6 above before approving the same.

8. All the executing agencies of MORTH shall provide all the details of bridges, types of sensors installed, the details of Data Acquisition System, software tools for analysis of their performance and outcomes of the analysis to S&R Zone of the Ministry periodically for further review of the guidelines based on the experience gained.

9. This issues with the approval of Competent Authority.

Yours faithfully



(Jitendra Kumar)
SE, S&R(Bridges)

For Director General (Road Development) & Special Secretary

Enclosure:

- (i) Annexure
- (ii) Model RFP document for continuous monitoring of bridges at s.no 7 of Annexure

Copy to:

1. All the Technical Officers in the Ministry of Road Transport &Highways
2. All the Joint Secretaries in the Ministry of Road Transport &Highways
3. Technical circular file of S&R (P&B) Section
4. NIC-for uploading on Ministry's website under "What's new"

Copy for kind information to:

1. PS to Hon'ble Minister (RT&H)
2. PS to Hon'ble MOS (RT&H)
3. Sr. PPS to Secretary (RT&H)
4. Sr. PPS to DG (RD) & SS
5. Sr. PPS/PPS to Addl. Secretary (Transport)/Addl. Secretary (H & LA)
6. Sr. PPS/ PPS to AS&FA
7. Sr. PPS/ PPS to all ADGs
8. Sr. PPS/ PPS to JS (EAP) / JS (Logistics)

ANNEXURE

SI No	Category of Bridge	Type of measuring instrument to be installed & (Location of installation)						Type of measurement		
		Strain Gauge	Triaxial accelerometer	Temperature Sensor	Corrosion Sensor	Biaxial inclinometer	Acoustic Sensor	Displacement Transducer	Continuous	At fixed intervals
1	Cable Stayed	√ (ES)	√ (ES)	√ (ES)	√ (ES) If bridge is within 15 km from cost line or in environment of high concentration of Chlorides/ Sulphates in air	√ on super structure of of (ES) and on (AI P) If foundation rests on marine clay	√ (AI P)	X	√	
2	Extradosed	√ (ES)	√ (ES)	√ (ES)	√ (ES) If bridge is within 15 km from cost line or in environment of high concentration of Chlorides/ Sulphates in air	√ on super structure of of (ES) and on (AI P) If foundation rests on marine clay	√ (AI P)	X	√	
3	Cable Suspension	√ (ES)	√ (ES)	√ (ES)	√ (ES) If bridge is within 15 km from cost line or in environment of high concentration of Chlorides/ Sulphates in air	√ on super structure of of (ES) and on (AI P) If foundation rests on marine clay	√ (AI P)	X	√	
4	Bridges of 100m span or more	√ (ES)	√ (ES)	√ (ES)	√ (ES) If bridge is within 15 km from cost line or in environment of high concentration of Chlorides/ Sulphates in air	√ on super structure of of (ES) and on (AI P) If foundation rests on marine clay	√ (AI P)	X	√	

MM

SI No	Category of Bridge	Type of measuring instrument to be installed & (Location of installation)						Type of measurement		
		Strain Gauge	Triaxial accelerometer	Temperature Sensor	Corrosion Sensor	Biaxial inclinometer	Acoustic Sensor	Displacement Transducer	Continuous	At fixed intervals
5	Bridges of span 60m or more located within 15 km from cost line or in environment of high concentration of Chlorides/ Sulphates in air	√ (ES)	√ (ES)	√ (ES)	√ (ES)	√ (ES) If foundation rests on marine clay	X	X	√	
6	Bridges of age more than 50 years with total length more than 300m and PSC balanced cantilever bridges of any span length with central Hinge bearing	√ (ES)	√ (ES)	√ (ES)	√ in affected spans if there are signs of corrosion	√ (on girders in affected spans if there is indication of girder roatation and on piers of affected foundation if there are signs of settlement of foundation)	√ (on piers of affected foundations if there are signs of scouring around foundations)	√ (On pier cap of affected spans touching girders close to bearings if there is indication of bearing malfunctioning)		√ (at one cycle of 15 days each at intervals of 3 years)
7	Bridges with spans of more than 40m where major rehabilitation / retrofitting was undertaken	√ (on each rehabilitated / retrofitted span)	√ (on each rehabilitated / retrofitted span)	√ (on each rehabilitated / retrofitted span)	√ (in affected spans if there are signs of corrosion)	√ (on girders in affected spans if there is indication of girder roatation and on piers of affected foundation if there are signs of settlement of foundation)	√ (on piers of affected foundations if there are signs of scouring around foundations)	√ (On pier cap of affected spans touching girders close to bearings if there is indication of bearing malfunctioning)	√	

Note: (i) 'ES' is Each span

(ii) 'AI P' is Alternate Piers

(iii) In case the bridges have different spans of different types, the instrumentation should be only for the type of spans for which different types of sensors are specified

10m



RW/NH-.....
GOVERNMENT OF INDIA
MINISTRY OF ROAD TRANSPORT & HIGHWAYS

.....Zone
Office Address.....

Dated202..

NATIONAL COMPETITIVE BIDDING

NAME OF WORK	-	Supply, Installation, Commissioning & Maintenance of Sensors, Data Acquisition, Data Transmission, Analysis, Management & Reporting including all Hardware and Software for the same for Bridge Health Monitoring System onin the State of
PERIOD OF SALE OF BIDDING DOCUMENT	-	FROM :Date, PM TO : Date, AM
TIME & DATE OF PRE-BID CONFERENCE	-	DATE : TIME :..... PM
LAST DATE & TIME FOR RECEIPT OF BIDS	-	DATE : TIME :AM
TIME & DATE OF OPENING TECHNICAL BIDS	-	DATE : TIME : AM
TIME & DATE OF OPENING FINANCIAL BIDS.	- at AM
PLACE OF OPENING OF BIDS.	-
VALIDITY OF BID.	-	120 Days
OFFICER INVITING THE BID	-

INVITATION FOR BID

(IFB)



RW/NH-.....
GOVERNMENT OF INDIA
MINISTRY OF ROAD TRANSPORT & HIGHWAYS
Zone

Office Address :.....
 Email-.....

Bid Reference No. dated

NATIONAL COMPETITIVE BIDDING
INVITATION FOR BIDS ON ONLINE MODE

Name of Work	Value of work including 18% GST (In Rs)	Bid security In Rs (2% of value ofwork)	Cost of Bid Document (in Rs)	Period of completion in months
1	2	3	4	5
Supply, Installation, Commissioning & Maintenance of Sensors, Data Acquisition, Data Transmission, Analysis, Management & Reporting including all Hardware and Software for the same for Bridge Health Monitoring System on Bridge over river at km of NH in State of	10000 (Bid document cost)	6(Six) Months for Supply, Installation & Commissioning of Sensors including all Hardware and software for Data Acquisition, Data Transmission, Analysis, Management & Reporting for Bridge Health Monitoring System and next 60 months for Maintenance of aforesaid Sensors including all Hardware and software and Data Acquisition, Data Transmission, Analysis, Management & Reporting for Bridge Health Monitoring System

1. The complete bid document can viewed / downloaded from official portal of <http://eprocure.gov.in> from at **11.00 AM** to up to **11:00 AM**. Bidder must submit its Technical Bid and the financial bid at the aforesaid web portal. Bid received online shall be opened on at **11.00 AM**.
2. If the office happens to be closed on the date of opening as specified, then the same will be opened on the next working day.
3. The bidders must possess compatible Digital Signature Certificate (DSC) both Signing and Encryption (in the name of person who will sign the tender) from any of the licensed Certifying Agency (Bidders can see the list of licensed CAs from the link www.cca.gov.in) to participate in e-tendering of MoRT&H. Bidder shall make payment towards cost of tender documents of Rs **10,000.00** (Ten Thousand) only through NTRP PORTAL (Non-Tax Receipt Portal) i.e www.bharatkosh.gov.in. The payment of cost of tender documents other than through NTRP portal will not be accepted and in such case the bid shall be summarily rejected.

Details to be selected in Bharatkosh Portal for making payment are as under:

Description	Details to be selected in NTRP Portal
Ministry/Regional office
Purpose	Sale of Tender Documents
Pay and Accounts Officer (PAO)/Regional Pay and Accounts Officer (RPAO)
Drawing and Disbursing Officer (DDO)

4. Bids must be accompanied with scan copy of financial instrument towards Bid Security specified for the work in the above table (Column-3) in the Technical Bid in the form of Insurance surety Bond (in the format at Section-8 issued by insurance company authorized by Insurance Regulatory and Development Authority of India), e-Bank Guarantee/physical bank guarantee (in the format at Section-8 from a scheduled Bank).
5. Bid must be submitted online and Bid submitted through any other mode shall not be entertained. However the bidder shall produce the hard copy of Bid document Cost, Bid security and other documents physically in the XXXXXXXX on any working days before last date of submission of bids i.e **11:00 AM of**, failing which the bid shall be summarily rejected and liable for other penal action as per rule prevailed in the state.
6. A pre-bid meeting will be held on at **11:00 AM** in the office of the in Hybrid Mode to clarify the issues and to answer questions on any matter that may be raised at that stage as stated in Clause 9.2 of "Instruction to Bidders" of the bidding document.
7. Subsequent corrigendum/addendum if required shall only be available in web site indicated above.
8. The Employer reserves the right to cancel any or all bid without assigning any reason.

XXXXXXXXX

SECTION 1
INSTRUCTIONS TO BIDDERS
(ITB)

Section 1: Instructions to Bidders

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A. GENERAL

1. Scope of Bid

1.1. The Employer (named in Appendix to ITB) invites bids for the works (as defined in these documents and referred to as "the works") detailed in the IFB. The bidders may submit bids for any or all of the works detailed in the IFB.

1.2. The successful bidder will be expected to complete the works by the intended completion date specified in the Contract data

1.3. Throughout these bidding documents, the terms 'bid' and 'tender' and their derivatives (bidder/tenderer, bid/tender, bidding/tendering, etc.) are synonymous.

2. Source of Funds

2.1 The expenditure on this project will be met from the budget of Government of India.

3. Eligible Bidders

3.1. This *Invitation for Bids* is open to all bidders.

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

4 Qualification of the Bidder

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

4.2. If the Employer has not undertaken pre-qualification of potential bidders, all bidders shall include the following information and documents with their bids in Section 2:

a) Copies of original documents defining the constitution or legal status, place of registration and principal place of business; written power of attorney of the signatory of the bid to commit the Bidder,

b) Total monetary value of similar type of works performed for each of the last five years as shown in Appendix to ITB.

c) experience in works of similar nature and size for each of the last five years as shown in Appendix to ITB and details of works underway or

contractually committed; and clients who may be contacted for further information on those contracts;

d) reports on the financial standing of the bidder, such as profit and loss statement and auditor's reports for the past five years as shown in Appendix to ITB;

e) Evidence of access to line (s) of credit and availability of other financial resources facilities (10% of contract value), certified by the bankers (not more than 3 months old).

f) Authority to seek references from the Bidder's bankers;

g) Information regarding any litigation, current or during the last five years as shown in Appendix to ITB in which the bidder is involved, the parties concerned and disputed amount and

h) The proposed methodology and programme of construction, backed with equipment planning and deployment, duly supported with broad calculation and quality control procedure proposed to be adopted, justifying their capability of execution and completion of the work as per technical specification within the stipulated period of completion as per mile stone.

i) GST registration certificate, GSTIN from concerned department, PAN Card and Contractor registration certificate.

k) A Bidder is required to submit, along with its technical BID, a self-certification that the item offered meets the local content requirement for 'Class-I local Supplier' / 'Class-II local Supplier', as the case may be. The self-certification shall also have details of the location(s) at which the local value addition is made. In case, bidder has not submitted the aforesaid certification, the bidder will be treated as 'Non-Local Supplier'

In the above pretext, the Class-I Local Supplier, Class-II Local Supplier and the Non-Local Supplier are defined as under:

- i. 'Class-I Local Supplier' means a supplier or service provider, whose goods, services or works offered for procurement, meets the minimum local content as prescribed for 'Class-I Local Supplier' under this RFP. The 'local content' requirement to categorize a supplier as 'Class-I Local Supplier' is minimum 50%
- ii. 'Class-II Local Supplier' means a supplier or service provider, whose goods, services or works offered for procurement meets the minimum local content as prescribed for 'Class-II Local Supplier' under this RFP. The 'local content' requirement to categorize a supplier as 'Class-II Local Supplier' is minimum 20%
- iii. 'Non-Local Supplier' means a supplier or service provider, whose goods, services or works offered for procurement, has local content less than that prescribed for 'Class-II Local Supplier' under this RFP.
- iv. 'Local content' means the amount of value added in India which shall be the total value of item procured (excluding net domestic indirect taxes) minus the value of imported content in the item (including all customs duties) as a proportion of the total value, in percent.

In case of procurement for a value in excess of Rs. 10crores, the 'Class-I Local Supplier'/'Class-II Local Supplier' shall provide a certificate from the statutory auditor or cost auditor of the company (in case of companies) or from a practicing cost accountant or practicing chartered accountant (in respect of suppliers other than companies) giving the percentage of local content

4.3 Post qualification will be based on applicants meeting all the following minimum pass/fail criteria regarding the Applicant’s general and particular experience and financial position, as demonstrated by the Applicant’s responses in the forms attached to the Letter of Application (specified requirements for joint ventures are given under Para 4.3.6 below).

ESCALATION

The base year shall be taken as

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

Year before	Multiplying factor
One	1.10
Two	1.21
Three	1.33
Four	1.46
Five	1.61

(Applicant should indicate actual figures of costs and amounts for the work executed by them without accounting for the above mentioned factors).

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

4.3.1 General Experience:

The Applicant shall meet the following minimum criteria:

- a. Average annual turnover (defined as billing for works in progress and completed in all classes of works involving **Supply, Installation, Commissioning & Maintenance of Sensors, Data Acquisition, Data Transmission, Analysis, Management & Reporting including all Hardware and Software for the same for Bridge Health Monitoring System** only or any part(s) thereof over the last five financial years of **an amount shown in Appendix to ITB**
- b. Experience in successfully completing or substantially completing at least one similar work involving **Supply, Installation, Commissioning & Maintenance of Sensors, Data Acquisition, Data Transmission, Analysis, Management & Reporting including all Hardware and Software for the same for Bridge Health Monitoring System** for 1 bridge at least within the last five years preceding the last date for submission of Bids for an amount as shown in appendix to ITB

The works may have executed by the Applicant as prime contractor or as a member of joint venture or sub-contractor. As member of joint venture or sub-contractor, he should have acquired the experience of **Supply, Installation, Commissioning & Maintenance of Sensors, Data Acquisition, Data Transmission, Analysis, Management & Reporting including all Hardware and Software for the same for Bridge Health Monitoring System**. Substantially completed works means those works which are at least 90 percent completed as on the date of submission (i.e gross value work done upto the last date of submission is 90 percent or more

of the original contract price.)

. For these, a Certificate from the employer shall be submitted along with the application incorporating clearly the name of the work, Contract value, billing amount, date of commencement of works, satisfactory performance of the contractor and any other relevant information. The Bidder has to submit the qualification information to be filled in by the Bidder as per Section 2 of of RFP in Table in para 1.3, 1.4 (A) & 1.4(B) supported by the certificate from the Employer.

4.3.2 Financial Position

The Applicant should demonstrate that he has access to, or has available, liquid assets (aggregate of working capital, cash in hand and uncommitted bank guarantees) and/or credit facilities for a minimum amount as shown in Appendix to ITB.

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

4.3.4 Litigation History

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

4.3.5 **Disqualification:** Even though the Applicants meet the above criteria, they are subject to be disqualified if they have:

A - Made misleading or false representation in the form, statements submitted: and/or if

B - Records of poor performance such as abandoning the work, rescinding of contract for which the reasons are attributable to the non-performance of the contractor: consistent history of litigation awarded against the Applicant or financial failure due to bankruptcy. The rescinding of contract of a joint venture on account of reasons other than non-performance, such as Most Experienced partner of joint venture pulling out, court directions leading to breaking up of a joint venture before the start of work, which are not attributable to the poor performance of the contractor will however, not affect the qualification of the individual partners.

4.3.6 JOINT VENTURES

4.3.6.1 Maximum two members are allowed in a Joint Venture.

4.3.6.2 In case, the bidder is a Joint Venture, any one member of the Joint Venture shall fulfil the minimum criteria given on para 4.3.1 either separately or combinedly i.e one member may fulfil para 4.3.1 a. and the other member may fulfil para 4.3.1 b.

5. One Bid per Bidder

5.1. Each bidder shall submit only one bid for one package. The CPPP shall not allow a bidder to submit more than one bid for the same package.

6. Cost of Bidding

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

7. Site Visit

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

B -BIDDING DOCUMENTS

8. Content of Bidding Documents

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

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

8.2. Bidder will download the bidding documents (Volume-I, II, III & IV) from CPPP i.e. <http://eprocure.gov.in>. Documents to be furnished by the bidder in compliance to section 2 will be prepared by him and furnished as Volume- V in two parts (refer clause 12).

8.3. The bidder is expected to examine carefully all instructions, conditions of contract, contract data, forms, terms, technical specifications, bill of quantities, forms, Annexes and drawings in the Bid Document. Failure to comply with the requirements of Bid Documents shall be at the bidder's own risk. Pursuant to clause 26 hereof, bids, which are not substantially responsive to the requirements of the Bid Documents, shall be rejected.

9. Clarification of Bidding Documents

9.1. A prospective bidder requiring any clarification of the bidding documents may notify the Employer in writing at the Employer's address indicated in the invitation to bid or by email on Employer's email id. The Employer will respond to any request for clarification, which he received earlier than 10 days prior to the deadline for submission of bids. Copies of the Employer's response will be uploaded on CPPP <http://eprocure.gov.in>.

9.2. Pre-bid meeting

9.2.1. Pre-bid meeting shall be held at least 10 days (clear) prior to the last date of submission of the bid. The bidder or his official representative is invited to attend a pre-bid meeting, which will take place at the address, venue, time, and date as indicated in Appendix to ITB.

9.2.2. The purpose of the meeting will be to clarify issues and to answer questions on any matter that may be raised at that stage.

9.2.3. The bidder is required to submit any questions in writing or by email.

9.2.4. Minutes of the meeting, including the text of the questions raised (without identifying the source of enquiry) and the responses given will be uploaded on CPPP <http://eprocure.gov.in>. Any modification of the bidding documents listed in Sub-clause 8.1, which may become necessary as a result of the pre-bid meeting, shall be made by the Employer exclusively through the issue of an addendum pursuant to Clause No. 10 and not through the minutes of the pre-bid meeting.

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

10. Amendment of Bidding Documents

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

10.2. Any addendum thus issued shall be part of the bidding documents and shall be communicated in writing or by cable to all the purchasers of the bidding documents. Prospective bidders shall acknowledge receipt of each addendum in writing or by cable to the Employer. The Employer will assume no responsibility for postal delays.

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

C. PREPARATION OF BIDS

11. Language of the Bid

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

12. Documents Comprising the Bid

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

Part I shall be named "Technical Bid" and shall comprise

- i. Bid Security in the form of Insurance surety Bond (in the format at Section-8 issued by insurance company authorized by Insurance Regulatory and Development Authority of India), e-Bank Guarantee/physical bankguarantee (in the format at Section-8 from a scheduled Bank).
- ii. Qualification Information and supporting documents as specified in Section -2
- iii. Certificates, undertakings, affidavits as specified in Section 2
- iv. Any other information pursuant to Clause 4.2 of these instructions
- v. Undertaking that the bid shall remain valid for the period specified in Clause 15.1

Part II shall be named "Financial Bid" and shall comprise

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

12.2. Following documents, which are not submitted with the bid, will be deemed to be part of the bid.

Section	Particular	Volume No.
	Invitation for Bids (IFB)	Volume I
1	Instructions to Bidders	
3	Conditions of Contract	
4	Contract data	
5	Specifications	Volume II
9	Drawings	Volume IV

13. Bid Prices

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

13.2. The bidder shall fill in rates column only in figures for all items of the Works described in the Bill of Quantities. Items for which no rate or price is entered by the bidder will not be paid for by the Employer when executed and shall be deemed covered by the other rates and prices in the Bill of Quantities.

13.3. All duties, taxes, and other levies **including GST** payable by the contractor under the contract, or for any other cause shall be included in the rates, submitted by the Bidder.

13.4. The rates and prices quoted by the bidder shall be fixed for the duration of the contract and shall not be subject to adjustment on any account for Supply, Installation & Commissioning of Sensors, including all Hardware and Software for Data Transmission, Analysis, Management &

Reporting for Bridge Health Monitoring System. The rates and prices quoted by the bidder for Maintenance of Sensors, Data Acquisition, Data Transmission, Analysis, Management & Reporting including all Hardware and Software for the same for Bridge Health Monitoring System are subject to adjustment during the performance of the contract in accordance with provisions of Clause 47 of Conditions of Contract

14. Currencies of Bid and Payment

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

15. Bid Validity

15.1. Bids shall remain valid for a period **not less than 120 days** after the deadline date for bid submission specified in Clause 20. A bid valid for a shorter period shall be rejected by the employer as non-responsive. In case of discrepancy in bid validity period between that given in the undertaking pursuant to Clause 12.1 (v) and the Form of Bid submitted by the bidder, the latter shall be deemed to stand corrected in accordance with the former and the bidder has to provide for any additional security that is required.

15.2. The exceptional circumstances, prior to expiry of the original time limit, the Employer may request that the bidders may extend the period of validity for a specified additional period. The request and the bidders' responses shall be made in writing or by email. A bidder may refuse the request without forfeiting his bid security. A bidder agreeing to the request will not be required or permitted to modify his bid, but will be required to extend the validity of his bid security for a period of the extension, and in compliance with Clause 16 in all respects.

16. Bid Security

16.1. The bidder shall furnish as part of its BID, a Bid Security of an amount mentioned in Appendix to ITB referred to in cl. 12.1 herein above in the form of Insurance surety Bond (in the format at Section-8 issued by insurance company authorized by Insurance Regulatory and Development Authority of India), e-Bank Guarantee issued by nationalized bank, or a Scheduled Bank in India having a net worth of at least Rs. 1000 crore (Rs. One thousand crore) in the favour of the Employer in the format at Section-8 (the "Bank Guarantee") and having a validity period of not less than 180 (one hundred eighty) days from the BID Due Date, inclusive of a claim period of 60(sixty) days, and may be extended as may be mutually agreed between the Employer and the Bidder from time to time. The Insurance Surety Bond shall be verified from the specific portal created for this purpose. The e-Bank Guarantee/Physical Bank Guarantee shall be transmitted through SFMS Gateway to the Bank mentioned in Appendix to ITB. In case the e- Bank Guarantee/Physical Bank Guarantee is issued by a foreign bank outside India, confirmation of the same by any nationalized bank in India is required. For the avoidance of doubt, Scheduled Bank shall mean a bank as defined under Section 2(e) of the Reserve Bank of India Act, 1934. A scanned copy of Insurance surety Bond, or e-Bank Guarantee/Physical Bank Guarantee shall be uploaded on CPPP while applying to the tender.

Note: If it is not possible to furnish the Bid-security in the form of e-Bank Guarantee option -Physical Bank guarantee shall also be accepted.

16.2. Any bid not accompanied by an acceptable Bid Security and not secured as indicated in Sub Clauses 16.1 above shall be rejected by the Employer as non-responsive.

16.3. The Bid Security of unsuccessful bidders will be returned within 28 days of the end of the bid validity period specified in Sub-Clause 15.1.

16.4. The Bid Security of the successful bidder will be discharged when the bidder has signed the Agreement and furnished the required Performance Security.

16.5. The Bid Security may be forfeited

a) If the Bidder withdraws the Bid after Bid opening during the period of Bid validity;

b) If the Bidder does not accept the correction of the Bid Price, pursuant to Clause 27; or

c) in the case of a successful Bidder, if the Bidder fails within the specified time limit to

(i) Sign the Agreement; or

(ii) Furnish the required Performance Security.

17. Alternative Proposals by Bidders

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

18. The Bid shall contain no alterations or additions, except those to comply with instructions issued by the Employer.

D. SUBMISSION OF BIDS

19. Online submission of Bids

19.1. The Bidder shall upload the Bid only in online. The original Bid security document and copy of transaction document towards payment of document fee shall be placed in an envelope which shall be sealed and shall clearly bear the identification such as "**Name of Work**" and the name and address of the bidder and submitted to the Employer at his address given in Appendix to ITB.

20. Deadline for Submission of the Bids

20.1. Complete Bids (including Technical and Financial) must be uploaded at the web site specified above not later than the date indicated in Appendix to ITB. The envelope containing hard copy of the documents mentioned in cl. 19.1 shall be submitted in the address of the Employer mentioned in Appendix to ITB not later than the date indicated in Appendix to ITB.

20.2. The Employer may extend the deadline for submission of bids by issuing an amendment in accordance with Clause 10, in which case all rights and obligations of the Employer and the bidders previously subject to the original deadline will then be subject to the new deadline.

21. Late Bids

21.1. E-Procurement portal CPPP website <https://eprocure.gov.in/eprocure/app> shall not allow submission of any Bid after the prescribed date and time as given in tender notice. Physical receipt of documents listed at clause 19.1 after the prescribed date and time as mentioned in Appendix to ITB shall not be considered and the bid shall be summarily rejected.

22. Modifications and Withdrawal of Bids

22.1. Bidders may modify or withdraw their bids online before the deadline prescribed in Clause 20.

22.2. Withdrawal or modification of a Bid between the deadline for submission of bids and the expiration of the original period of bid validity specified in Clause 15.1 above or as extended pursuant to Clause 15.2 may result in the forfeiture of the Bid security pursuant to Clause 16.

E. BID OPENING AND EVALUATION

23. Bid Opening

23.1. The Employer will open all the Bids online in the presence of the Bidders or their representatives who choose to attend at time, date and the place specified in Appendix to ITB in the manner specified in Clause 20 and 23.3. In the event of the specified date of Bid opening being declared a holiday for the Employer, the Bids will be opened online at the appointed time on the next working day.

23.2. Technical BID of only those Bidders shall be online opened whose documents listed at cl. 19.1 have been physically received and the Bid Security does conform to the amount and validity period as specified in the Invitation for Bid (ref. Column 3 of IFB), and has been furnished in the form specified in Clause 16. Following the opening of Technical Bids, authenticity of the Bid Security shall be verified from concerned Bank(s)/Insurance Company. Evaluation of Technical Bid of all the Bidders whose Bid Security authenticity have been verified shall be carried out. Employer may seek any clarification from any Bidder on any document furnished by it but no additional document for any purpose shall be considered. Employer shall publish the result of Technical Bid evaluation in CPPP. If any Bidder becomes technically non-responsive, reasons for the same will also be published in CPPP and such technically non-responsive Bidders would be given 7 days time period to submit representation, if any.

23.3.

(i) Save & except as provided in this tender document , the Employer shall not entertain any correspondence with any Bidder in relation the acceptance or rejection of any BID except that the Employer would display the result of technical evaluation on the CPPP and consider representations, if any, submitted by any of the Bidders whose Bid have been technically non- responsive.

(ii) The representations submitted by any of the Bidders in pursuance to cl. (i) above shall be considered by the Employer and final list technically responsive Bidders shall be published on CPPP for opening of Financial Bids.

(iii) The Employer shall online open the Financial Bids of the technically responsive Bidders only on scheduled date and time in the presence of the authorized representative of the Bidders who may chose to attend. The Employer shall publicly announce the Bid Prices quoted by the technically responsive Bidders. Thereafter, the Employer shall prepare a record of opening of Financial Bids .

24. Process to be Confidential

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

25. Clarification of Financial Bids

25.1. To assist in the examination, evaluation, and comparison of Bids, the Employer may, at his discretion, ask any Bidder for clarification of his Bid, including breakdowns of unit rates. The request for clarification and the response shall be in writing or by email.

25.2. Subject to sub-clause 25.1, no Bidder shall contact the Employer on any matter relating to his bid from the time of the bid opening to the time the contract is awarded. If the Bidder wishes to bring additional information to the notice of the Employer, it should do so in writing.

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

26. Examination of Bids and Determination of Responsiveness

26.1. During the detailed evaluation of "Technical Bids", the Employer will determine whether each Bid (a) meets the eligibility criteria defined in Clause 3 and 4; (b) has been properly digitally signed; (c) is accompanied by the required securities and; (d) is substantially responsive to the requirements of the Bidding documents. During the detailed evaluation of the "Financial Bid", the responsiveness of the bids will be further determined with respect to the remaining bid conditions, i.e., priced bill of quantities, technical specifications, and drawings.

26.2. A substantially responsive "Financial Bid" is one which conforms to all the terms, conditions and specifications of the Bidding documents, without

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

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

27. Evaluation and Comparison of Financial Bids

27.1. The Employer will evaluate and compare only the Bids determined to be substantially responsive in accordance with Sub-Clause 26.2.

27.2. The Employer reserves the right to accept or reject any variation or deviation. Variations and deviations and other factors, which are in excess of the requirements of the Bidding documents or otherwise result in unsolicited benefits for the Employer, shall not be taken into account in Bid evaluation.

27.3. The estimated effect of the price adjustment conditions under Clause 47 of the *Conditions of Contract*, during the period of implementation of the Contract, will not be taken into account in Bid evaluation.

27.4. If the Bid of the successful Bidder is seriously unbalanced in relation to the Engineer's estimate of the cost of work to be performed under the contract, the Employer may require the Bidder to produce detailed price analyses for any or all items of the Bill of Quantities, to demonstrate the internal consistency of those prices with the construction methods and schedule proposed. After evaluation of the price analyses, the Employer may require that the amount of the performance security set forth in Clause 31 be increased at the expense of the successful Bidder to a level sufficient to protect the Employer against financial loss in the event of default of the successful Bidder under the Contract.

27.5. A bid which contains several items in the Bill of Quantities which are unrealistically priced low and which cannot be substantiated satisfactorily by the bidder, may be rejected as non-responsive.

F. AWARD OF CONTRACT

28. Award Criteria

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

(i) to be substantially responsive to the Bidding documents and who has offered the lowest evaluated Bid Price; and

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

29.1. Notwithstanding Clause 28, the Employer reserves the right to accept or reject any Bid, and to cancel the Bidding process and reject all Bids, at any time prior to the award of Contract, without thereby incurring any liability to the affected Bidder or Bidders or any obligation to inform the affected Bidder or Bidders of the grounds for the Employer's action.

30. Notification of Award and Signing of Agreement

30.1. The Bidder whose Bid has been accepted will be notified of the award by the Employer prior to expiration of the Bid validity period by email, telex or facsimile confirmed by registered letter. This letter (hereinafter and in the Conditions of Contract called the Letter of Acceptance) will state the sum that the Employer will pay the Contractor in consideration of the execution, completion, and maintenance of the Works by the Contractor as prescribed by the Contract (hereinafter and in the Contract called the "Contract Price").

30.2. The notification of award will constitute the formation of the Contract, subject only to the furnishing of a performance security in accordance with the provisions of Clause 31.

30.3. The Agreement will incorporate all agreements between the Employer and the successful Bidder. It will be signed by the Employer and the successful Bidder, within 7 days of submission of performance Security by the successful Bidder in accordance with cl. 31.1.

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

31. Performance Security

31.1. Within 21 days of receipt of the Letter of Acceptance, the successful Bidder shall deliver to the Employer a Performance Security in the form of Insurance surety Bond (in the format at Section-8 issued by insurance company authorized by Insurance Regulatory and Development Authority of India), or irrevocable and unconditional guarantee e-Bank Guarantee/ Physical Bank Guarantee from a Bank in the form set forth in Section-8 (the Performance Security") for an amount equal to 3% (Three percent) of its BidPrice in the favour of Employer as detailed in Appendix to ITB. If it is not possible to furnish the Performance security in the form of e-Bank Guarantee option, Physical Bank guarantee shall also be accepted.

31.2. Failure of the successful Bidder to comply with the requirements of Sub-Clause 31.1 shall constitute sufficient grounds for cancellation of the award and

forfeiture
Bid Security.

of

the

32. Advance Payment and Security

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

33. Corrupt or Fraudulent Practices

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

33.2. Furthermore, Bidders shall be aware of the provision stated in Sub-Clause 23.2 and Sub-Clause 59.2 of the Conditions of Contract.

33.3. There shall be no payment towards bonus for early completion of the work. Bonus clause appeared else where in this document shall be deemed to have been deleted.

APPENDIX to ITB

Sl. No.		Clause Reference with respect to Section – I
1.	Name of the Employer is	[Cl. 1.1]
2.	The last five years 20.. – 20.. 20.. – 20.. 20.. – 20.. 20.. – 20.. 20.. – 20..	[Cl. 4.3 & 4.3.1 a]
3.	The Average annual financial turn over amount required is Rs. ... crore only	[Cl. 4.3 1 (a)]
4.	Value of one similar work is Rs. crore only	[Cl. 4.3. 1 (b)]
5.	Liquid assets and /or availability of credit facilities is Rs. ... lakhs only.	[Cl. 4.3.2]
6.	The pre-bid meeting will take place on at ... Hrs. at in hybrid mode	[Cl. 9.2.1]
7.	Bid Security should be for Rs....	[Cl. 16.1]
8.	Bank details for Bid Security	[Cl. 16.1]
9.	Address of the Employer	[Cl. 19.1]
10.	The bid should be submitted latest by at 11:00 AM	[Cl. 20.1]
11.	Hard copies will be submitted by	[Cl. 20.1]
12.	The bid will be opened online on at ... Hrs.	[Cl. 23.1]
13.	The Performance Security shall be in favour of	[Cl. 31. 1]

SECTION 2
QUALIFICATION INFORMATION
(TO BE FILLED IN BY THE BIDDER)

QUALIFICATION INFORMATION

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

1. Qualification requirements

1.1 Constitution or Legal status of Bidder (in case of Joint Venture, information shall be provided in respect of Individual Members separately.

[Attach copy]

Place of registration: _____

Principal place of business: _____

Power of attorney of signatory of Bid _____

[Attach]

1.1 Total value of Supply, Installation, Commissioning & Maintenance of Sensors, Data Acquisition, Data Transmission, Analysis, Management & Reporting including all Hardware and Software for the same for Bridge Health Monitoring System only or any part(s) of the same \$work performed in the last five years i.e.

1.2 Work performed as prime contractor/member of joint venture/nominated subcontractor will also be considered provided the sub-contract involved execution of all main items of work described in the bid document, provided further that all other qualification criteria are satisfied (in the same name) on works of a similar nature i.e. Supply, Installation, Commissioning & Maintenance of Sensors, Data Acquisition, Data Transmission, Analysis, Management & Reporting including all Hardware and Software for the same for Bridge Health Monitoring System over the last five years. **

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

* Attach certificate(s) from the Engineer-in-Charge

\$ Attach certificate from Chartered Accountant.

1.3

(A) Existing commitments and on-going works :

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

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

• (B) Works for which bids already submitted:

Description of works	Place & State	Name & Address of Employer	Estimate value of works (Rs. Cr.)	Stipulated Period of Completion	Date when decision is expected	Remarks,if any
1	2	3	4	5	6	7

1.4 Financial reports for the last five years: balance sheets, profit and loss statements, auditors' reports (in case of companies/corporation), etc. List them below and attach copies.

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

Other Party (ies)	Employer	Cause of Dispute	Amount involved	Remarks showing Present Status

1.8 Proposed work method and schedule. The Bidder should attach descriptions, drawings and charts as necessary to comply with the requirements of the Bidding documents. [Refer ITB Clause 4.1 & 4.2(h)]

1.9 Quality Assurance Programme

2 Additional Requirements

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

- (i) Affidavit
- (ii) Undertaking

**SAMPLE FORMAT FOR EVIDENCE OF ACCESS TO OR
AVAILABILITY OF CREDIT FACILITIES
(CLAUSE 4.3.2 OF ITB)
BANK CERTIFICATE**

This is to certify that M/s _____ is a reputed company with a good financial standing. If the contract for the work namely _____ is awarded to the above firm, we shall be able to provide overdraft/credit facilities to the extent of Rs..... to meet their working capital requirements for executing the above contract during the contract period.

(Signature) Name of Bank
Senior Bank Manager
Address of the Bank

“In case of Joint Venture, to be submitted separately for each member of Joint Venture)

UNDERTAKING

I the undersigned do here by undertake that our firm
M/s..... Agree to abide by this bid for a period 120 days
from the last date fixed for receiving the same and it shall be binding on us and may be
accepted at any time before the expiration of that period

(Signed by an authorized officer of the Firm)

Title of Officer

Name of the firm

DATE

AFFIDAVIT

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

2 The undersigned also hereby certifies that neither our firm M/s.....
..... have abandoned any work on National Highways in India nor any contract awarded to us for such works have been rescinded, during last five years prior to the date of this bid.

3 The undersigned hereby authorise(s) and request(s) any bank, person, firm or corporation to furnish pertinent information deemed necessary and requested by the Department to verify this statement or regarding my (our) competence and general reputation.

4 The undersigned understand and agrees that further qualifying information may be requested, and agrees to furnish any such information at the request of the Department/ Project implementing agency.

(Signed by an Authorized Officer of the Firm)

Title of Officer

Name of Firm

DATE

"In case of Joint Venture, to be submitted separately for each member of Joint Venture)

UNDERTAKING

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

(Signed by an Authorized Officer of the Firm),

Title of Officer

Name of Firm

Date

"In case of Joint Venture, to be submitted separately for each member of Joint Venture)

SECTION 3
CONDITIONS OF CONTRACT

Conditions of Contract

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CONDITIONS OF CONTRACT

A. GENERAL

1. Definitions

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

Bill of Quantities means the priced and completed Bill of Quantities forming part of the Bid. **Compensation Events** are those defined in Clause 44 hereunder.

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

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

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

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

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

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

Days are calendar days; months are calendar months.

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

The **Defects Liability Period (DLP)** *is same as the period of Operations and Maintenance i.e. 60 months period after the Supply, Installation and Commissioning period of 6 months. In case the Supply, Installation and Commissioning is extended/delayed, Operations & Maintenance period will start from the date of completion of Supply, Installation and Commissioning. The contractor is expected to do maintenance/replacement of the Sensors including all Hardware and software for Data Acquisition, Data Transmission, Analysis, Management & Reporting for Bridge Health Monitoring System during the DLP without any additional cost to the Employer.*

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

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

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

The **Intended Completion Date** is the date on which it is intended that the Contractor shall complete the Supply, Installation & Commissioning of **Sensors including all Hardware and Software for Data Acquisition, Data Transmission, Analysis, Management & Reporting for Bridge Health Monitoring System** and next **Maintenance of Sensors including all Hardware and Software for Data Acquisition, Data Transmission, Analysis, Management & Reporting for Bridge Health Monitoring System** and also **Data Acquisition, Data Transmission, Analysis, Management & Reporting for Bridge Health Monitoring System onin the State of**. The Intended Completion Date is specified in the Contract Data for Supply, Installation & Commissioning of **Sensors including all Hardware and Software for Data Acquisition, Data Transmission, Analysis, Management & Reporting for Bridge Health Monitoring System** and next **Maintenance of Sensors including all Hardware and Software for Data Acquisition, Data Transmission, Analysis, Management & Reporting for Bridge Health Monitoring System** and also **Data Acquisition, Data Transmission, Analysis, Management & Reporting for Bridge Health Monitoring System in the State of**. The Intended Completion Date for Supply, Installation & Commissioning of **Sensors including all Hardware and software for Data Acquisition, Data Transmission, Analysis, Management & Reporting for Bridge Health Monitoring System** and next **Maintenance of Sensors including all Hardware and Software for Data Acquisition, Data Transmission, Analysis, Management & Reporting for Bridge Health Monitoring System** and also **Data Acquisition, Data Transmission, Analysis, Management & Reporting for Bridge Health Monitoring System** may be revised only by the Engineer by issuing an extension of time.

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

Equipment/Hardware/Instruments/Software are any integral part of the Works, which is to have a mechanical, electrical, electronic or chemical or biological function.

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

Site Investigation Reports are those, which were included in the Bidding documents and are factual interpretative reports about the surface and sub-surface conditions at the site.

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

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

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

Temporary Works are works designed, constructed, installed, and removed by the Contractor, which are needed for Installation, Commissioning and Maintenance **of Sensors, Data Acquisition, Data Transmission, Analysis, Management & Reporting including all Hardware and Software for the same for Bridge Health Monitoring System**

A **Variation** is an instruction given by the Engineer, which varies the Works either in the Bridges under the scope of Health Monitoring System or enhancement of scope to an additional Bridge.

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

2. Interpretation

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

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

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

- (1) Agreement
- (2) Letter of Acceptance, notice to proceed with the works
- (3) Contractor's Bid
- (4) Contract Data
- (5) Conditions of Contract including Special Conditions of Contract
- (6) Specifications
- (7) Drawings
- (8) Bill of quantities and
- (9) any other document listed in the Contract Data as forming part of the Contract.

3. Languages and Law

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

4. Engineer's Decisions

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

5. Delegation

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

6. Communications

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

7. Sub-contracting

7.1 Deleted

8. Other Contractors -

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

9. Personnel

9.1. The Contractor's key personnel shall be competent enough to carry out installation, maintenance and operations works.

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

10. Employer's and Contractor's Risks

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

11. Employer's Risks

11.1. The Employer is responsible for the excepted risks which are (a) in so far as they directly affect the execution of the Works in India, the risks of war, hostilities, invasion, act of foreign enemies, rebellion, revolution, insurrection or military or usurped power, civil war, riot commotion or disorder (unless restricted to the Contractor's employees), and contamination from any nuclear fuel or nuclear waste or radioactive toxic explosive, or (b); a cause due solely to the design of the Works, other than the Contractor's design.

12. Contractor's Risks

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

13. Insurance

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

- (a) loss of or damage to the structure, Works, Plant and Materials;
- (b) loss of or damage to Equipment/Hardware/Instruments/Software ;

(c) loss of or damage of property (except the structure , Plant, Materials and Equipment /Hardware/Instruments/Software) in connection with the Contract; and

(d) Personal injury or death.

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

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

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

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

14. Site Investigation Reports

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

15. Queries about the Contract Data

15.1. The Engineer will clarify queries on the Contract Data.

16. Contractor to Construct the Works

16.1. The Contractor shall construct and install the Works in accordance with the Specifications and Drawings.

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

17.1. The Contractor may commence execution of the Works on the Start Date and shall carry out the Works in accordance with the programme submitted by the Contractor, as updated with the approval of the Engineer, and complete them by the Intended Completion Date.

17.2 On completion of work ,all Equipment/Hardware/Instruments/Software shall be property of the employer.

18. Approval by the Engineer

18.1. The Contractor shall submit Specifications and Drawings showing the proposed Temporary Works to the Engineer, who is to approve them if they comply with the Specifications and Drawings.

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

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

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

18.5 All Drawings prepared by the Contractor for the execution of the temporary or permanent Works, are subject to prior approval by the Engineer before their

use.

18.6 There is no standardized analysis tool available presently for monitoring different parameters and for different topologies of the bridges. Contractor is free to propose software tool of his choice for analysing the data collected through sensors to furnish outcome deliverables like extent of deterioration in the strength of different components of the bridge, extent loss / deterioration in the cables/reinforcement/prestressing tendons, extent of additional stresses / forces / moments induced in the bridge components due to rotation, tilt etc., and consequent requirements for strengthening / rehabilitation extent of scouring , extent of deterioration in the bearings etc., and requirements of corresponding corrective actions. The Engineer will approve the aforesaid requirements as per guidelines of the Ministry.

19. Safety

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

20. Discoveries

20.1. Any thing of historical or other interest or of significant value unexpectedly discovered on the Site is the property of the Employer. The Contractor is to notify the Engineer of such discoveries and carry out the Engineer's instructions for dealing with them.

21. Possession of the Site

21.1. The Employer shall give possession of all parts of the Site for installation of the sensors, hardware and monitoring of the health of the bridge to the Contractor. If possession of a part is not given by the date stated in the Contract Data the Employer is deemed to have delayed the start of the relevant activities and this will be Compensation Event.

22. Access to the Site

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

23. Instructions

23.1. The Contractor shall carry out all instructions of the Engineer pertaining to works, which comply with the applicable laws where the Site is located.

23.2. The Contractor shall permit the Employer to inspect the Contractor's accounts and records relating to the performance of the Contractor and to have them audited by auditors appointed by the Employer, if so required by the Employer.

24. Disputes

24.1. If the Contractor believes that a decision taken by the Engineer was either outside the authority given to the Engineer by the Contract or that the decision was wrongly taken, the decision shall be referred to the DG (RD) & SS and Chairman of the Board of Directors of the Contractor for amicable settlement within 14 days of the notification of the Engineer's decision for adjudication.

25. Procedure for Disputes

25.1. Upon such reference, such persons shall meet within 7 business days from the date of reference and attempt to amicably resolve the disputes. If such disputes are not resolved within 30 days from reference, either party may refer the dispute to arbitration as per Cl. 25.2.

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

26 Replacement of Dispute Review Expert.

26.1 Deleted.

B.TIME CONTROL

27. Programme

27.1 Within the time stated in the Contract Data the Contractor shall submit to the Engineer for approval a Programme showing the general methods, arrangements, order and timing for all the activities in the Works along with monthly cash flow forecast.

27.2 An update of the Programme shall be a programme showing the actual progress achieved on each activity and the effect of the progress achieved on the timing of the remaining work including any changes to the sequence of the activities.

27.3 The contractor shall submit to the Engineer, for approval, an updated Programme at intervals no longer than the period stated in the Contract Data. If the Contractor does not submit an updated Programme within this period, the Engineer may withhold the amount stated in the Contract Data from the next payment certificate and continue to withhold this amount until the next payment after the date on which the overdue programme has been submitted.

27.4 The Engineer's approval of the Programme shall not alter the Contractor's obligations. The Contractor may revise the Programme and submit it to the Engineer again at any time. A revised Programme is to show the effect of Variations and Compensation Events.

28 Extension of the Intended Completion Date

28.1 The Engineer shall extend the Intended Completion Date for Supply, Installation, Commissioning and Maintenance **of Sensors including all Hardware and Software for Data Acquisition, Data Transmission, Analysis, Management & Reporting including all Hardware and Software for the same for Bridge Health Monitoring System** if a Compensation Event occurs or a Variation is issued which makes it impossible for Completion to be achieved by the intended Completion Date without the Contractor taking steps to accelerate the remaining work and which would cause the Contractor to incur additional cost.

28.2. The Engineer shall decide whether and by how much to extend the Intended Completion Date within 35 days of the Contractor asking the Engineer for a decision upon the effect of a Compensation Event or Variation and submitting full supporting information. If the Contractor has failed to give early warning of a delay or has failed to Cooperate in dealing with a delay, the delay by this failure shall not be considered in assessing the new Intended Completion Date.

28.3. The Engineer shall within 14 days of receiving full justification from the contractor for extension of Intended Completion Date refer to the Employer his decision. The Employer shall in not more than 21 days communicate to the Engineer the acceptance or otherwise of the Engineer's decision. If the Employer fails to give his acceptance, the Engineer shall not grant the extension and the contractor may refer the matter to the Dispute Review Expert under Clause 24.1.

29. Deleted

30. Delays Ordered by the Engineer

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

31. Management Meetings

31.1. Either the Engineer or the Contractor may require the other to attend a management meeting. The business of a management meeting shall be to review the plans for remaining work and to deal with matters raised in accordance with the early warning procedure.

31.2. The Engineer shall record the business of management meetings and is to provide copies of his record to those attending the meeting and to the Employer. The responsibility of the parties for actions to be taken is to be decided by the Engineer either at the management meeting or after the management meeting and stated in writing to all who attended the meeting.

32. Early Warning

32.1. The Contractor is to warn the Engineer at the earliest opportunity of specific likely future events or circumstances that may adversely affect the quality of the work increase the Contract Price or delay the execution of works. The Engineer may require the Contractor to provide an estimate of the expected effect of the future event or circumstance on the Contract Price and Completion Date. The estimate is to be provided by the Contractor as soon as reasonably possible.

32.2. The Contractor shall cooperate with the Engineer in making and considering proposals for how the effect of such an event or circumstance can be avoided or reduced by anyone involved in the work and in carrying out any resulting instruction of the Engineer.

C. QUALITY CONTROL

33. Identifying Defects

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

34. Tests

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

35. Correction of Defects

35.1. The Engineer shall give notice to the Contractor of any Defects before the end of the Defects Liability Period, which begins at Completion and is defined in the Contract Data. The Defects Liability Period shall be extended for as long as Defects remain to be corrected.

35.2. Every time notice of a Defect is given, the Contractor shall correct the notified Defect within the length of time specified by the Engineer's notice.

36. Uncorrected Defects

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

D. COST CONTROL

37. Bill of Quantities

37.1. The Bill of Quantities shall contain items for the construction, installation, testing and commissioning work to be done by the Contractor.

37.2. The Bill of Quantities is used to calculate the Contract Price. The Contractor is paid for the quantity of the work done at the rate in the Bill of Quantities for each item.

38. Changes in the Quantities

38.1. If the final quantity of Supply, Installation and Commissioning of any of the Sensors differs from the quantity in the Bill of Quantities, the additional quantity(ies) shall be paid in the same rate as given in the Bill of Quantities. However, no change in the quantity or rate of **Maintenance of Sensors including all Hardware and Software for Data Acquisition, Data Transmission, Analysis, Management & Reporting and also for Data Acquisition, Data Transmission, Analysis, Management & Reporting for Bridge Health Monitoring System** provided no additional Bridge is included or an existing Bridge is excluded from the scope of work.

38.2. Deleted

38.3. Deleted

39. Variations

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

40. Payments for Variations.

40.1. The Contractor shall provide the Engineer with a quotation (with breakdown of unit rates) for carrying out the Variation other than for Supply, Installation and Commissioning of any of the Sensors when requested to do so by the Engineer. The Engineer shall assess the quotation, which shall be given within seven days of the request or within any longer period stated by the Engineer and before the Variation is ordered.

40.2. If the work in the Variation relates to Supply, Installation and Commissioning of any of the Sensors in the Bridge(s) included in the scope or even some additional Bridge, the additional quantity(ies) shall be paid in the same rate as given in the Bill of Quantities. However, no change in the quantity or rate of **Maintenance of Sensors including all Hardware and Software for Data Acquisition, Data Transmission, Analysis, Management & Reporting for Bridge Health Monitoring System and also of Data Acquisition, Data Transmission, Analysis, Management & Reporting for Bridge Health Monitoring System** provided no additional Bridge is included or an existing Bridge is excluded from the scope of work. If any additional Bridge is included or

an existing Bridge is excluded from the scope of work, the rate per month shall be modified in the proportionate basis i.e. $\text{new rate} = \text{BoQ rate} \times \frac{\text{total nos. of Sensors provided}}{\text{total nos. of Sensors in the BoQ}}$. If the nature in the Variation does not correspond with items in the Bill of Quantities, the quotation by the Contractor shall be in the form of new rates for the relevant items of work.

40.3. If the Contractor's quotation 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.

40.4. If the Engineer decides that the urgency of varying the work would prevent a quotation being given and considered without delaying the work, no quotation shall be given and the Variation shall be treated as a Compensation Event.

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

41. Cash Flow Forecasts

41.1. When the Programme is updated, the contractor is to provide the Engineer with an updated cash flow forecast.

42. Payment Certificates

42.1. The Contractor shall submit to the Engineer monthly statements of the estimated, value of the work completed less the cumulative amount certified previously.

42.2. Deleted

42.3. The value of work executed shall be determined by the Engineer.

42.4. The value of work executed shall comprise the value of the quantities of the items in the Bill of Quantities completed.

42.5. The value of work executed shall include the valuation of Variations and Compensation Events.

42.6. The Engineer may exclude any item certified in a previous certificate or reduce the proportion of any item previously certified in any certificate in the light of later information.

43. Payments

43.1 Payments shall be adjusted for deductions for advance payments, retention, other recoveries in terms of the contract and taxes at source, as applicable under the law. The Employer shall pay the Contractor the amounts certified by the Engineer within 28 days of the date of each certificate. 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 12% per annum.

43.2. If an amount certified is increased in a later certificate as a result of an award by the Adjudicator or an Arbitrator, the Contractor shall be paid interest upon the delayed payment as set out in this clause. Interest shall be calculated from the date upon which the increased amount would have been certified in the absence of dispute.

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

43.4. In case of JV, the invoice to the client shall be submitted by the lead partner of the JV

44. Compensation Events

44.1 The following are Compensation Events unless they are caused by the Contractor:

(a) The Employer does not give access to a part of the Site by the Site Possession Date stated in the Contract Data.

- b. The Employer modifies the schedule of other contractors in a way, which affects the work of the contractor under the contract.
- c. The Engineer orders a delay or does not issue drawings, specifications or instructions required for execution of works on time.
- d. The Engineer instructs the Contractor to uncover or to carry out additional tests upon work, which is then found to have no Defects.
- e. Deleted
- f. Ground conditions are substantially more adverse than could reasonably "have been assumed before issuance of Letter of Acceptance from the information issued to Bidders (including the Site Investigation' Reports), from information available publicly and from a visual inspection of the site.
- g. The Engineer gives an instruction for dealing with an unforeseen condition, caused by the Employer, or additional work required for safety or other reasons.

(h) Other contractors, public authorities, utilities or the Employer does not work within the dates and other constraints stated in the Contract, and they cause delay or extra cost to the Contractor.

(i) The advance payment is delayed, beyond 28 days after receipt of application and bank guarantee.

(j) The effect on the Contractor of any of the Employer's Risks.

(k) The Engineer unreasonably delays issuing a Certificate of Completion.

(l) Other Compensation Events listed in the Contract Data or mentioned in the Contract.

44.2. If a Compensation Event would cause additional cost or would prevent the work being completed before the Intended Completion Date, the Contract Price shall be increased and/or the Intended Completion Date is extended. The Engineer shall decide whether and by how much the Contract Price shall be increased and whether and by how much the Intended Completion Date shall be extended.

44.3. As soon as information demonstrating the effect of each Compensation Event upon the Contractor's forecast cost has been provided by the Contractor, it is to be assessed by the Engineer and the Contract Price shall be adjusted accordingly. If the Contractor's forecast is deemed unreasonable, the Engineer shall adjust the Contract price based on Engineer's own forecast. The Engineer will assume that the Contractor will react competently and promptly to the event.

44.4. The Contractor shall not be entitled to compensation to the extent that the Employer's interests are adversely affected by the Contractor not having given early warning or not having cooperated with the Engineer.

45. Tax

45.1. The rates quoted by the Contractor shall be deemed to be inclusive of the GST and other taxes that the Contractor will have to pay for the performance of this Contract. The Employer will perform such duties in regard to the deduction of such taxes at source as per applicable law.

46. Currencies

46.1. All payments shall be made in Indian Rupees.

47. Price Adjustment

47.1 The rate for **Maintenance of Sensors including all Hardware and Software for Data Acquisition, Data Transmission, Analysis, Management & Reporting for Bridge Health Monitoring System and for Data Acquisition, Data Transmission, Analysis, Management & Reporting for Bridge Health Monitoring System shall be adjusted by increase/decrease in WPI for all commodities in the following manner:**

Rate for a particular month = BoQ rate * WPI (all commodities) prevailing on the last date of the previous month for which the IPC relates / WPI (all commodities) prevailing on the last date of the month preceding the Bid Due Date.

47.2 Deleted

48. Retention

48.1. The Employer shall retain from each payment due to the Contractor for Supply, Installation & Commissioning of **Sensors including all Hardware and Software for Data Acquisition, Data Transmission, Analysis, Management & Reporting for Bridge Health Monitoring System** the proportion stated in the Contract Data until Completion (Supply, Installation and Commissioning of **Sensors including all Hardware and Software for Data Acquisition, Data Transmission, Analysis, Management & Reporting for Bridge Health Monitoring System**) of the whole of the Works.

48.2. On Completion (Supply, Installation and Commissioning of **Sensors including all Hardware and Software for Data Acquisition, Data Transmission, Analysis, Management & Reporting for Bridge Health Monitoring System**) of the whole of the Works, half the total amount retained is repaid to the Contractor and half when the Operations/Defects Liability Period has passed and the Engineer has certified that all Defects notified by the Engineer to the Contractor before the end of this period have been corrected.

48.3 Deleted

49. Liquidated Damages

49.1. The Contractor shall pay liquidated damages to the Employer at the rate per day stated in the Contract Data for each day that the Completion Date is later than the Intended Completion Date for Supply, Installation Commissioning of **Sensors including all Hardware and Software for Data Acquisition, Data Transmission, Analysis, Management & Reporting for Bridge Health**

Monitoring System or for delay in Maintenance of Sensors/Hardware/software or for delay in Data Acquisition, Data Transmission, Analysis, Management & Reporting for Bridge Health Monitoring System . The total amount of liquidated damages shall not exceed the amount defined in the Contract Data. The Employer may deduct liquidated damages from payments due to the Contractor. Payment of liquidated damages does not affect the Contractor's liabilities.

49.2. If the Intended Completion Date is extended after liquidated damages have been paid, the Engineer shall correct any overpayment of liquidated damages by the Contractor by adjusting the next payment certificate. The Contractor shall be paid interest on the over payment calculated from the date of payment to the date of repayment at the rates specified in Sub Clause 43.1.

49.3. Deleted

49.4. Deleted

50. Bonus

50.1. Deleted

51. Advance Payment

51.1. The Employer shall make advance payment to the Contractor of the amounts stated in the Contract Data by the date stated in the Contract Data, against provision by the Contractor of an Unconditional Bank Guarantee in a form and by a bank acceptable to the Employer in amounts and currencies equal to be at least 110% of the advance payment.

The guarantee shall remain effective until the advance payment has been repaid, but the amount of the guarantee shall be progressively reduced by the amounts repaid by the Contractor. The mobilization advance would be deemed as interest bearing advance at an interest rate of 12%.

51.2. The Contractor is to use the advance payment only to pay for Equipment/hardware/Instruments/Software /Plant and Mobilization expenses required specifically for execution of the Works. The Contractor shall demonstrate that advance payment has been used in this way by supplying copies of invoices or other documents to the Engineer.

51.3 The advance payment shall be repaid by deducting proportionate amounts from payment otherwise due to the contractor, following the schedule of completed percentages of the works on a payment basis as shown in Contract Data. No account shall be taken up of the advance payment or its repayment in assessing valuation of work done, variations, price adjustment, Compensations Events, or Liquidated Damages.

51.4 Secured Advance

Deleted

52. Securities

52.1. The Performance Security shall be provided to the Employer no later than the date specified in the Letter of Acceptance and shall be issued in an amount and form and by a bank or surety acceptable to the Employer, and denominated in Indian Rupees. The Performance Security shall be valid until a date 28 days from the date of expiry of Defects Liability Period.

53. Deleted

54. Cost of Repairs

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

E. FINISHING THE CONTRACT

55. Completion

55.1. The Contractor shall request the Engineer to issue a Certificate of Completion of the Works (**Maintenance of Sensors including all Hardware and Software for Data Acquisition, Data Transmission, Analysis, Management & Reporting for Bridge Health Monitoring and Data Acquisition, Data Transmission, Analysis, Management & Reporting for Bridge Health Monitoring** and the Engineer will do so upon deciding that the Work is completed.

56. Taking Over

56.1. Deleted

57. Final Account

57.1. The Contractor shall supply to the Engineer a detailed account of the total amount that the Contractor considers payable under the Contract before the end of the Defects Liability Period. The Engineer shall issue a Defect Liability Certificate and certify any final payment that is due to the Contractor within 56 days of receiving the Contractor's account if it is correct and complete. If it is not, the Engineer shall issue within 56 days a schedule that states the scope of the corrections or additions that are necessary. If the Final Account is still unsatisfactory after it has been resubmitted, the Engineer shall decide on the amount payable to the Contractor and issue a payment certificate, within 56 days of receiving the Contractor's revised account.

58. Operating and Maintenance Manuals

"As Built" Drawings and Operating and Maintenance manuals shall be supplied by the Contractor by the dates stated in the Contract Data.

58.1. If the Contractor does not supply the Drawings and/or manuals by the dates stated in the Contract Data, or they do not receive the Engineer's approval, the Engineer shall withhold the amount stated in the Contract Data from payments due to the Contractor.

59. Termination

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

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

- a. the Contractor stops work for 28 days when no stoppage of work is shown on the current Programme and the stoppage has not been authorized by the Engineer;
- b. the Engineer instructs the Contractor to delay the progress of the Works and the instruction is not withdrawn within 28 days;
- c. the Employer or the Contractor is made bankrupt or goes into liquidation other than for a reconstruction or amalgamation;
- d. a payment certified by the Engineer is not paid by the Employer to the Contractor within 56 days of the date of the Engineer's certificate;
- e. the Engineer gives Notice that failure to correct a particular Defect is a fundamental breach of Contract and the Contractor fails to correct it within a reasonable period of time determined by the Engineer;
- f. the Contractor does not maintain a security which is required;
- g. the Contractor has delayed the completion of works by the number of days for which the maximum amount of liquidated damages can be paid as defined in the Contract data; and

(h) if the Contractor, in the judgment of the Employer has engaged in corrupt or fraudulent practices in competing for or in executing the Contract.

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

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

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

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

60. Payment upon Termination

60.1. If the Contract is terminated because of a fundamental breach of Contract by the Contractor, the Engineer shall issue a certificate for the value of the work done less advance payments received up to the date of the issue of the certificate, less other recoveries due in terms of the contract, less taxes due to be deducted at source as per applicable law and less the percentage to apply to the work not completed as indicated in the Contract Data. Additional Liquidated Damages shall not apply. If the total amount due to the Employer exceeds any payment due to the Contractor, the difference shall be a debt payable to the Employer.

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

61. Property

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

62. Release from Performance

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

F. SPECIAL CONDITIONS OF CONTRACT

1. LABOUR:

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

The Contractor shall, if required by the Engineer, deliver to the Engineer a return in detail, in such form and at such intervals as the Engineer may prescribe, showing the staff and the numbers of the several classes of labour from time to time employed by the Contractor on the Site and such other information as the Engineer may require.

2. COMPLIANCE WITH LABOUR REGULATIONS:

During continuance of the contract, the Contractor and his sub-contractors shall abide at all times by all existing labour enactments and rules made there under, regulations, notifications and bye laws of the State or Central Government or local authority and any other labour law (including rules), regulations, bye laws that may be passed or notification that may be issued under any labour law in future either by the State or the Central Government or the local authority. Salient features of some of the major labour laws that are applicable to construction industry are given below. The Contractor shall keep the Employer indemnified in case any action is taken against the Employer by the competent authority on account of contravention of any of the provisions of any Act or rules made there under, regulations or notifications including amendments. If the Employer is caused to pay or reimburse, such amounts as may be necessary to cause or observe, or for non-observance of the provisions stipulated in the notifications/bye laws/Acts/Rules/regulations including amendments, if any, on the part of the Contractor, the Engineer/Employer shall have the right to deduct any money due to the Contractor including his amount of performance security. The Employer/Engineer shall also have right to recover from the Contractor

any sum required or estimated to be required for making good the loss or damage suffered by the Employer.

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

SALIENT FEATURES OF SOME MAJOR LABOUR LAWS APPLICABLE TO ESTABLISHMENTS ENGAGED IN BUILDING AND OTHER CONSTRUCTION WORK. -

- a. Workmen Compensation Act 1923 :- The Act provides for compensation in case of injury by accident arising out of and during the course of employment.
- b. Payment of Gratuity Act 1972 :- Gratuity is payable to an employee under the Act on satisfaction of certain conditions on separation if an employee has completed 5 years service or more on death, the rate of 15 days wages for every completed year of service. The Act is applicable to, all establishments employing 10 or more employees.
- c) Employees P.F. and Miscellaneous Provision Act 1952: The Act Provides for monthly contributions by the employer plus workers @ 10% or 8.33%. The benefits payable under the Act are:
 - (i) Pension or family pension on retirement or death, as the case may be.
 - (ii) Deposit linked insurance on the death in harness of the worker.
 - (iii) Payment of P.F. accumulation on retirement/death etc.
- d) Maternity Benefit Act 1951 :- The Act provides for leave and some other benefits to women employees in case of confinement or miscarriage etc.
- e) Contract Labour (Regulation & Abolition) Act 1970 :- The Act provides for certain welfare measures to be provided by the Contractor to contract labour and in case the Contractor fails to provide, the same are required to be provided, by the Principal Employer by Law. The Principal Employer is required to take Certificate of Registration and the Contractor required to take license from the designated officer. The Act is applicable to the establishments or Contractor of Principal Employer, if they employ 20 or more contract labour.
- f) Minimum Wages Act 1948:- The Employer is supposed to pay not less than the Minimum Wages fixed by appropriate Government as per provisions of the Act, if the employment is a scheduled employment. Construction of Buildings, Roads, Runways are scheduled employments.
- g) Payment of Wages Act 1936:- It lays down as to by what date the wages are to be paid, when it will be paid and what deductions can be made from the wages of the workers.
- h) Equal Remuneration Act 1979 : - The Act provides for payment of equal wages for work of equal nature to Male and Female workers and for not making discrimination against Female employees in the matters of transfers, training and promotions etc.
- i) Payment of Bonus Act 1965:- The Act is applicable to all establishments employing 20 or more employees. The Act provides for payments of annual bonus subject to a minimum of 8.33% of wages and maximum of 20% of wages to employees drawing Rs.3500/-per month or less. The bonus to be paid to

employees getting Rs.2500/- per month or above upto Rs.3500/- per month shall be worked out by taking wages as Rs.2500/ per month only. The Act does not apply to certain establishments. The newly set-up establishments are exempted for five years in certain circumstances. Some of the State Governments have reduced the employment size from 20 to 10 for the purpose of applicability of this Act.

j) Industrial Disputes Act 1947:- The Act lays down the machinery and procedure for resolution of Industrial disputes, in what situations a strike or lock-out becomes illegal and what are the requirements for laying off or retrenching the employees or closing down the establishment.

k) Industrial Employment Standing Orders Act 1946:- It is applicable to all establishments employing 100 or more workmen (employment size reduced by some of the States and Central Government to 50). The Act provides for laying down rules governing the conditions of employment by the Employer on matters provided in the Act and get the same certified by the designated Authority.

l) Trade Union Act 1926: - The Act lays down the procedure for registration of trade unions of workmen and employers. The Trade Unions registered under the Act have been given certain immunities from civil and criminal liabilities.

m) Child Labour (Prohibition & Regulation Act 1986): - The Act prohibits employment of children below 14 years of age in certain occupations and processes and provides for regulation of employment of children in all other occupations and processes. Employment of Child Labour is prohibited in Building and Construction Industry.

n) Inter-State Migrant workmen's Regulation of Employment & Conditions of service) Act 1979:

The Act is applicable to an establishment which employs 5 or more inter-state migrant workmen through an intermediary (who has recruited workmen in one state for employment in the establishment situated in another state). The Inter-State migrant workmen, in an establishment to which this Act becomes applicable, are required to be provided certain facilities such as housing, medical aid, traveling expenses from home upto the establishment and back, etc.

o) The Building and Other Construction workers Regulation of Employment and Conditions of Service Act 1996 and the Cess Act of 1996: All the establishments who carry on any building or other construction work and employs 10 or more workers are covered under this Act. All such establishments are required to pay cess at the rate not exceeding 2% of the cost of construction as may be modified by the Government. The Employer of the establishment is required to provide safety measures at the Building or construction work and other welfare measures, such as Canteens, First-Aid facilities, Ambulance, Housing accommodations for workers near the work place etc. The Employer to whom the Act applies has to obtain a registration certificate from the Registering Officer appointed by the Government.

p) Factories Act 1948:- The Act lays down the procedure for approval of plans before setting up a factory, health and safety provisions, welfare provisions, working hours, annual earned leave and rendering information regarding accidents or dangerous occurrences to designated authorities. It is

applicable 'to premises employing 10 persons or more with aid of power or 20 or more persons without the aid of power engaged in manufacturing process.

ARBITRATION (GCC Clause 25.2)

The procedure for arbitration will be as follows:

(i) In case of Dispute or difference arising between the Employer and a domestic contractor relating to any matter arising out of or connected with this agreement, such disputes or difference shall be settled in accordance with the Arbitration and Conciliation Act, 1996 and amendments thereto. The parties shall make efforts to agree on a sole arbitrator and only if such an attempt does not succeed and the Arbitral Tribunal consisting of 3 arbitrators one each to be appointed by the Employer and the Contractor and the third Arbitrator to be chosen by the two Arbitrators so appointed by the Parties to act as Presiding Arbitrator shall be considered. In case of failure of the two arbitrators appointed by the parties to reach upon a consensus within a period of 30 days from the appointment of the arbitrator appointed subsequently, the Presiding Arbitrator shall be appointed by the Council, Indian Road Congress.

(ii) If one of the parties fails to appoint its arbitrator in pursuance of sub clause (i) above within 30 days after receipt of the notice of the appointment of its arbitrator by the other party, then the Council, Indian Roads Congress shall appoint the arbitrator. A certified copy of the order of the Council, Indian Roads Congress making such an appointment shall be furnished to each of the parties.

(iii) Arbitration proceedings shall be held in India, and the language of the arbitration proceedings and that of all documents and communications between the parties shall be English.

(iv) The decision of the majority of arbitrators shall be final and binding upon both parties. The cost and expenses of Arbitration proceedings will be paid as per Arbitration and Conciliation Act, 1996 and amendments thereto and rules framed thereunder. However, the expenses incurred by each party in connection with the preparation, presentation, etc. of its proceedings as also the fees and expenses paid to the arbitrator appointed by such party or on its behalf shall be borne by each party itself.

(i) Performance under the contract shall continue during the arbitration proceedings and payments due to the contractor by the owners shall not be withheld, unless they are the subject matter of the arbitration pro

SECTION 4
CONTRACT DATA

CONTRACT DATA

		Clause Reference With respect to section 3
1.	The Employer is Name: Address:	[Cl. 1.1]
2.	The Engineer isPWD/NHAI/NHIDCL/BRO	[Cl. 1.1]
3.	The Defects Liability Period is Five years from the date of completion of Supply, Installation & Commissioning of Sensors including all Hardware and software for Data Acquisition , Data Transmission, Analysis, Management & Reporting for Bridge Health Monitoring	[Cl.1.1 & 35]
4.	The Start Date shall be within 15 (fifteen) days for the date of issue of the Notice to proceed with the work.	[Cl. 1.1]
5.	The Intended Completion Date for the whole of the Supply, Installation & Commissioning of Sensors including all Hardware and software for Data Acquisition , Data Transmission, Analysis, Management & Reporting for Bridge Health Monitoring is 6 (Six) months after start of work:	[Cl. 1.1,17&28]
6.	The Site is located at river in the State of	[Cl. 1.1]
7.	The Works shall consist of Supply, Installation & Commissioning of Sensors including all Hardware and software for Data Acquisition, Data Transmission, Analysis, Management & Reporting for Bridge Health Monitoring during initial 6 months period and thereafter Maintenance of aforesaid Sensors including all Hardware and Software for Data Acquisition, Data Transmission, Analysis, Management & Reporting for Bridge Health Monitoring and Data Acquisition, Data Transmission, Analysis, Management & Reporting for Bridge Health Monitoring in next 60 months in the State of	[Cl. 1.1]
8.	The Contractor is	[Cl. 1.1, 8]
9.	The following documents also form part of the Contract:	[Cl.2.3]
10.	The law which applies to the Contact is the law of Union of India	[Cl.3.1]
11.	The language of the Contract documents is English.	[Cl.3.1]
12.	The Schedule of other contractors	[Cl. 8]
13.	The minimum insurance cover for physical property, injury and death is Rs. 5 lakhs per occurrence with the number of occurrence eslimited to four. After each occurrence, contractor will pay additionalpremium necessary to make insurance valid for four occurrences always.	[Cl.13]

14.	Site investigation report	[Cl.14]	
15.	The Site Possession Dates shall be within seven days from Notice to Proceed to Work.	[Cl.21]	
16.	The period for submission of the programme for approval of Engineer shall be 21 days from the issue of Letter of Acceptance.	[Cl.27.1]	
17.	The period between programme updates shall be 90 days.	[Cl. 27.3]	
18.	The amount to be withheld for late submission of an updated programme shall be 1 % of the contract value.	[Cl. 27.3]	
19.	The following events shall also be Compensation Events:	[Cl. 44]	
	Nil		
20.	The currency of the contract is Indian Rupees	{Cl.46}	
21.	The proportion of payments retained (retention money) shall be 5% from each.	[Cl. 48]	
22.	Amount of liquidated damages for delay in completion of works	For whole of work (1/2000)th of the Initial Contract Price, rounded off to the nearest Thousand, per day.	[Cl.49]
23.	Maximum limit of liquidated damages for delay in completion of work.	10 percent of the Initial Contract Price rounded off to the nearest thousand.	[Cl.49]
24.	The amounts of the advance payment are: 10% of BoQ amount for Supply, Installation & Commissioning of Sensors including all Hardware and Software for Data Acquisition, Data Transmission, Analysis, Management & Reporting for Bridge Health Monitoring	[Cl.51.1]	
25.	Repayment of advance payment for mobilization and Equipment/Hardware/Instruments/Software/ Plant The advance loan shall be repaid with percentage deductions from the interim payments certified by the Engineer under the Contract. Deductions shall commence from the next Interim Payment Certificate following payment of Advance and shall be made at the rate of 20 percent of the amounts of all Interim Payment Certificates until such time as the loan has been repaid, always provided that the loan shall be completely repaid prior to the expiry of the original time for completion pursuant to Clauses 17 and 28.	[Cl.51.3]	
26.	The Securities shall be for the following minimum amounts equivalent as a percentage of the Contract Price: Performance Security for 3 per cent of contract price	[Cl.52]	
27.	The "As-Built" Drawings & Operating and Maintenance Manual shall be submitted within 15 days of completion of Supply, Installation and Commissioning of Sensors including all Hardware and Software for Data Acquisition, Data Transmission, Analysis, Management & Reporting for Bridge Health Monitoring	[Cl.58]	
28.	The amount to be withheld for failing to supply "As-Built" Drawings & Operating and Maintenance Manual by the stipulated date: Last	[Cl.58]	

	IPC and Final Bill for Supply, Installation and Commissioning of Sensors including all Hardware and Software for Data Acquisition, Data Transmission, Analysis, Management & Reporting for Bridge Health Monitoring shall not be paid	
29.	The percentage to apply to the value of the work not completed representing the Employer's additional cost for completing the Works shall be 20 per cent.	[Cl.60]

SECTION 5

TECHNICAL SPECIFICATION

TECHNICAL SPECIFICATIONS:

1. Bridge Health Monitoring System will be undertaken for thedistrict of The bridge hascarriageway. The bridge hasnos. spans, span lengthm and Superstructure type.. The bridge was completed on/built approximately years back.

GAD (as built/reconstructed) enclosed.

Typical cross section of the bridge enclosed.

2. Bridge Health Monitoring will be done for 60 months period following completion of installation and commissioning.

3. The location and numbers of the sensors are as detailed below:

Sensor Type	Location	Numbers
Triaxial Accelerometer		
Strain Gauge		
Temperature Sensor		
Biaxial Inclinator / Tilt meter on girder		
Corrosion sensor		
Biaxial Inclinator on pier cap		
Linear Variable Displacement Transducer on pier cap		
Acoustic Sensor on pier		

4. Following are the Technical Specifications of the Sensors:

Sl. No.	Sensor Type	Sensor Details	Specifications
1	Tri axial Accelerometer	Type or Model	MEMS
		Measurement Range	± 2g, 4g, 8g
		Resolution	20bit, 50µg
		Frequency Response	0 - 200Hz
		Sampling Rate	Selectable upto 2000 S/s
		Operating temperature	-20°C to +80°C
		Waterproof	IP 67 compliant
2	Strain Gauge	Installation	Surface mounting on structure either by clamping or gluing
		Type or Model	FBG
		Length of Measurement basis	500mm+/-20mm
		Temperature compensation	Intrinsic type; a separate temperature compensation mechanism should be included within the same strain sensor conduit or have no effect from temperature variation on the strain measurement.
		Measurand	Deformation and/or Strain
		Measurement Range	+/- 1000 µε
		Sampling Rate	Selectable upto 200 Hz
		Operating temperature	-20°C to +80°C

		Measurement precision	1 $\mu\epsilon$
		Accuracy	$\pm 2\%$ reading individually calibrated to NIST standards
		Installation	Surface mounting on structure either by clamping or gluing
		Waterproof	IP 67 compliant
3	Temperature Sensor	Sensor Type	Thermocouple
		Measurand	Temperature in structural concrete section
		Range	-10°C to $+80^{\circ}\text{C}$
		Accuracy	$\pm 0.1^{\circ}\text{C}$
		Resolution	$\pm 0.01^{\circ}\text{C}$
		Sampling rate	1 Hz
		Waterproof	IP 67 compliant
		Installation	Surface mounting on structure either by clamping or gluing
4	Biaxial Inclinometer / Tilt meter	Type or Model	MEMS
		Measurement Range	$\pm 10^{\circ}$
		Accuracy	$\pm 0.05^{\circ}$
		Measurands	Rotation of vertical structure in degree or radian
		Resolution	$\pm 0.001^{\circ}$
		Repeatability	$\pm 0.01^{\circ}$ (static)
		Linearity	2% of full scale
		Sample rate	Selectable upto 200 Hz
		Operating temperature	-20°C to $+80^{\circ}\text{C}$
		Waterproof	IP67 compliant
		Installation	Surface mounting on structure either by clamping or gluing
5	Corrosion sensor	Type or Model	Corrosion sensor (Sensor should contain anode and cathode to measure corrosion penetration in steel and concrete resistivity to corrosion)
		Measurement	LPR, resistance
		Temperature	-20°C to $+80^{\circ}\text{C}$
		Reference Cell	The reference cell will be the ERE 20 standard MnO ₂ /Ag-Agcl reference cell
		Installation	Core drilling minimum 40mm
6	Linear Variable Displacement Transducer	Type or Model	Potentiometric
		Measurement Range	± 25 mm
		Accuracy	0.1 mm
		Resolution	0.01 mm
		Waterproof	IP67 compliant
		Installation	Surface mounting on structure either by clamping or gluing
		Operating Temperature	-20°C to $+80^{\circ}\text{C}$
7	Acoustic Sensor on pier	Type or Model	Sonic
		Depth Range	Up to 25m
		Depth Resolution	10 cm
		Frequency/Rate	200 kHz
		Beam Width	$9^{\circ} \pm 1^{\circ}$
		Temperature Sensor	Included
		Temperature accuracy	0.1°C
		Temperature Resolution	0.01°C

	Operating Depth	10m
	Protection type	Capable to be submerged in water

All the sensors shall have synchronised aggregator as the data have to be time synchronized.

5. The Contractor shall provide compatible power arrangement. Data Acquisition System collect data from all the sensors and Data Transmission System transmit the data to appropriate storage location i.e. server/cloud. The Contractor shall analyse the data with compatible and internationally recognized software tool and submit consolidated report to the Employer on monthly basis. The Data Acquisition System, Data Transmission System and the analysis tool shall be got approved from Employer and any other agency Employer may like to engage for technical advice in such matter.

Data Acquisition System and Data Transmission System should have the following minimum specifications to record, automate the measurements from various sensors.

- Capable of taking reading from all sensors in synchronized manner.
- The reading unit must have multiple sensors connection capability to avoid separate Data logger for each sensor and thus crowding the instrumentation panel.
- The reading unit must be capable of automatic, scheduled, long-term reading and storage of data on local data logger. The reading unit must be capable of remote connection via analogue or mobile telephone modem, or TCP/IP connection, for programming of measurements and data downloading.
- The reading unit must be easy and safe to handle and operate, packed in an appropriate manner for use on-site.
- The reading unit must be powered by AC/DC current and internal battery for uninterrupted operation in case of power failure.
- The reading unit shall be protected in IP67 based enclosure.

6. Software for Data Management, Visualization, Analysis, Data Forwarding

- The data management should consist of execution of measurements (reading of sensors), Storage of data (local or remote) and provide access to data.
- The provision to collect data manually, semi-automatically or automatically; on site or remotely; periodically or continuously; statically and dynamically with predefined schedule shall be provided.
- Data shall be stored in the form of report, tables and diagrams on different types of support, such as electronic files or hard versions.
- The manner of storage of data has to ensure that data will not be lost and that prompt access to any selected data is possible. The software that manages the collection and storage of data shall be part of the monitoring system and user friendly.
- Advanced data visualization (threshold levels, diagnostic algorithms and tools, additional information to be published etc.) is to be defined and customizable by the client.
- Data publishing on a secure website, including automatic warning generation and data representation in table, graphical and map formats. Data export to Excel or excel compatible files.
- All predefined monitoring parameters shall be executed automatically by the software.
- Setup warning and alarm generation module to raise an issue to the engineer if the defined parameter crosses the threshold set.
- The Software should store the data in a database for easy access and storage on automatic and continuous mode.
- The Software shall be compatible with the data logging soft wares and can be installed on either windows, Mac or Linux operating system.
- The system will be capable of reporting loads action on the bridge and the corresponding responses from the bridge. The loads will include wind, temperature, weather and traffic. The responses reported are the measures values in SI units at the point of instrumentation.

- The software will be capable of comparing all combinations of measured values, this combination will be both graphical and tabulated. All values and combination of values will be possible to extract either as real-time values or historical. The software will be able to generate a number of predefined reports.
- Real-time presentation
- All real-time values will be presented graphical or tabulated. All values are the measured values converted to SI unit values filtered for noise.
- The software will be able to present all measured values as a function of time simultaneously.
- The software will support all measured values to be presented as a function of each other. The Software will support any mathematical manipulation of a single or any combination of two or more measured values.
- Historical presentation
- Contractor is free to propose software tool of his choice for analysing the data collected through sensors to furnish outcome deliverables like extent of deterioration in the strength of different components of the bridge, extent loss / deterioration in the cables/reinforcement/prestressing tendons, extent of additional stresses / forces / moments induced in the bridge components due to rotation, tilt etc., and consequent requirements for strengthening / rehabilitation extent of scouring , extent of deterioration in the bearings etc., and requirements of corresponding corrective actions.
- Any values from any time period will be presentable.

7. Approvals from Engineer

The Contractor will take approval for the following from the Engineer:

- i. Schematic drawing of the bridge (either on as-built drawing if available or prepared drawing) showing actual position of sensors and arrangement of their embedment
- ii. Conformance of the sensors to this Technical Specifications
- iii. Methodology of installation and commissioning of sensors
- iv. Details of Data Acquisition System, Data Transmission System and storage supported by materials and equipment detail, suitable diagrams, **and any other detail** as may be required by the Engineer
- v. Algorithm for bridge health parameters and its evaluation
- vi. Selected analysis software/tool along with key performance indicators considered and weightage thereto.
- vii. Any other detail as may be required by the Engineer.

Employer may take assistance from any expert during the approval process and in those circumstances, Contractor shall furnish all support to the expert(s) and facilitate interaction with them, site visit, etc.

8. Submittals

The Contractor will be required to furnish the following documents/drawings as submittals:

- Schematic drawing showing all the instruments/sensors positions on the bridge.
- Detailed description of every sensor, Data Acquisition System, instrument used, along with a comprehensive operation manual.
- Warrantee certificates for all sensors/instruments
- Login credentials of all units and server.
- Cabling and communications details.
- Details about the data processing software.
- Reports (Temperature data monitoring report, Corrosion monitoring report, Vibration data monitoring report, Tilt meter data monitoring report, Strain Data Monitoring report, Bearing Monitoring Report) in both Tabular and Graphical formats, acceptable service life of bridge, etc
- Warning and alarm thresholds for the bridge
- Report on extent of deterioration in the strength of different components of the

bridge, extent loss / deterioration in the cables/reinforcement/prestressing tendons, extent of additional stresses / forces / moments induced in the bridge components due to rotation, tilt etc., and consequent requirements for strengthening / rehabilitation extent of scouring , extent of deterioration in the bearings etc., and requirements of corresponding corrective actions

- Recommendation on repair and rehabilitation plan for the bridge
- Any other submittals as may be required by the Engineer.

SECTION-6
FORM OF BID

FORM OF BID

Description of the work:

.....

BID

To

Address

- 1. We offer to execute the works described above and remedy any defects there in conformity with the conditions of the contract, specification drawings bill of quantities and addenda for the sum (S) of

_____ (_____)

_____)

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

Dated this..... Day of..... 20.....

Signature----- In the capacity of

duly authorised to sign bids for and on behalf of

.....

(In block capital or typed)

Address

Witness

Address

Occupation

SECTION- 7
BILL OF QUANTITIES

BILL OF QUANTITIES

PREAMBLE

1. The Bill of Quantities shall be read in conjunction with the Instruction to Bidders, General Conditions of contract, Technical specifications & Drawings.
2. The quantities given in the Bill of Quantities are estimated and provisional and are given to provide a common basis for bidding. The basis of payment will be the actual quantities of work ordered and carried out, as measured by the contractor and verified by the Engineer and valued at the rates and prices tendered in the priced Bill of quantities, where applicable and otherwise at such rates and prices as the Engineer may fix within the terms of the contract.
3. The rates and prices tendered in the priced Bill of Quantities shall exceptin so far as it is otherwise, provided under the contract, include all constructional plant, labour, supervision, materials, erection maintenance, insurance, profit, taxes and duties together with all general risks, liabilities and obligations setout or implied in the contract.
4. The rates and prices shall be quoted entirely in Indian Currency.
5. A rate or price shall be entered against each item in the Bill of Quantities, whether quantities are stated or not. The cost of Items against which the contractor has failed to enter a rate or price shall be deemed to be covered by other rates and prices entered in the Bill of Quantities.
6. The whole cost of complying with the provisions of the contract shall be included in the items provided in the priced Bill of Quantities, and where no items are provided , the cost shall be deemed to be distributed among the rates and prices entered for the related Items of the Work.
7. General directions and descriptions of work and material are not necessarily repeated or summarized in the Bill of Quantities. References to the relevant sections of the contract documentation shall be made before entering rates or prices against each item in the Bill of Quantities.

BILL OF QUANTITIES

IT E M	DESCRIPTION OF WO RKS	U N I T	QUA NTI TY	R A T E (₹)	AM OU NT (₹)
1.	Supply, installation and commissioning of Sensors including all Hardware and Software for Data Acquisition, Data Transmission, Analysis, Management & Reporting for Bridge Health Monitoring System on Major Bridge over river Bandhan at km on NH in theState of				

	complete including preparation of detailed drawings and obtaining the Engineer's approval, transmission and receipt of test data for Bridges, as per Technical Specification.				
1(a)	MEMS Tri axial Accelerometer	Nos.			
1(b)	FBG strain Gauge	Nos.			
1 (c)	Temperature Sensor (Thermocouple)	Nos.			
1(d)	MEMS Biaxial Inclinometer / Tilt meter on the girder.	Nos.			
1(e)	Corrosion sensor	Nos.			
1(f)	MEMS Biaxial Inclinometer / Tilt meter on the pier	Nos.			
1(g)	Linear Variable Displacement Transducer on the pier cap.	Nos.			
1(h)	Acoustic Sensor on pier	Nos.			
2.	Maintenance of Sensors including all Hardware and Software for Data Acquisition, Data Transmission, Analysis, Management & Reporting and Data Acquisition, Data Transmission, Analysis, Management & Reporting for Bridge Health Monitoring System on Major Bridge over river in the State of including diagnosis of instrument defects, replacement of faulty sensors/ instruments, obtaining of Calibration Certificate, ensure snag-free transmission of data each hour as per Technical Specification.	Month			
		Total			

Note:

1. Item for which no rate or price has been entered in will not be paid for by the Employer when executed and shall be deemed covered by the other rates and prices in the bill of quantities (Refer: ITB Clause 13.2 and GCC Clause 43.3).
2. Unit rates and prices shall be quoted by the bidder in Indian rupee [ITB Clause 14.1].
3. In case data is not submitted from any sensor for any period, payment under item no. 2 will be proportionately reduced. Contractor shall have spare sensors and all hardware components and carry out any repair or replacement within 24 hrs. period. Failure to do so will attract penalty at the rate of daily payment for maintenance, even if, only 1 sensor is not working. The damages will be recovered from monthly payment or retention money.

SECTION 8:
SECURITIES AND OTHER FORMS

Bank Guarantee for **BID SECURITY (e/Physical BANK GUARANTEE)**

(Refer Cl. 16.1 of ITB)

B.G.
No.

Dated:

In consideration of you, ****, having its office at ****, (hereinafter referred to as the "Employer", which expression shall unless it be repugnant to the subject or context thereof include its, successors and assigns) having agreed to receive the BID of and having its registered office at.....(and acting on behalf of its JV) (hereinafter referred to as the "Bidder" which expression shall unless it be repugnant to the subject or context thereof include its/their executors, administrators, successors and assigns), for the

Supply, Installation, Commissioning & Maintenance of Sensors and Data Acquisition, Data Transmission, Analysis, Management & Reporting including all Hardware and Software for the same for Bridge Health Monitoring System in the State of

Project (hereinafter referred to as "the Project") pursuant to the Bid Reference No **Dated**

1. issued in respect of the Project and other related documents including without limitation the draft contract Agreement (hereinafter collectively referred to as "Bidding Documents"), we (Name of the Bank) having our registered office at and one of its branches at (hereinafter referred to as the "Bank"), at the request of the Bidder, do hereby in terms of Cl. 16.1 of ITB of the Bidding Documents, irrevocably, unconditionally and without reservation guarantee the due and faithful fulfilment and compliance of the terms and conditions of the Bidding Documents by the said Bidder and unconditionally and irrevocably undertake to pay forthwith to the Authority an amount of Rs. *** ** (Rupees *** ** only) (hereinafter referred to as the "Guarantee") as our primary obligation without any demur, reservation, recourse, contest or protest and without reference to the Bidder if the Bidder shall fail to fulfil or comply with all or any of the terms and conditions contained in the said Bidding Documents.
2. Any such written demand made by the Employer stating that the Bidder is in default of the due and faithful fulfilment and compliance with the terms and conditions contained in the Bidding Documents shall be final, conclusive and binding on the Bank.
3. We, the Bank, do hereby unconditionally undertake to pay the amounts due and payable under this Guarantee without any demur, reservation, recourse, contest or protest and without any reference to the Bidder or any other person and irrespective of whether the claim of the Employer is disputed by the Bidder or not, merely on the first demand from the Authority stating that the amount claimed is due to the Authority by reason of failure of the Bidder to fulfil and comply with the terms and conditions contained in the Bidding Documents including failure of the said Bidder to keep its BID open during the BID validity period as set forth in

the said Bidding Documents for any reason whatsoever. Any such demand made on the Bank shall be conclusive as regards amount due and payable by the Bank under this Guarantee. However, our liability under this Guarantee shall be restricted to an amount not exceeding Rs. *** ***(Rupees *** ** only).

4. This Guarantee shall be irrevocable and remain in full force for a period of 180 (one hundred and eighty) days from the BID Due Date inclusive of a claim period of 60 (sixty) days or for such extended period as may be mutually agreed between the Employer and the Bidder, and agreed to by the Bank, and shall continue to be enforceable till all amounts under this Guarantee have been paid.
5. We, the Bank, further agree that the Authority shall be the sole judge to decide as to whether the Bidder is in default of due and faithful fulfilment and compliance with the terms and conditions contained in the Bidding Documents including inter alia, the failure of the Bidder to keep its BID open during the BID validity period set forth in the said Bidding Documents, and the decision of the Authority that the Bidder is in default as aforesaid shall be final and binding on us, notwithstanding any differences between the Authority and the Bidder or any dispute pending before any Court, Tribunal, Arbitrator or any other Authority.
6. The Guarantee shall not be affected by any change in the constitution or winding up of the Bidder or the Bank or any absorption, merger or amalgamation of the Bidder or the Bank with any other person.
7. In order to give full effect to this Guarantee, the Employer shall be entitled to treat the Bank as the principal debtor. The Employer shall have the fullest liberty without affecting in any way the liability of the Bank under this Guarantee from time to time to vary any of the terms and conditions contained in the said Bidding Documents or to extend time for submission of the BIDs or the BID validity period or the period for conveying acceptance of Letter of Award by the Bidder or the period for fulfilment and compliance with all or any of the terms and conditions contained in the said Bidding Documents by the said Bidder or to postpone for any time and from time to time any of the powers exercisable by it against the said Bidder and either to enforce or forbear from enforcing any of the terms and conditions contained in the said Bidding Documents or the securities available to the Employer, and the Bank shall not be released from its liability under these presents by any exercise by the Employer of the liberty with reference to the matters aforesaid or by reason of time being given to the said Bidder or any other forbearance, act or omission on the part of the Employer or any indulgence by the Employer to the said Bidder or by any change in the constitution of the Employer or its absorption, merger or amalgamation with any other person or any other matter or thing whatsoever which under the law relating to sureties would but for this provision have the effect of releasing the Bank from its such liability.
8. Any notice by way of request, demand or otherwise hereunder shall be sufficiently given or made if addressed to the Bank and sent by courier or by registered mail to the Bank at the address set forth herein.
9. We undertake to make the payment on receipt of your notice of claim on us addressed to [name of Bank along with branch address] and delivered at our above branch which shall be deemed to have been duly authorised to receive the said notice of claim.

10. It shall not be necessary for the Employer to proceed against the said Bidder before proceeding against the Bank and the guarantee herein contained shall be enforceable against the Bank, notwithstanding any other security which the Employer may have obtained from the said Bidder or any other person and which shall, at the time when proceedings are taken against the Bank hereunder, be outstanding or unrealised.
11. We, the Bank, further undertake not to revoke this Guarantee during its currency except with the previous express consent of the Employer in writing.
12. The Bank declares that it has power to issue this Guarantee and discharge the obligations contemplated herein, the undersigned is duly authorised and has full power to execute this Guarantee for and on behalf of the Bank.
13. For the avoidance of doubt, the Bank's liability under this Guarantee shall be restricted to Rs. *** crore (Rupees *** ** crore only). The Bank shall be liable to pay the said amount or any part thereof only if the Employer serves a written claim on the Bank in accordance with paragraph 9 hereof, on or before [*** (indicate date falling 180 days after the BID Due Date)].
14. This guarantee shall also be operatable at our..... Branch at, from whom, confirmation regarding the issue of this guarantee or extension / renewal thereof shall be made available on demand. In the contingency of this guarantee being invoked and payment thereunder claimed, the said branch shall accept such invocation letter and make payment of amounts so demanded under the said invocation.
15. The guarantor/bank hereby confirms that it is on the SFMS (Structural Finance Messaging System) platform & shall invariably send an advice of this Bank Guarantee to the designated bank of [Ministry/NHAI/NHIDCL/State PWD/BRO], details of which is as under:

S. No.	Particulars	Details
1.	Name of Beneficiary	
2.	Name of Bank	
3.	Account No.	
4.	IFSC Code	

Signed and Delivered by..... Bank

By the hand of Mr./Ms, its.....and authorised official.

(Signature of the Authorised Signatory)

(Official-Seal)

FORM OF INSURANCE SURITY BOND
for BID Security (Refer Cl. 16.1 of ITB)

Dated:

1. In consideration of you,, having its office at,,
(hereinafter referred to as the "Employer", which expression shall unless it be
repugnant to the subject or context thereof include its, successors and assigns)
having agreed to receive the BID of..... and having its registered
office at
(hereinafter referred to as the "Bidder" which expression shall unless it be
repugnant to the subject or context thereof include its/their executors,
administrators, successors and assigns), for the Project "

**Supply, Installation, Commissioning & Maintenance of Sensors and Data
Acquisition, Data Transmission, Analysis, Management & Reporting
including all Hardware and Software for the same for Bridge Health
Monitoring System in the State of**

(Bid Ref No

..... **Dated**

)" (hereinafter referred to as the Project") pursuant to the RFP collectively
referred to as "Bidding Documents"), we (Name of the Surety Insurer)
having our registered office at and one of its branches
at.....(hereinafter referred to as "Surety Insurer") at the request of the
Bidder, do hereby in terms of Cl. 16.1 of the ITB, irrevocably,
unconditionally and without reservation guarantee the due and faithful
fulfilment and compliance of the terms and conditions of the Bidding
Documents by the said Bidder and unconditionally and irrevocably
undertake to pay forthwith to the Employer an amount of Rs. ** ** (Rupees
*** ** only) (hereinafter referred to as the "Surety Bond) as our primary
obligation without any demur, reservation, recourse, contest or protest and
without reference to the Bidder if the Bidder shall fail to fulfil or comply with
all or any of the terms and conditions contained in the said Bidding
Documents.

2. Any such written demand made by the Employer stating that the
Bidder is in default of the due and faithful fulfilment and compliance with
the terms and conditions contained in the Bidding Documents shall be final,
conclusive and binding on the Surety Insurer.

3. We, the Surety Insurer, do hereby unconditionally undertake to pay
the amounts due and payable under this Surety Bond without any demur,
reservation, recourse, contest or protest and without any reference to the
Bidder or any other person and irrespective of whether the claim of the
Employer is disputed by the Bidder or not merely on the first demand from
the Employer stating that the amount claimed is due to the Employer by
reason of failure of the Bidder to fulfil and comply with the terms and
conditions contained in the Bidding Documents including failure of the said
Bidder to keep its BID open during the BID validity period as set forth in

the said Bidding Documents for any reason whatsoever. Any such demand made on the Bank shall be conclusive as regards amount due and payable by the Bank under this Guarantee. However, our liability under this Surety Bond shall be restricted to an amount not exceeding Rs. *** *(Rupees *** ** only).

4. This Surety Bond shall be irrevocable and remain in full force for a period of 180 (one hundred and eighty) days from the BID Due Date inclusive of a claim period of 60 (sixty) days or for such extended period as may be mutually agreed between the Employer and the Bidder, and agreed to by the Bank, and shall continue to be enforceable till all amounts under this Surety Bond have been paid.

5. We, the surety insurer, further agree that the Employer shall be the sole judge to decide as to whether the Bidder is in default of due and faithful fulfilment and compliance with the terms and conditions contained in the Bidding Documents including, inter alia, the failure of the Bidder to keep its BID open during the BID validity period set forth in the said Bidding Documents, and the decision of the Employer that the Bidder is in default as aforesaid shall be final and binding on us, Notwithstanding any differences between the Employer and the Bidder or any dispute pending before any Court, Tribunal, Arbitrator or any other Authority.

6. The Surety Bond shall not be affected by any change in the constitution or winding up of the Bidder or any absorption, merger or amalgamation of the Bidder or the Surety insurer or any with any other person.

7. In order to give full effect to this Surety Bond, the Employer shall be entitled to treat the Surety Insurer as the principal debtor. The Employer shall have the fullest liberty without affecting in any way the liability of the Surety Insurer under this Surety Bond from time to time to vary any of the terms and conditions contained in the said Bidding Documents or to extend time for submission of the BIDs or the BID validity period or the period for conveying acceptance of Letter of Award by the Bidder or the period for fulfilment and compliance with all or any of the terms and conditions contained in the said Bidding Documents by the said Bidder or to postpone for any time and from time to time any of the powers exercisable by it against the said Bidder and either to enforce or forbear from enforcing any of the terms and conditions contained in the said Bidding Documents or the securities available to the Employer and the Surety Insurer shall not be released from its liability under these presents by any exercise by the Authority of the liberty with reference to the matters aforesaid or by reason of time being given to the said Bidder or any other forbearance, act or omission on the part of the Employer or any indulgence by the Employer to the said Bidder or by any change in the constitution of the Employer or its absorption, merger or amalgamation with any other person or any other matter or thing whatsoever which under the law relating to sureties would but for this provision have the effect of releasing the Surety Insurer from its such liability.

8. Any notice by way of request, demand or otherwise hereunder shall be sufficiently given or made if addressed to the Surety Insurer and sent by courier or by registered mail to the Surety Insurer at the address set forth herein.
9. We undertake to make the payment on receipt of your notice of claim on us addressed to [name of Surety Insurer along with branch address] and delivered at our above branch which shall be deemed to have been duly authorised to receive the said notice of claim.
10. It shall not be necessary for the Employer to proceed against the said Bidder before proceeding against the Surety Insurer and the Surety Bond herein contained shall be enforceable against the Surety Insurer, notwithstanding any other security which the Employer may have obtained from the said Bidder or any other person and which shall, at the time when proceedings are taken against the Surety Insurer hereunder, be outstanding or unrealised.
11. We, the Surety Insurer, further undertake not to revoke this Surety Bond during its currency except with the previous express consent of the Employer in writing.
12. The Surety Insurer declares that it has power to issue this Surety Bond and discharge the obligations contemplated herein, the undersigned is duly authorised and has full power to execute this Surety Bond for and on behalf of the Surety Insurer.
13. For the avoidance of doubt, the Surety Insurer's liability under this Surety Bond shall be restricted to Rs. *** crore (Rupees *** ** crore only). The Surety Insurer shall be liable to pay the said amount or any part thereof only if the Employer serves a written claim on the Surety Bond in accordance with paragraph 9 hereof, on or before [*** (indicate date falling 180 days after the BID Due Date)].
14. This Surety Bond shall also be operatable at our..... Branch at from whom, confirmation regarding the issue of this Surety Bond or extension I renewal thereof shall be made available on demand. In the contingency of this Surety Bond being invoked and payment thereunder claimed, the said branch shall accept such invocation letter and make payment of amounts so demanded under the said invocation.
15. The Insurance Surety Bond shall be verified from the specific portal created for this purpose.

Signed and Delivered by

Surety Insurer

By the hand of Mr/Msitsand authorised official.

(Signature of the Authorised Signatory) (Official-Seal)

FORM OF INSURANCE SURITY BOND
for Performance Security (Refer Cl. 31.1 of ITB)

To,

.....[**Name of Employer**]

.....[**Address of Employer**]

WHEREAS[name and address of Contractor]
(hereinafter called "Contractor") has undertaken in pursuance of Letter of
Acceptance (LOA) No.....Dated.....for **Supply, Installation,
Commissioning & Maintenance of Sensors and Data Acquisition, Data
Transmission, Analysis, Management & Reporting including all Hardware
and Software for the same for Bridge Health Monitoring**
..... in the State of (..... Dated

)" hereinafter called the "Contract")

AND WHEREAS the Contract requires the Contractor to furnish an
(Performance Security) for due and faithful performance of its obligations,
under and in accordance with the Contract, during the (Installation Period/
Operations and Maintenance Period} in a sum of Rs..... cr. (Rupees crore)
(the , "Surety Bond Amount").AND WHEREAS we,..... through
our branch at.....(the "Surety Insurer") have agreed to furnish
this Surety Bond by way of Performance Security.

NOW, THEREFORE, the Surety Insurer hereby, unconditionally and
irrevocably, guarantees and affirms as follows:

1. Insurer hereby unconditionally and irrevocably guarantees the due and faithful performance of the Contractor's obligations during the {Installation Period/ Operations and Maintenance Period} under and in accordance with the Contract, and agrees and demand, and undertakes to pay to the Authority, upon its mere first written Demand without any demur, reservation, recourse, contest or protest, and without any reference to the Contractor such sum or sums up to an aggregate sum of the Surety Bond Amount as the Authority shall claim without the Authority being required to prove or to show grounds or reasons for its demand and/or for the sum specified therein.
2. A letter from the Employer under the hand of an officer not below the rank of [Executive Engineer,,], that the Contractor has committed default in the due and faithful performance of all or any of its obligations under and in accordance with the Contract shall be conclusive, final and binding on the Surety Insurer. The Surety Insurer further agrees that the Employer shall be the sole judge as to whether the Contractor is in default in due and faithful performance of any of its obligations during and under the Contract and its decision that the Contractor is in default shall be final and binding on the Surety Insurer notwithstanding any

differences between the Employer and the Contractor as to whether the Contractor or any dispute between them pending before any court, tribunal or arbitrators or any other authority or body, or by the discharge of the contractor for any reason whatsoever.

3 In order to give effect to this Surety Bond, the Employer shall be entitled to act as if the Surety Insurer were the principal debtor and any change in the constitution of the Contractor and/or the Surety Insurer, whether by their absorption with any other body or corporation or otherwise, shall not in any way or manner affect the liability or obligation of the Surety Insurer under this Surety Bond.

4 It shall not be necessary, and the Surety Insurer hereby waives any necessity, for the Employer to proceed against the Contractor before presenting to the Surety Insurer its demand under this Surety Bond.

7. The Employer shall have the liberty, without affecting in any manner the liability of the Surety Insurer under this Surety Bond, to vary at any time, the terms and conditions of the Contract or to extend the time or period for the compliance with, fulfilment and/ or performance of all or any of the obligations of the Contractor contained in the Contract or to postpone for any time, and from time to time, any of the rights and powers exercisable by the Employer against the Contractor, and either to enforce or forbear from enforcing any of the terms and conditions contained in the Contract and/or the securities available to the Employer, and the Surety Insurer shall not be released from its liability and obligation under these presents by any exercise by the Authority of the liberty with reference to the matters aforesaid or by reason of time being given to the Contractor or any other forbearance, indulgence, act or omission on the part of the Employer or of any other matter or thing whatsoever which under any law relating to sureties and guarantors would but for this provision have the effect of releasing the Surety Insurer from its liability and obligation under this Surety Bond and the Surety Insurer hereby waives all of its rights under any such law.
8. This Surety Bond is in addition to and not in substitution of any other Surety Bond or security now or which may hereafter be held by the Employer in respect of or relating to the Contract or for the fulfilment, compliance and/or performance of all or any of the obligations of the Contractor under the Contract.
9. Notwithstanding anything contained hereinbefore, the liability of the Surety Insurer under this Surety Bond is restricted to the Surety Bond Amount and this Surety Bond will remain in force for the period specified in paragraph 8 below and unless a demand or claim in writing is made by the Employer on the Surety Insurer under this Surety Bond all rights of the Employer under this Surety Bond shall be forfeited and the Surety Insurer shall be relieved from its liabilities hereunder.

8. The Surety Bond shall cease to be in force and effect on\$. Unless a demand or claim under this Surety Bond made in writing before expiry of the Surety Bond, the Surety Insurer shall be discharged from its liabilities hereunder.

9. The Surety Insurer undertakes not to revoke this Surety Bond during its currency, except with the previous express consent of the Employer in writing, and declares and warrants that it has the power to issue this Surety

Bond and the undersigned has full powers to do so on behalf of the Surety Insurer.

10. Any notice by way of request, demand or otherwise hereunder may be sent by post addressed to the Surety Insurer at its above referred branch, which shall be deemed to have been duly authorized to receive such notice and to effect payment thereof forthwith, and if sent by post it shall be deemed to have been given at the time when it ought to have been delivered in due course of post and in proving such notice, when given by post, it shall be sufficient to prove that the envelope containing the notice was posted and a certificate signed by an officer of the Employer that the envelope was so posted shall be conclusive
11. This Surety Bond shall come into force with immediate effect and shall remain in force and effect for up to the date specified in paragraph 8 above or until it is released earlier by the Employer pursuant to the provisions of the Contract.
12. This Surety Bond is subject to the Uniform Rules for Demand Guarantees (URDG) 2010Revision, ICC Publication No. 758, except that the supporting statement under Article 15(a) is hereby excluded.

Signed and sealed this day of..... 20 at

SIGNED,SEALED AND DELIVERED
For and on behalf of the Surety Insurer by:

(Signature) (Name)

(Designation) (Code Number) (Address)

\$ Insert date at least 2 (two) years from the date of issuance of this Bond(in accordance with Clause 2.21 of the RFP). The contractors can submit the ISB for periods of two years at one time and keep on renewing the same till the DLP is over if they have problems in getting the ISB in one go for the entire DLP.

FORM OF BANK GUARANTEE
[Performance Security]
(Cl. 31.1 of ITB)

To

_____ [name of Employer]

_____ [address of Employer]

WHEREAS _____ [name and address of Contractor] (hereafter called the "Contractor") has undertaken, in pursuance of Letter of Acceptance (LOA)

No. _____ Dated _____ for **Supply, Installation, Commissioning & Maintenance of Sensors and Data Acquisition, Data Transmission, Analysis, Management & Reporting including all Hardware and Software for the same for Bridge Health Monitoring System on** **State of** (Bid reference No.) **Dated**

(hereinafter called the "Contract").

AND WHEREAS the Contract requires the Contractor to furnish an {Performance Security} for due and faithful performance of its obligations, under and in accordance with the Contract, during the {Installation Period/Operations and Maintenance Period} in a sum of Rs..... cr. (Rupees crore) (the "**Guarantee Amount**"¹⁴). AND WHEREAS we, through our branch at..... (the "**Bank**") have agreed to furnish this Bank Guarantee (hereinafter called the "**Guarantee**") by way of Performance Security.

NOW, THEREFORE, the Bank hereby, unconditionally and irrevocably, guarantees and affirms as follows:

1. The Bank hereby unconditionally and irrevocably guarantees the due and faithful performance of the Contractor's obligations during the {Installation Period/ Operations and Maintenance Period} under and in accordance with the Contract, and agrees and undertakes to pay to the Employer, upon its mere first written demand, and without any demur, reservation, recourse, contest or protest, and without any reference to the Contractor, such sum or sums up to an aggregate sum of the Guarantee Amount as the Employer shall claim, without the Employer being required to prove or to show grounds or reasons for its demand and/or for the sum specified therein.
2. A letter from the Employer, under the hand of an officer not below the rank of [.....,,], that the Contractor has committed default in the due and faithful performance of all or any of its obligations under and in accordance with the Contract shall be conclusive, final and binding on the Bank. The Bank further agrees that the Employer shall be the sole judge as to whether the Contractor is in default in due and faithful performance

of its obligations during and under the Contract and its decision that the Contractor is in default shall be final and binding on the Bank, notwithstanding any differences between the Employer and the Contractor, or any dispute between them pending before any court, tribunal, arbitrators or any other authority or body, or by the discharge of the Contractor for any reason whatsoever.

3. In order to give effect to this Guarantee, the Employer shall be entitled to act as if the Bank were the principal debtor and any change in the constitution of the Contractor and/or the Bank, whether by their absorption with any other body or corporation or otherwise, shall not in any way or manner affect the liability or obligation of the Bank under this Guarantee.
4. It shall not be necessary, and the Bank hereby waives any necessity, for the Employer to proceed against the Contractor before presenting to the Bank its demand under this Guarantee.
5. The Employer shall have the liberty, without affecting in any manner the liability of the Bank under this Guarantee, to vary at any time, the terms and conditions of the Contract or to extend the time or period for the compliance with, fulfillment and/ or performance of all or any of the obligations of the Contractor contained in the Contract or to postpone for any time, and from time to time, any of the rights and powers exercisable by the Employer against the Contractor, and either to enforce or forbear from enforcing any of the terms and conditions contained in the Contract and/or the securities available to the Employer, and the Bank shall not be released from its liability and obligation under these presents by any exercise by the Employer of the liberty with reference to the matters aforesaid or by reason of time being given to the Contractor or any other forbearance, indulgence, act or omission on the part of the Employer or of any other matter or thing whatsoever which under any law relating to sureties and guarantors would but for this provision have the effect of releasing the Bank from its liability and obligation under this Guarantee and the Bank hereby waives all of its rights under any such law.
6. This Guarantee is in addition to and not in substitution of any other guarantee or security now or which may hereafter be held by the Employer in respect of or relating to the Contract or for the fulfillment, compliance and/or performance of all or any of the obligations of the Contractor under the Contract.
7. Notwithstanding anything contained hereinbefore, the liability of the Bank under this Guarantee is restricted to the Guarantee Amount and this Guarantee will remain in force for the period specified in paragraph 8 below and unless a demand or claim in writing is made by the Employer on the Bank under this Guarantee all rights of the Employer under this Guarantee shall be forfeited and the Bank shall be relieved from its liabilities hereunder.
8. The Guarantee shall cease to be in force and effect on ****\$. Unless a demand or claim under this Guarantee is made in writing before expiry of the Guarantee, the Bank shall be discharged from its liabilities hereunder.
9. The Bank undertakes not to revoke this Guarantee during its currency, except with the previous express consent of the Employer in writing, and declares and warrants that it has the power to issue this Guarantee and the undersigned has full powers to do so on behalf of the Bank.
10. Any notice by way of request, demand or otherwise hereunder may be sent by post addressed to the Bank at its above referred branch, which shall be deemed to have been duly authorized to receive such notice and to effect payment thereof forthwith, and if sent by post it shall be deemed

to have been given at the time when it ought to have been delivered in due course of post and in proving such notice, when given by post, it shall be sufficient to prove that the envelope containing the notice was posted and a certificate signed by an officer of the Employer that the envelope was so posted shall be conclusive.

11. This Guarantee shall come into force with immediate effect and shall remain in force and effect for up to the date specified in paragraph 8 above or until it is released earlier by the Employer pursuant to the provisions of the Contract.
12. This Guarantee is subject to the Uniform Rules for Demand Guarantees (URDG) 2010 Revision, ICC Publication No. 758, except that the supporting statement under Article 15(a) is hereby excluded.

Signed and sealed this day of, 20..... at

SIGNED, SEALED AND DELIVERED

For and on behalf of the Bank by:

(Signature)

(Name)

(Designation)

(Code Number)

(Address)

§Insert date atleast 2 (two) years from the date of issuance of this Guarantee (in accordance with Conditions of Contract). The contractors can submit the BG for periods of two years at one time and keep on renewing the same till the DLP is over if they have problems in getting the BG in one go for the entire Operations and Maintenance Period.

BANK GUARANTEE FOR ADVANCE PAYMENT

To,

[name of Employer]

_____ [address of Employer]

_____ [name of Contractor]

Gentlemen :

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

of _____ [amount of Guarantee] * _____ [in words].

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

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

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

Letter of Acceptance

(Letterhead paper of the Employer)

_____ [date]

To:

_____ [Name and address of
the Contractor]

Dear Sirs,

This is to notify you that your Bid dated _____ for execution of
the _____

_____ [name of the contract and identification
number, as given in the Instructions to Bidders] for the Contract
Price of _____ Rupees.....(.....)
.....) [amount in words and figures], as
corrected and modified in accordance with the Instructions to Bidders¹ is hereby
accepted by our Agency.

We accept/do not accept that _____ be
appointed as the Adjudicator². You are hereby requested to furnish Performance
Security, in the form detailed in Para 31.1 of ITB for an amount
of Rs.....within 21 days of the receipt of this letter of acceptance
valid upto 28 days from the date of expiry of Defects Liability Period i.e. upto
..... and sign the contract, failing which action as stated in Para 31.2 of
ITB will be taken.

Yours faithfully,

Authorized Signature

Name and Title of Signatory

Name of Agency

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

2. To be used only if the Contractor disagrees in his Bid with the Adjudicator proposed by the Employer in the "Instructions to Bidders."

Issue of Notice to proceed with the work

(letterhead of the Employer)

(date)

To

_____ [Name and address of the
Contractor]

Dear Sirs:

Pursuant to your furnishing the requisite security as stipulated in ITBclause
31.1 and signing of the contract for the construction of _____

—

_____ at a Bid Price of

Rs.....

.

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

Yours
faithfully,

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

Agreement Form

Agreement

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

Whereas the Employer is desirous that the Contractor execute _____ (name and identification number of Contract) (hereinafter called "the Works") and the Employer has accepted the Bid by the contractor for the execution & completion of such Works and the remedying of any defects therein , at a cost of Rs _____ .

NOW THIS AGREEMENT WITNESSETH as follows :

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

- v) Contract Data
 - vi) Additional condition
 - vii) Drawings
 - viii) Bill of Quantities and
- ix. Any other documents listed in the Contract Data as forming part of the Contract.

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

The Common Seal
of _____

_____ was hereunto affixed in the presence of:

_____ Signed, Sealed and Delivered by the
said _____

in the presence of:

Binding Signature of Employer _

Binding Signature of
Contractor. _____

SECTION-9

DRAWINGS

General Arrangement Drawings

S. No.	Bridge Description	File Name
1.		
2.		
3.		
4.		
5.		

SECTION-10

DOCUMENTS TO BE FURNISHED BY BIDDER

As per SBD