BORDER ROADS ORGANISATION
MINISTRY OF DEFENCE
CHIEF ENGINEER PROJECT DANTAK

NAMEOFTHEWORK: - **"DESIGN AND CONSTRUCTION INCLUDING PLATE LOAD TEST OF18 MTR SPAN RCC T-BEAM BRIDGE AT KM 51.019 ON ROAD CONFLUENCE-HAA UNDER 19BRTF PROJECT DANTAK IN BHUTAN".**

Name of Contractor: _____

INDEX

AE(C)
ASW
For Accepting Officer

(Signature of the Contractor)

* Not attached, these documents can be seen in the office of Accepting Officer/Commander Task Force/OC during working hours.

Registered/AD

Headquarters
Chief Engineer
Project Dantak
PIN: 931708
C/O 99 APO

http : //www.bro.gov.in
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80563/ /E8 May 2022

M/s……..
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NAMEOFTHEWORK:-"DESIGN AND CONSTRUCTION INCLUDING PLATE LOAD TEST OF18 MTR SPAN RCC T-BEAM BRIDGE AT KM 51.019 ON ROAD CONFLUENCE-HAA UNDER 19BRTF PROJECT DANTAK IN BHUTAN",

DearSir(s),

Dear Sir (s),

1. A set of tender documents for the above work is forwarded herewith. Please note that tender will be received by the Accepting Officer at the office of the Chief Engineer (P) Dantak C/O 99 APO or at OIC liaison cell located at HQ 19 BRTF, Jaigaon, Pin-930019, Ph **8145087696/9970889254**upto**1700 hrs (BST) on 23 May 2022 and Technical Bid (Part-I) of the tender documents will be opened at 1530 hrs (BST) on the 27 May 2022**. Tender received after the due date and time will not be considered.

2. Tenderers or their duly authorized representative who have submitted their tenders and who wish to be present at the time of opening of tenders may attend the office of Accepting officer **Chief Engineer (P) Dantak C/O 99 APO** at the above mentioned time.

3. Tender documents may also be downloaded from CPP Portal www.eprocure.gov.in and printout is to be taken on A4 size paper. It is advisable that downloaded tender document preferably to be printed through laser printer only. Submission of photocopy of tender is not permitted. Bid security declaration, Integrity Pact duly signed on each page by the bidder(s) and undertaking given at Page No. 16 of tender must be delivered to the Chief Engineer Project along with the T Bid and if Bid security declaration and integrity pact is not submitted along with the T Bid, same shall be rejected by the Accepting officer.

4. Tendering procedure shall be single stage-two bid System and tender documents shall be prepared in two parts as under :-

Part-I ('Technical Bid' – 'T' Bid)

Part-II ('Price/commercial' – 'Q' Bid)

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5. **Part-I ('Technical Bid' – 'T' Bid)**

5.1 (a) The tender to be submitted (physically) by the bidder will be comprised of following documents: -

(i) Blank.

(ii) Bid security declaration by un-enlisted contractor and enlisted contractors who have submitted/not submitted standing security deposit.

(iii) Signed copy of all the Eligibility/Qualification documents required as per tender conditions given at Page No. 03 to Page No.11 of tender documents.

(iv) Signed copy of Integrity Pact.

(v) Signed copy of undertaking by tenderer given at Serial Page No. 16 of tender.

(b) Following documents will be deemed to be part of the contract during the time of acceptance of contract: -

(i) Part-I Technical Bid of the tender document

(ii) Notice Inviting Tender

(iii) Special Conditions of Contract

(iv) Particular/Technical Specifications including Drawings, if any

(v) Any other Amendment/errata to tender document

5.2 **Technical evaluation criteria**

5.2.1 If contractor is not enlisted with BRO or enlisted with BRO but has not submitted Standing Security Deposit, he should have submitted Bid security declaration.

5.2.2 All the pages of T-Bid should have been duly signed by the bidder/authorized representative having valid Power of Attorney.

6. **Eligibility Criteria**:- (A) Tenderers shall meet the following eligibility criteria for qualifying in Technical bid:-

(a) The tenderer should have working capital and/or credit facilities of at least 10% of the estimated cost of the work (Applicable only for non – enlisted Contractors)

6.1 **Experience**: -

Tenderer should have successfully completed or substantially completed with any Govt agencies/PSU/Municipal Corporation/local Govt bodies

three similar works costing not less than the amount equal to 40% of estimated cost of work or two similar works costing not less than the amount equal to 50% of estimated cost of work or one similar work costing not less than the amount equal to 80% of estimated cost of work in last seven & current financial years.

Similar works means construction of minor/major bridge work.

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Notes: -

1. Substantially completed works means those works which are 90% completed on the

date of submission (i.e. gross value of work done up to the last date of submission Is 90% or more of the original contract price) and continuing satisfactorily.

2. Tenderer shaII submit list of work executed in the past 7 years in their letter head duly signed by the proprietor/partner/director of the firm in the proforma contained in Clause 8 .1

3. Completion cost of works shall be brought to common base date of receipt of tender as per following formula: -

Completion cost X (1 +Period in days from date of completion to date of receipt of tender/365 days) X 0.10)

6.2 Available Bid Capacity (ABC)

6.2.1 ABC as per formula given here-in-after should be more than the estimated cost of work given in NIT. Tenderers shall calculate ABC and submit details duly signed on letter head.

Available Bid Capacity = 2.5 x A x N – B

A.- Maximum value of all Civil Engineering works in any one year during the last 5 financial years (Updated to the current price level with enhancement factor as given below) supported with duly certified Balance Sheets/ Certificates from Chartered Accountant.

Year	Multiplying factor
Last first year	1.10
Last second year	1.20
Last third year	1.30
Last fourth year	1.40
Last fifth year	1.50

N- Number of years prescribed for completion of work for which the current bid is invited.

B- Value of the balance ongoing works to be executed in period N.

6.2.2 The tenderers shall indicate actual figures of completion cost of work and value of A without any enhancement as stated above.

6.2.3 The tenderer may be accorded an opportunity to clarify or modify his qualification documents, if necessary, with respect to any rectifiable defects through option of short fall in tender documents to be submitted by the bidder. The tenderer will respond in not more than 07 days of issuance of the clarification letter through shortfall option failing which his tender is liable to be rejected.

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6.3 Vehicles, Equipments and Plants (VEP) :

6.3.1 Tenderer should own or have assured access (through hire/lease/purchase agreement/ other commercial means) to the requisite Equipment, Plants and vehicles in good working condition (complete usage life not more than 7 years except stone crusher) as required to complete the work.

6.3.2 Tenderer shall indicate source of requisite Equipment, Plants and Vehicles along with vintage required for execution of work in following format-.

(i) Item

(ii) Year of Manufacture

(iii) Source from where to be arranged (Owned/ lease etc.)

(iv) Location presently deployed.

(v) Based on known commitments, whether will be available for use in the proposed contract.

(vi) Copy of documentary support of ownership/assured access to the satisfaction of the Accepting Officer.

Note :- Tenderer should own critical VEP as per specific requirement of the work as decided/specified by the Tender issuing authority in the tender.

6.4 Performance and other requirements:

(a) There should not be poor/slow progress in running work. (If yes, submit details and reasons of delay to check that these are not attributable to him or am beyond his control.)

(b) There are no serious defect observed in works which stand unrectified (If yes submit details and reasons).

(c) There are no Cancelled/abandoned contracts in which Govt. unrealized recoveries exist(If yes submit details and reasons).

(d) He/They have not been blacklisted by any Govt. Deptt(If yes submit details and reasons).

(e) There are no any Govt. dues, outstanding against the firm (If yes submit details and reasons).

(f) Tenderer should not be habitual litigant i.e. having more than 3 unsuccessful arbitration/court cases during last years in which his views/claims substantially rejected.

(g) Proprietor/partners/directors of firm are not involved in anti national/social activities and should have neither been convicted nor should any proceedings be pending in court for such activities.

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(h) Firm should have been considered capable of taking more load in work load return circulated by DGBR. In case the firm is not considered capable for taking more work load due to unsatisfactory performance in the running works, in the prevailing report circulated by DGBR their technical bid shall be rejected.

6.5 Disqualification

6.5.1 Even though the tenderers meet the above criteria, they are liable to be disqualified if they have made misleading or false information in bidding documents submitted.

7. JOINT VENTURE IN BRO WORKS (Except for EPC Tenders)

7.1 Two firms are permitted to bid for the tender based on Joint Venture agreement between them. Joint Venture (JV) shall not comprise more than two firms (called parties of JV). The format of agreement at Annexure 'I'. The JV shall be considered as un-enlisted contractor. The JV shall submit Earnest Money Deposit for all tenders and individual Security deposit as per instructions, in contract is awarded.

7.2. JV shall be allowed for the following works: -

(a) Road work with estimated cost more than Rs.50crore.

(b) Bridge work and via duct with estimated cost more than Rs.20 crores.

(c) Tunnel Works of any value.

(d) Runway Work any value.

(e) PEB structure works of any value

(f) Solar Power works of any value

(g) Works for specialist E/M services with estimated cost more thanR.s 20 crore.

(h) Consultancy Work for Preparation of DPR for Bridges Tunnels & EPC roads with estimated Cost more than Rs.5 Crore

j) Works other than the types at (a) to (h) above with estimated cost more than Rs.50 crore

7.3. No JV shall be allowed for furniture works. No JV shall be allowed to participate 1f either or both the parties are banned/adversely remarked in WLR of BRO or debarred from tendering by any authority. Foreign Companies shall not be permitted to participate in JV except in case of tunnel project

7.4. Security clearance of Foreign Companies having foreign citizenship Directors shall dealt with as prescribed under subsequent para.

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7.5. (a) Indian Companies having Director (s) of foreign origin and Indian Companies having Director (s) of Indian origin but residing abroad / having foreign citizenship shall be permitted to participate in JV. However, security clearance in such cases shall be obtained by following procedure laid down by Ministry of Home Affairs vide their letter No 11/20034/2013-1S II dt 30 Jun 2015 and amendment there if vide OM No 11/20034/2013-11 dt 09 Dec 2015. These letters, being classified, are not being shared. The case for security clearance shall be processed to HQ DGBR for taking up matter with concerned authorities.

(i) Case for security clearance shall be processed to HQ DGBR on PRIORITY after opening T-bid (Cover-1). Further processing of tender to open Finance Bid (Cover 2) shall not be held up awaiting receipt of security clearance. However, if the JV requiring security clearance of Director(s) becomes L1, the tender shall be accepted only on receipt of security clearance. For this, the Accepting officer will pursue the security clearance vigorously.

(j) For runway tenders, all other policies issued vide E-in-C's Branch letter No. A/37696/OSDPL/POL/ E2W (PPC) dt 15 May 2015 as amended vide their letter even No dt 14 Mar 2017 pertaining to experience, nature of works executed, requirement of tools. plants and machinery, financial turnover, Available Bid Capacity etc shall be followed.

7.6 A valid agreement shall exist between the parties of JV defining clearly the role, responsibility and scope of work of each party, percentage share of each party along with nomination of leader (lead Party) for the purpose of this work and a confirmation that the parties of the JV are jointly and severally responsible.

7.7 JV as a single unit or each party of the JV shall have Permanent Account Number (PAN) and GSTIN. However, if the contract is awarded to the JV, then PAN & GSTIN shall be obtained by the JV as single unit.

7.8 The JV shall have two parties. The lead party of the JV shall meet minimum 60% or the percentage of share in the JV (whichever is higher) of the qualifying criteria pertaining to (a) past experience of completed works, (b) Average Annual Turnover, (c) Bank Solvency/ FinanciaIly Sound for engagement and (d) Working Capital. Both the parties combined shall meet minimum 120% of the above qualifying criteria The party other than the lead party shall meet minimum 30% of the above qualifying criteria.

7.9 Both the Parties of JV shall jointly possess the required T&P, machinery and engineering/ supervisory staff. T&P can be either on ownership basis or lease hold as stipulated in NIT/ tender documents and documentary proof of the same shall be submitted other qualification criteria shall be meet fully/ Jointly by both the parties of JV or as a single unit of JV.

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7.1.0 In the Residual Bid Capacity (in the formula 2.5 xAxN-B, where A= Maximum turnover in last five financial years, N= Period of completion of contracted (tendered) work (in years calculated till two decimal places) and B= Value of balance work in all Govt & Private works), in respect of a JV, values of A and B shall be the sum total of the respective figures of both the parties.

7.1.1 Similarly when a Firm/ Contractor working in JV applies for tender (s) in his own capacity (i.e. independently), the part value of A and B of his JV work (s) in proportion to his percentage share in JV shall also be considered against the tender applied in his own capacity and capacity and hence these details shall be submitted by the Firm/ Contractor in his T- bid.

7.1.2 JV concluded upto the date of bid submission are permitted to apply. Copy of JV should be uploaded. The Department reserves the right to verify the particulars furnished by the applicant independently. If any information furnished by the applicant JV is found incorrect and / or misleading and/or false representation and/or deliberately suppressed information, at a later stage, the JV and both the parties shall be liable to be debarred from tendering/taking up of any work in BRO.

7.1.3 Party/parties will not be allowed to bid for the same tender in their independent capacity as well as under JV. Also, no party will be allowed to bid for the same tender under multiple JVs. In case of violation (party/parties bidding independently as well as under JV for the same tender, party/parties bidding for the same tender under multiple JVs), the bid of the party/parties concerned as well as the bid(s) of the related JV(s) shall not be opened (i.e. shall not be qualified in T bid Cover '1').

7.1.4 The lead party shall attend all progress review meetings and shall be answerable to all issues relating to the project.

7.1.5 For any of the defaults as under of the JV, administrative action shall be taken against both the parties of the JV: -

(a) In case of non-submission of physical original documents of cost of tender, EMD- Barring from bidding for six months.

(b) Due to default in performance of contract etc.- Administrative actions as per existing instructions

7.1.6 Any unrealized recovery from JV shall be recovered proportionately from the parties in proportion to their percentage share in the JV. If it is not possible to recover proportionate share (partly/fully) form one party, it shall be recovered from other party.

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8 List & format of eligibility documents to be attached alongwith Part-I of tender documents to prove eligibility: -

8.1 List of works completed/substantially completed in "last seven and current" financial years and ongoing works in following format: -

Name of work & CA No	Brief scope of work	Name & address of employer /client	Accepted contract amount	Date of commencement of work	Original date of completion	Extended date of completion	Actual date of completion /present progress	Cost of completed work	Cost of balance Work	Remarks explaining reasons of delay if any

Note : Works proving eligibility criteria of experience shall be highlighted and performance certificate from client in respect of these works shall be submitted.

8.2 Available Bid Capacity:

For -A :- Balance sheets/certificates from Chartered Accountant indicating annual turnover of Civil Engineering works constructed in last 5 years.

For-B: - Contractors shall submit details of ongoing works as per format stated in Clause 8.1 of above.

Tenderers shall calculate ABC and submit details duly signed.

8.3 Equipments, Plants and Vehicles:

(a) Tenderer shall indicate source of requisite Equipment, Plants and vehicles in good working condition required for execution of work in following format:-

S/No	Item	Year of manufacture	Source from where to be arranged (Owned/Leased)	Location presently deployed	Whether will be available for use in the present contract

(b)Copy of documentary support of ownership/assured access to the satisfaction of the Accepting officer is required to be enclosed.

8.4. **Integrity Pact (IP)** (applicable for tender with estimated cost of **Rs. 5.00 Crore** and above for all contract works and in tender for procurement services, stores, equipments & plants with estimated cost of **Rs. 1.00 Crore** and above).

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IP duly signed by Accepting Officer/ authorized officer has been uploaded along with this tender as **Annx-II** same shall be signed by bidder(s) on each page and scanned copy shall be submitted as part of Technical bid (cover-1) and original IP duly signed on each page shall be forwarded by post along with tender fee and EMD (if applicable). IP will be an integral part of the Contract and both parties are bound by its provision.

8.5 Performance and other requirements.

8.5.1 Tenderer shall submit undertaking that:-

(a) There is no poor/slow progress in running works. (If yes, he will submit details and reasons of delay to check that these are not attributable to him or are beyond his control).

(b) There are no serious defects observed in works which stand un-rectified (If yes, he will submit details and reasons).

(c) There are no cancelled/abandoned contracts in which Govt. unrealized recoveries exist (If yes, he will submit details and reasons).

(d) He/They have not been blacklisted by any Govt. Deptt (If yes, he will submit details and reasons).

(e) There are no any Govt. dues outstanding against the firm (If yes, he will submit details and reasons).

(f) Proprietor/partners/directors of firm are not involved in anti national/social activities and have neither been convicted nor are any proceedings pending in court for such activities (If yes, he will submit details).

8.5.2 Tenderer shall submit information of all arbitration/court cases decided during last five & current financial years and also presently in progress as per following format: -

(a) Name and address of employer.

(b) Cause of dispute.

(c) Amount involved.

(d) Brief of Court judgment/arbitration award (if published) otherwise present progress.

8.6 **Working capital:-**

Copy of Latest balance sheet/income tax return for working capital and/or Banker's certificate for credit facilities. If necessary Department will make inquiries with the tenderer's Banker.

8.7 Constitution of firm along with copy of partnership deed (in case of partnership firms) and memorandum of articles and association (in case of limited companies).

8.8 In case of unenlisted firms, Copies of Passport of proprietor/partners/directors (if available). Present address & photograph for verification of character and antecedents of proprietor/partners/directors from police authorities.

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8.9 Copies of PAN Card of proprietor/partners/directors.

8.10 Lowest bidder if unenlisted firm in BRO (if his offer is decided for acceptance) will be required to fill enlistment form for provisional enlistment.

Notes:-

1 Documents as listed at clause 8.6 to 8.8 above are exempted for tenderers enlisted with BRO in any class.

2 Affidavits shall be submitted on Non-Judicial stamp papers of appropriate values duly attested by the Magistrate/Notary Public.

3 Photocopies of documents shall be attested by Gazetted officer/Public notary and also self attested.

4 The. bidder should meet all the technical evaluation criteria indicated in the biddocuments in order that the bid is considered to be technically responsive and the bidder qualifying to have its Financial Bid opened.

9. Part-II ('Price/commercial' – 'Q' Bid)

9.1 Part-II 'Price/commercial Bid' – 'Q' Bid) shall comprise of the following: -

(i) Schedule- 'A' Notes.

(ii) Schedule 'A' (to be quoted by Bidder)

(iii) Schedules 'B', 'C', & 'D'.

(iv) Tender page

10 **Q bid evaluation**

(i) Arithmetical corrections shall be made as per General condition of contracts **6(A)(A) of IAFW-2249.**

(ii) Commercial bids will be reviewed to ensure that the figures indicated therein are consistent with the details of the corresponding Technical bids.

(iii) For the purpose of evaluation "cost" shall be inclusive of all taxes and duties.

(iv) Cost of all items of Schedule A shall be totaled and the bidder who has quoted lowest total cost in Schedule A (L-1) shall be considered successful bidder and all other bidders shall be considered unsuccessful. Offer of successful bidder (L-1) shall only be considered for acceptance. If L-1 backs out, re-tendering shall be resorted in a fair and transparent manner.

10.1 The **Chief Engineer Project Dantak** will be Accepting Officer here-in-after referred to as such for the purpose of this contract.

10.2 If tenderers desire that any condition or stipulation given in the tender documents is to be modified or deleted, they may submit their comments/suggestions before last working date of clarification as shown in critical date details in subject tender ID for consideration by the Deptt for issue of corrigendum/amendments to tender documents. If Deptt considers

comments/ suggestions suitable, corrigendum/amendments to tender documents shall be issued and also uploaded on E- tendering Portal. If Deptt does not consider comments/suggestion suitable, corrigendum/amendments to tender documents shall not be issued/uploaded on E- tendering Portal and tenderers shall quote strictly complying with the various provisions given in the tender documents. Any tender who stipulates any alterations to any of the conditions/provisions laid down in tender documents (including corrigendum/amendments) or which proposes any other conditions of any description whatsoever is liable to be rejected.

10.3 The tenderers are advised to visit the work site to acquaint themselves of working and site conditions, before submitting their tender. The submission of tender by a person implies that he has read this tender forwarding letter, the conditions of contract and has made himself aware of the scope and specifications of the work to be done and of the conditions and other factors, site conditions, taxes & levies prevailing etc which may affect the quotation and execution of the work.

10.4 Tenderer must be very careful to deliver a bonafide tender, failing which the tenders are liable to be rejected. Tenderers are, therefore, advised to ensure that their tender must satisfy each and every condition laid down in the tender documents.

10.5 Your attention is drawn to the Indian Official Secret Act-1923 **(XIX** of 1923) as amended up to date particularly section 5 thereof.

11 **Earnest Money** :-

(a) Earnest money is not required to be attached with tender by the enlisted contractor with BRO (term “enlisted contractor: used in tender documents means “enlisted contractor with BRO”) who have submitted standing security but same is required from un-enlisted contractor/enlisted contractors with BRO, who have not submitted standing security deposit.

(b) Un-enlisted contractors with BRO/enlisted contractors with BRO, who have not submitted standing security deposit will submit the tender accompanied with Earnest Money amounting to **Rs 3,48,740/-** (**Rupees Three lacs forty eight thousand seven hundred forty only**)in the form of Deposit at call Receipt/Term Deposit Receipt/Special Term Deposit Receipt and Bank Guarantee issued in favour of Chief Engineer (P) Dantak, C/O 99 APO payable at **SBI Hasimara (WB)** by Nationalized/Scheduled Bank. Technical bid not accompanied with earnest money will not be considered for opening of financial bid. The amount of this receipt should be basic amount and not their maturity value. Any deposit lying with the department in any form against any other tender and/or contract shall not be considered for adjustment as the earnest money against the tender. Any tender not accompanied with the earnest money in the form as indicated here-in-before or accompanied with any letter/communication containing any request for adjustment of any other deposit as earnest money shall be treated as non bonafied tender.

(c) Earnest money shall be returned to unsuccessful bidders (other than L-1) after opening of Financial Bids and to successful (L-1) bidder after receipt of security deposit.

(d) However, MSME registered firm should be exempted for submission of EMD

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12. **Performance security** :-

12.1 Within 28 days of receipt of the letter of acceptance, the successful contractor shall deliver to the accepting Officer a Performance Security for an amount equivalent to **10%(Amended vide HQ DGBR letter No. 24556/सी.स.म./दन्तक/सामान्य/92/ई8 dated 25 Nov 2021)** of the Contract sum as laid down under condition 19 of IAFW-2249 / Condition 14 A of IAFW -1815 Z (General Conditions of Contract).

12.2 Failure of the successful contractor to comply with the requirement of sub clause 12.1 shall constitute sufficient grounds for cancellation of award of work and forfeiture of the Earnest Money. In case of BRO enlisted contractor amount equal to the Earnest Money stipulated in the Notice Inviting Tender , shall be notified to the tenderer for depositing the amount through MRO, issue of tender to such tenderers shall remain suspended till the aforesaid amount equal to the earnest Money is deposited in Government Treasury.

12.3 In the event of contract being cancelled, under Condition 52, 53 & 54 of IAFW-2249 or under conditions 26, 27 & 28 of IAFW -1815Z General Conditions of Contracts the Performance Security & retention money as per last RAR shall be forfeited. ALL T&P and material of contra tor lying at site shall be confiscated by the Government and shall be absolutely at the disposal of the President of India and no compensation whatsoever shall be allowed by department.

12.4 Form for Bank Guarantee Bond against Performance Security Deposit shall be as per **Annx-III**.

12.5 The period of validity of the Bank Guarantee Bond against Performance Security shall be upto and including the scheduled date of expiry of Defects Liability Period.

13 The Accepting Officer reserves the right to accept a tender submitted by a Public Undertaking, giving a purchase preference over other tender(s) as are admissible under the Government Policy. No claim for any compensation or otherwise shall be admissible to such tenders whose tenders may be rejected on account of the said policy.

14. The tender shall remain open for acceptance for a period of 60 days from bid submission end date.

15. On acceptance of tender, the name of authorized representative (s) of the contractors who would be responsible for taking instructions from Engineer-in-Charge or its authorized representative shall be intimated by the contractor within 7 days of issue of Acceptance letters.

16. **Revision/Modification of quoted Price**

(a) In case the tenderer has to revise /modify /withdraw his quoted rates / offer after it is uploaded in e-tendering portal he may do so on before bid submission end date & time in in e-tendering portal only. Any revision/ modification in offer / withdrawal of offer in the form of an open letter after bid submission end date & time and the same shall be considered as revocation of offer and shall not be taken into account, while considering his originally quoted offer.

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17. **Revocation of offer**

In the event of lowest tenderer revokes his offer or revise his rates upward (which will be treated as revocation of offer), after bid submission end date and before expiry of original validity period stipulated in tender documents, the earnest money deposited by him shall be forfeited. In case of BRO enlisted contractors, the amount equal to the earnest money stipulated in the Notice Tender, shall be notified to the tenderer for depositing the amount through MRO, failing which the amount shall be recovered from any payment due to such contractor or shall be adjusted from the Standing Security Deposit. In addition, L-1 tenderer revoking offer and his related firms shall not be issued the tender in second or subsequent calls of subject work.

18. **Tenderers are requested to quote rates both in figure and words against each item of Schedule 'A' and extend the amount in Schedule 'A'.**

19. **All the tender documents (Part-I & Part-II) shall be submitted together at one stage but placed in separate sealed envelopes (supplied by the tenderer) duly marked Part I and Part II as stated above**.All the two envelopes containing Part I and Part II duly sealed shall be put in one large size envelope (cloth lined, outer cover to be supplied by the tenderer). This outer cover shall indicate name of work, name of tenderer, last date and time of receipt of tender prominently.

20. **The tender documents (Part-I and Part-II) should be submitted/should be dropped in Tender Box kept at the office of Accepting Officer HQ CE (P) Dantak, C/O 99 APO before the date and time fixed for receipt of tender**. The tender received after due date and time shall not be considered for acceptance. BRO shall not be responsible for any postal or other delay and shall not take care to ensure the submission of tender at place and time fixed for receipt of tender.

21. Tender shall be opened immediately after time indicated in Para 1 herein before in the presence of the tenderers or their authorized representative whoever wish to be present. Part-I only shall be opened first on **27 May 2022 at 1530 hrs (BST)**. Part II (Priced bid) shall not be opened. Part II (Price bid) envelopes shall be signed by the tender opening officers and some bidders present and shall be put in separate large envelope and sealed by the opening officers. Large envelop shall also be signed by the tender opening officers and some bidders present. This large size envelope containing unopened price bids shall be kept in safe custody of the officer nominated by the Accepting officer for this purpose. Part I (Technical Bid) will be evaluated as per technical evaluation criteria given in the tender documents. Unqualified tenders will also be informed and their Part II (Price Bid) shall be returned unopened separately. The date of opening of price bids will be intimated separately to the qualified firms and the Part II (Priced Bid as sealed in large size envelope) will be opened on the scheduled date in the presence of such tenderers who choose to be present and the amounts quoted by the tenderers shall be read out by the opening officer(s) to the tenderers.

Yours faithfully

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For Accepting Officer

(Signature of the Contractor)

Enclosures :Tender Documents including drawings

ANNEXURE ·III

PERFORMANCE GUARANTEE BOND

1. Inconsideration of the President of India (hereinafter called "the government") having agreed to **exempt……..**(hereinafter called "the said Contractor's) from the demand. under the terms and conditions of an Agreement dated.....Made between…….. .....and……..for……(hereinafter called "the said Agreement") of Security deposit for the due fulfilment by the said contractors of the terms and conditions contained in the said Agreement on production of a Bank Guarantee forRs .....(Rupees…….only)we……. ……..bank Ltd (hereinafter referred as the Bank) do hereby undertake to pay to the Government an amount not exceeding. Rs ……Against any loss or damage caused to or would be caused to or suffered by the Government, by reason of any breach by the said contractor(s) of any the terms or conditions contained in the said Agreement.

2. We……. Bank Ltd. Do hereby undertake to pay the amounts due and payable under this guarantee without any demur, merely on a demand from the Government, stating that the amount claimed is due by way of loss or damage caused to or would be caused to or suffered by the Government by reason of any breach by the said Contractor(s) of any of the terms or conditions contained in the said Agreement or by reason of the contractor's (s) failure to perform the said Agreement. Any such demand made on the Bank shall be conclusive as regards the amount due and payable by the Bank under this guarantee shall be restricted to an amount not exceeding Rs.. ……

3. We……. Bank Ltd. Further agree that guarantee.: herein contained shall remain in full force and effect during the period that would be taken for the performance of the said Agreement and that it shall continue to be enforceable till all the dues of the Government under or by the virtue of the said Agreement have been fully paid and its claims satisfied or discharged or till... .....(Office/ Department). Ministry of…… Certifies that the terms and conditions of the said Agreement have been fully and properly carried out by the said Contractor(s) and accordingly discharges the guarantee. Unless a demand or claim under this guarantee is made to us in writing on a before the .....we shall be discharged from all liability: under this guarantee thereafter.

4. We……. Bank Ltd. Further agree with the Government that the Government shall have the fullest liberty without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said Agreement or to extend time of performance by the said Contractor(s) from time to time: or to postpone for any time or from time to time any of the powers exercisable by the Government against the said contractor(s) and to forbear or enforce any of the terms and conditions relating to the said agreement and we shall not be relieved from our liability by reason of any such variation or extension being granted to the said contractor(s) or for any forbearance act or omission on the part of Government or any indulgence by the Government to the said contractor(s) or any such matter or thing whatsoever which under the law relating to sureties would but for this provision have effect of so relieving us.

5. We……. Bank Ltd. lastly undertake not to revoke this guarantee during its currency except with the previous consent of the Government in writing.

AE(C)
ASW
For Accepting Officer

(Signature of the Contractor)

Appendix 'A'
(Ref Para-16 (f) of Forwarding Letter)

UNDERTAKING BY AUTHORISED SIGNATORY

I, the undersigned do hereby under take that our firm M/s _____ _____agree to abide by Terms and Conditions of subject Tender for **"DESIGN AND CONSTRUCTION INCLUDING PLATE LOAD TEST OF18 MTR SPAN RCC T-BEAM BRIDGE AT KM 51.019 ON ROAD CONFLUENCE-HAA UNDER 19BRTF PROJECT DANTAK IN BHUTAN",** from Page No. 1 to 191 as advertised on the central public procurement portal site http://eprocure.gov.in/eprocure/app, BRO websitewww.bro.gov.in and CAB website www.cab.org.btin and it shall be binding on us and may be accepted at any time before the expiration of stipulated tender conditions.

_____
(Signed by an Authorized Rep of the firm)

_____
Title of Rep

_____
Name of Firm

_____
Date

AE(C)
ASW
For Accepting Officer

(Signature of the Contractor)

[In lieu of IAFW-1779-A (to be use in conjunction with General Conditions Of Contract based on and IAFW-2249) (1989 Print)]

CHIEF ENGINEER PROJECT DANTAK

http : //www.gref.gov.in
http : //www.bro.gov.in
E-mail : brodtk@gmail.com
Tele : **009752 - 351082/351086/351088**
Fax : **009752 – 351285**

Headquarters
Chief Engineer
Project Dantak
PIN : 931708
C/O 99 APO

80563/ /E8 May 2022

NAME OF WORK:	**DESIGN AND CONSTRUCTION INCLUDING PLATE LOAD TEST OF18 MTR SPAN RCC T-BEAM BRIDGE AT KM 51.019 ON ROAD CONFLUENCE-HAA UNDER 19BRTF PROJECT DANTAK IN BHUTAN**

Dear Sir (s),

Messrs/Mr _____ of _____ is/are hereby authorised to tender for the above work. The tender is to be delivered at the Office of the Chief Engineer, Project DANTAK, PIN 931708, C/O 99 APO or at OIC liaison cell located at HQ 19 BRTF, Jaigaon, Pin-930019, Ph **8145087696/9970889254** upto **1700Hrs(BST) on 23 May 2022** addressed to Headquarters, Chief Engineer, Project Dantak, PIN – 931708, C/o 99 APO "**DESIGN AND CONSTRUCTION INCLUDING PLATE LOAD TEST OF18 MTR SPAN RCC T-BEAM BRIDGE AT KM 51.019 ON ROAD CONFLUENCE-HAA UNDER 19BRTF PROJECT DANTAK IN BHUTAN**" to be opened on **27 May 2022 at 1530 Hrs (BST).**

All documents must be returned whether or not a tender has been submitted.

Any correction concerning this tender should be addressed as indicated at the top of this sheet, quoting the reference as given.

THE PRESIDENT OF INDIA DOES NOT BIND HIMSELF TO ACCEPT THE LOWEST TENDER OR ANY TENDER

AE(C)
ASW
For Accepting Officer

(Signature of the Contractor)

BORDER ROADS ORGANISATION
CHIEF ENGINEER PROJECT DANTAK
NOTICE INVITING TENDER- 08 /2020-21

1. A sealed tender is invited for "**DESIGN AND CONSTRUCTION INCLUDING PLATE LOAD TEST OF18 MTR SPAN RCC T-BEAM BRIDGE AT KM 51.019 ON ROAD CONFLUENCE-HAA UNDER 19BRTF PROJECT DANTAK IN BHUTAN.**"

2. Tender documents may be downloaded from central public procurement portal site http://eprocure.gov.in/eprocure/app, BRO websitewww.bro.gov.in and CAB websitewww.cab.org.btas per the schedule as given in **CRITICAL DATE SHEET** as under and p0rintout is to be taken on A4 size paper. It is advisable that the downloaded tender document to be printed through laser printer preferably. Submission of photocopy of tender is not permitted.

CRITICAL DATE SHEET

01	Publishing date & time on CPPP website	10 May 2022 at 1600 Hrs
02	Bid document download start date	10 May 2022 at 1630 Hrs
03	Clarification start date & time (Pre Bid queries)	10 May 2022 at 1630 Hrs
04	Clarification end date & time	20 May 2022 at 1100 Hrs
05	Bid submission start date & time	11 May 2022 at 1100 Hrs
06	Bid submission end date & time	23 May 2022 at 1700 Hrs
07	Opening date & time of Technical bid	27 May 2022 at 1530 Hrs
08	Opening date of Financial bid	Will be intimated later

3. The estimated cost of work is **Rs 273.74 Lacs (Rupees Two Crore Seventy Three Lacs Seventy Four Thousand only)** approximately or as subsequently amended in tender documents and uploaded in central public procurement portal site http://eprocure.gov.in/eprocure/app,BRO websitewww.bro.gov.in and CAB website www.cab.org.bt. This estimate, however, is not a guarantee and is merely given as a rough guide, and if work costs more or less, tenderer shall have no claim on that account of what so ever nature.

4. The tender shall be based on Specifications, **General Conditions of Contracts IAFW-2249 and item rate contract form based on IAFW 1779-A with Schedule "A"** (List of works) to be priced by tenderers.

5. Not more than one tender shall be submitted by one contractor or contractors having business relationship. Under no circumstances will a father or his son(s) or other close relations who have business relationship with one another (i.e. when one or more partner(s)/director(s) are common), be allowed to tender for the same contract as separate competitors. A breach of this condition will render the tenders of both the parties liable to rejection.

6. The work is to be completed within **365 days** or as subsequently amended in tender documents or uploaded on central public procurement portal site http://eprocure.gov.in/eprocure/app,BRO website www.bro.gov.in and CAB website www.cab.org.btin accordance with the phasing, if any, indicated in the tender from the date of handing over the site, which will be generally within one month from the date of issue of Acceptance letter.

7. Tender (in full) either downloaded from CPP Portal website will be received at HQ CE (P) Dantak , C/o 99 APO or at OIC liaison cell located at HQ 19 BRTF, Jaigaon, Pin-930019, Ph **8145087696/9970889254** at **1700 hrs (BST) on 23 May 2022**. Part - I un-priced bid will be opened on **27 May 2022** at **1530 hrs (BST)**. Tender received after due date shall not be considered for opening and no reason for delay or claim whatsoever shall be entertained.

AE(C)
ASW
For Accepting Officer

(Signature of the Contractor)

NOTICE INVITING TENDER (CONTD)

8. **The Chief Engineer (P) Dantak**, **C/O 99 APOwill be Accepting Officer** hereinafter, referred to as such for the purpose of this contract.

9. Intending tenderers are advised to visit central public procurement portal site http://eprocure.gov.in/eprocure/app, BRO websitewww.bro.gov.in and CAB websitewww.cab.org.btthree days prior to date of opening of tender for any corrigendum/addendum/amendment.

10. (a) **Earnest money** is not required to be attached with tender by the enlisted contractor with BRO (term "enlisted contractor" used in tender documents means "enlisted contractor with BRO") who have submitted standing security but same is required from unenlisted contractor/enlisted contractors with BRO, who have not submitted standing security deposit.
(b) Unenlisted contractors with BRO/enlisted contractors with BRO, who have not submitted standing security deposit will submit the tender accompanied with Earnest Money amounting to **Rs 3,48,740/- (Rupees Three Lakhs Forty Eight Thousand Seven hundred Forty only)** in the form of Deposit at call receipt/Term deposit receipt/Special Term deposit receipt issued in favour of Chief Engineer (P) Dantak C/O 99 APO by Nationalised/ Scheduled Bank. Tender not accompanied with earnest money will not be considered for acceptance. The amount of this receipt should be basic amount and not their maturity value. Any deposit lying with the department in any form against any other tender and/or contract shall not be considered for adjustment as the earnest money in the form as indicated here-in –before or accompanied with any letter/communication containing any request for adjustment of any other deposit as earnest money shall be treated as non bonafied tender.
(c) Earnest money shall be returned to unsuccessful bidder (other than L-1) after opening of price bids and to successful(L-1) bidder after receipt of security deposit.
(d) However, MSME registered firm should be exempted for submission of EMD

11. ***Successful Bidder (L-1) shall deposit to Accepting Officer a Performance Security for an amount of 10% of contract sum (Amended vide HQ DGBR letter No. 24556/सी.स.म./दन्तक/सामान्य/92/ई8 dated 25 Nov 2021) in the shape of Bank Guarantee or FDR within 28 days of issue of LoA.***

12. Copies of drawings (if applicable) and other documents pertaining to the work (signed for the purpose of identification by the Accepting Officer or his accredited representative) and sample of materials and stores to be supplied by the contractor will be opened for inspection at the following locations: -

Chief Engineer (P) Dantak, C/o 99 APO

13. The tenderer are advised to visit the site by making prior appointment with Commander, 19 Border Roads Task Force, C/o 99 APO sufficiently in advance (Telephone No of Commander,19 BRTF at **009755- 252201)**. A tenderer shall be deemed to have full knowledge of all relevant documents, local conditions, sites etc. For further details tenderer may contact telephonically if required, SW, Project DANTAK at **009752 – 351082/351086** during office hours.

14. A tenderer shall be deemed to have full knowledge of all relevant documents, samples, site etc whether he has inspected them or not.

15. Any qualification documents/tender which stipulates any alterations to any of the conditions laid down or proposes any other conditions of any description what so ever, is liable to be rejected.

16. The Accepting Officer reserves his right to accept a tender submitted by a public undertaking, giving a price preference over other tender (s) which may be lower, as are admissible under the Govt. policy. No claim for any compensation or otherwise shall be admissible from such tenderer (s) whose tenders may be rejected on account of the said policy.

17. **The submission of tender by a tenderer implies that he had read this notice and conditions of contract and has made himself aware of the scope and specifications of the work to be done and of the conditions rates at which stores, tools and plants etc will be issued to him, local conditions and other factors bearing on the execution of the work.**

AE(C)
ASW
For Accepting Officer

(Signature of the Contractor)

NOTICE INVITING TENDER (CONTD)

18. Blank.

19. The hard copy of original instruments in respect of earnest money, under taking regarding acceptance of tender conditions, Enlistment letter if firm is enlisted in BRO, EPFO, Registration letter, GST Registration and any other document required to be submitted with respect to various conditions mentioned in the tender documents should be attached with tender documents

20. Blank.

21. Blank.

22. Blank.

23. In case of rejection of technical bid, contractor may appeal to next higher engineer authority i.e. HQ DGBR on email bro-e8@nic.inwith copy to the Accepting Officer i.e. CE on email bro-dtk@nic.in against rejection within 05 days from the date of publishing of result of technical bid qualification on CPP Portal whose decision shall be final and binding. If the appeal is not made within this period, the bidder shall forfeit his right of appeal against rejection of his technical bid. Any appeal received after 05 days of such publication of result shall not be entertained under any circumstances. The next higher engineering authority shall preferably try to resolve the issue within 05 days of such representation. However, contractor/bidder shall not be entitled for any compensation whatsoever on account of rejection of technical bid.

24. For any further particulars, you may refer central public procurement portal site http://eprocure.gov.in/eprocure/app**,** BRO websitewww.bro.gov.in and CAB websitewww.cab.org.bt.

25. Blank.

26. In the event of lowest tenderer revoking his offer or revising his rates upward (which will be treated as revocation of offer), after opening of tenders, the earnest money deposited by him shall be forfeited. In case of BRO enlisted contractors, the amount equal to the earnest money stipulated in the Notice of tender, shall be notified to the tenderer for depositing the amount through MRO, failing which the amount shall be recovered from payment due to such Contractor or shall be adjusted from the Standing Security Deposit. In addition, such tenderer and his related firm shall not be issued the tender in second or subsequent calls.

27. Important- Above particulars may change due to Administrative or any other reasons and shall be available in central public procurement portal site http://eprocure.gov.in/eprocure/app,BRO websitewww.bro.gov.in and CAB websitewww.cab.org.bt Therefore, bidders/contractors are requested to visit central public procurement portal site http://eprocure.gov.in/eprocure/app**,** BRO websitewww.bro.gov.in and CAB websitewww.cab.org.btfrequently and at least once again 03 (three) days prior to bid submission date as per critical date sheet, for any changes in above particulars.

28. Blank

29. The tender shall remain open for acceptance for a period of **60 days** from bid submission date.

30. The tender may be accepted as whole.

31. This notice of tender shall form part of the contract.

AE(C)
ASW
For Accepting Officer

(Signature of the Contractor)

NAME OF WORK:	**DESIGN AND CONSTRUCTION INCLUDING PLATE LOAD TEST OF18 MTR SPAN RCC T-BEAM BRIDGE AT KM 51.019 ON ROAD CONFLUENCE-HAA UNDER 19BRTF PROJECT DANTAK IN BHUTAN.**

GENERAL CONDITION OF CONTRACTS
IAFW –2249: 1989 PRINT

FOR

ITEM RATE CONTRACTS (IAFW-1779 A)

1. A copy of General Conditions of Contract (IAFW-2249: Print 1989) with Errata 1 to 20 and Amendments Nos. 1 to 48 is in my/our possession. I/we has/have read and understood the provisions contained in the aforesaid GENERAL CONDITIONS OF CONTRACTS before submission of this tender and I/we agree that I/we shall abide by the terms and conditions thereof.

2. It is hereby further agreed and declared by me/us that the GENERAL CONDITIONS OF CONTRACT, including Condition No. 70 thereof pertaining to the settlement of disputes by Arbitration (IAFW-2249) and Condition No 71 pertaining to appointment of Dispute resolution Board shall form part of this tender documents.

3. Wherever the phrases Commander Works Engineer (CWE) and Garrison Engineer (GE) have been used in the General Conditions of Contract (IAFW-2249) the same are considered as Task Force Commander (TFC) and OC Contract respectively as applicable in Border Roads Organisation.

Note: - Copy of General Condition of Contracts IAFW-2249 can be referred in the office of HQ CE (P) Danntak/HQ 19 BRTF (GREF), if required.

AE(C)
ASW
For Accepting Officer

(Signature ofContractor)

SPECIAL CONDITIONS

"**DESIGN AND CONSTRUCTION INCLUDING PLATE LOAD TEST OF18 MTR SPAN RCC T-BEAM BRIDGE AT KM 51.019 ON ROAD CONFLUENCE-HAA UNDER 19BRTF PROJECT DANTAK IN BHUTAN**."

1. GENERAL

The following Special Conditions shall be read in conjunction with General Conditions of contracts **IAFW-2249**, including amendments thereto, and whereas variation exists the Special Conditions shall take precedence over the aforesaid General Conditions.

The Special Conditions given in succeeding paragraphs shall be read in conjunction with Schedule A, technical specifications and General Conditions of Contracts IAFW-2249. In case of any discrepancies in the various provisions of the contract, the following order of precedence shall be observed:-

(a) Description given in Schedule 'A'.
(b) Particular/Technical Specifications.
(c) Drawings and sketches.
(d) Ministry of Road Transport & Highways (MoRTH) specifications for Road and bridge works published by Indian Roads Congress New Delhi (Vth Revision).
(e) Special conditions.
(f) General conditions of contracts.

2. INSPECTION OF SITES

The contractor is particularly advised to inspect the site (s) of work by making prior appointment with the **Chief Engineer Project Dantak, C/o 99 APO/Commander 19 BRTF, C/o 99 APO** so as to acquaint himself with regard to the nature and conditions of site, nature and means of local communication, working hours, conditions of access and all other cognate matters concerning the execution and completion of the work. Any paths, tracks, approaches etc, required for the movement of plants, equipments, machines and vehicles etc to the work site and plate form, bund etc required for the execution of work will be responsibility of the contractor and rates quoted must include these aspects also where required. The tenderer shall be deemed to have inspected the site and made himself familiar with various factors which may affect his quotation where he actually inspects the site or not. No extra charges consequent on misunderstanding or otherwise will be allowed.

3. LAND FOR OFFICES ETC

The contractor shall have to make his/her own arrangements for the land as may be required by him/her for housing of staff and labour and for erection of store sheds, offices, godowns etc., required by him/her for this work. The contractor must ensure that the staff, labour, plant, equipment, machines, vehicles, stores etc., employed or collected in connection with the work are so located that there is no hindrance to free flow of traffic on the roads/highway. Suitable cautionary and warning signs and other measures are to be installed/provided by the contractor at his own cost for the safety of traffic.

AE(C)
ASW
For Accepting Officer

(Signature of the Contractor)

SPECIAL CONDITIONS (CONTD)

4. MINIMUM FAIRWAGES PAYMENT TO LABOUR

(a) The contractor shall pay wages not less than the minimum fair wages fixed from time to time by the Central Govt/State Govt/Local Authorities. He shall have no claim whatsoever, if on account of any local regulations and/or otherwise, he is required to pay wages in excess of the wages so fixed.

(b) The contractor shall observe the laws/regulations applicable in the area regarding the employment of labour, payment of wages and other cognate matters relating to the conditions.

(a) In case local labourers are not available, the contractor may have to obtain written permit from the appropriate authority of State Govt. to import labour from outside the state.

(d). The contractor shall ensure compliance to all the labour wages laws and benefit rules for the labour employed by him.

(e) The contractor shall maintain muster roll of labourer engaged in the work along with wages being paid to labourer (trade wise). The muster roll shall be available at site for inspection by Engineer-in-Charge or any authorized Govt. Officials.

5. ROYALTIES. The Contractor shall make his own arrangement for procuring materials required under the contract and he shall ensure that the royalty for the material procured by him under this CA has been correctly paid to the concerned authority. Any claim of royalty by the concerned department on the material procured under this CA shall be settled with concerned authority directly by Contractor. Further the contractor should ensure that the supply of material is not arranged illegally. An undertaking to this account will be given by contractor before payment of RAR/Final bill

SPECIMEN COPY OF UNDERTAKING

I / We, M/s _____hereby declare that I /We have supplied the following materials against CA No. CE (P) Dantak/ / 2022-23 during the period from _____ to _____.

Srl No.	Materials	Gross Quantity supplied
(a)		
(b)		
(c)		

It is further certified that the royalty for the above quantity of materials at the applicable rates have been paid by us to the concerned department of the Govt.

(M/s _____)

.

AE(C)
ASW
For Accepting Officer

(Signature of the Contractor)

SPECIAL CONDITIONS (CONTD)

6. BLASTING ROCKS

(a) The contractor shall be responsible for the safe custody and storage of blasting materials in accordance with the rules on the subject. Written authority of the Engineer-in-Charge/OC Contract shall be obtained before any blasting operations are commenced.

(b) The contractor shall ensure that the charges in blasting are not excessive and that the charged bore holes are properly protected before firing and that proper precautions are taken for the safety of men and property.

(c) Blasting should be generally avoided. In case it is unavoidable less charge controlled blasting may be resorted with the prior permission of the Engineer-in-Charge/OC Contract. The contractor shall be bound to abide by the instructions of the Engineer-in-Charge/OC Contract Contract regarding the necessity of blasting and the type, number size and pattern of holes to be drilled and also the type , amount and method of firing of explosive to be used. The Engineer-in-Charge/OC Contract t shall reserve the right to restrict the number of charge to be fired at a time so that the hillside is not adversely affected. The contractor shall fire the charges only at such time as approved by the Engineer-in-Charge/OC Contract and shall have no claim, whatsoever, on account of any delay and extra cost due to carrying out the instructions of the Engineer-in-Charge/OC Contract and / or taking the safety precautions directed by him.

7. MOVEMENT OF CONTRACTOR VEHICLES

7.1. Minimum classification of existing bridges on the roads are Class 70 R bridges, contractor should not bring any heavier vehicle/plnt/equipment as such vehicle/plant/equipment shall not be allowed on the bridges. The contractor's vehicle may be required to ply in convoys as per directions given by the concerned Civil/Military authorities. No extra payment/time will be admissible on this account.

7.2. In case the condition of these bridges warrants further downwards load classification due to any unforeseen circumstances, the same will be done by OC Contract whose decision shall be final and binding. In case of any such eventuality, the contractor may have to unload his heavy load carried at locations, indicated to suit the load classification indicated by the OC Contract. Any such heavy load carriage thus necessitated across such indicated bridge(s) shall have to be done by the contractor without any additional payment and no claim whatsoever on this account will be entertained.

8. SECURITY RESTRICTIONS

8.1 Contractor intention is invited to condition 25 of IAFW-2249 contractor shall employ only Indian National/Bhutanese after verifying their antecedents and loyalty. The contractor shall on demand by the Engineer-in-Charge / OC Contract, submit list of his agents, employees and work people concerned and shall satisfy the Engineer-in-Charge / OC Contract as to the bonafide credential of such people.

8.2 The contractor and his workmen shall observe all the rules promulgated by the authority controlling the area in which work is to be carried out e.g. prohibition of smoking, lighting, fire precautions, search of persons on entry and exit, keeping to specified routes and restricted hours of work etc. Thorough search of all persons and transport may be conducted by the departmental authorities at the site of works at any time and any number of times for security reasons Necessary Permits are to be obtained from Civil Authorities by the contractor, for himself, his staff and labour. Nothing shall be paid extra on this account. During currency of the contract, if anybody is suspected to have any connection with anti-national elements/activities, he will immediately be removed and contractor shall have no claim whatsoever on this account.

AE (C)
ASW
For Accepting Officer

(Signature of the Contractor)

SPECIAL CONDITIONS (CONTD)

9. **FREE ACCESS TO SITES AND LOOKING AFTER OF WORKS**

The contractor shall give all reasonable facilities to this department personal for the inspection of the works being executed under this contract. He will also provide free access to the works if being executed by this department or other agencies and if such works are located near the sites covered under this contract. Responsibility of all the works covered in this contract will lie on the contractor and these works will be fully completed and accordingly handed over to this department.

10. **TAXES ETC**

The tendered amount shall inter-alia be deemed to be inclusive of all taxes, viz work Contract Tax, terminal taxes, toll taxes, Royalty, octroi, **GST**, sale tax/VAT, Service Tax, or any other taxes and the like levies payable under the respective existing country/states etc. No claim on account of any taxes will be payable to contractor whatsoever except as provided in sub Para 11 (b) here-in-after.

10.1 **GST/Sales Tax are not applicable for Project Dantak**. For any query regarding **exemption of GST** on import of goods and services **from India to Bhutan**, kindly refer to the following websites for detail information.

(aa) www.cbec.gov.in//htdocs-cbec/gst/index.
(ab) www.cbec.gov.in/resources//htdocs-cbec/gst/notfctn-42-igst-rate-english.pdf.
(ac) www.cbec.gov.in/resources//htdocs-cbec/gst/notfctn-300CGST-rate-english.pdf.

10.2 **For Indian Supplier only**. As supply to Project Dantak located outside India, no GST is applicable. Indian Supplier / Bidder shall attach undertaking certificate as per the following format mandatorily :-

UNDERTAKING CERTIFICATE

"It is certified that the goods / materials given in the CA No_____ of HQ CE (P) Dantak will be supplied by me / our firm as export and for use in Bhutan. It is declared that no GST cost has been included by me in the rates quoted in above mentioned enquiry".

Signature with date :
Name of the bidder :
Name of firm with address :

Certificate on account of GST as per Rule No 16 (1) of IGST Act 2017 will be issued on receipt of stores as format of certificate is as given under:-

AE (C)
ASW
For Accepting Officer

(Signature of the Contractor)

SPECIAL CONDITIONS (CONTD)

GST : ZERO RATED SUPPLY CERTIFICATE

1. It is certified that the goods supplied by your firm against CA No_____ for the cost of Rs. _____/- (Rupees _____only) is a zero rated Supply as per **GST Rule No 16 (1)** of **IGST Act 2017** as the goods were supplied as an export and to be used in Bhutan by this Project.

2. It is further certified that no amount was paid to your firm by this Project on account of GST.

Consignee Unit

Indian firms may refer to rule 16 of IGST Act 2017 and Notification No. 42/2017- Integrated Tax (Rate) Ministry of Finance dated 27 Oct 2017.

11. RE-IMBURSEMENT/REFUND ON VARIATION IN "TAXES DIRECTLY RELATED TO CONTRACT VALUE"(As per latest policy dated 24228/DGBR/Policy Instr/2017/100/E8 dated 25 Aug 2017)

(a) The rates quoted by the contractor shall be deemed to be inclusive of all taxes, (including GST on materials, GST on Work Contracts, turnover tax, Labour Welfare cess /tax Ecological and Environment cess etc**),** duties, Royalties, Octroi & other levies payable under the respective statutes. No re-imbursement /refund for variation in rates of taxes, duties royalties, Octroi & other levies, and / or imposition / abolition of any new/existing taxes, duties, royalties, Octroi& other levies shall be made except as provided in sub Para (b) here-in-below:-

(b) (i) The taxes which are levied by Govt. at certain percentage rates of Contract Sum / Amount shall be termed as "taxes directly related to contract value" such as GST on works contracts, turnover tax, Labour Welfare Cess /Tax and like but excluding Income Tax. The tendered rates shall be deemed to be inclusive of all "taxes directly related to contract value" with existing percentage rates as prevailing on last due date for receipt of tenders. Any increase in percentage rates of 'taxes directly related to contract value" with reference to prevailing rates on last due date for receipt of tenders shall be reimbursed to the contractor and any decrease in percentage rates of 'taxes directly related to contract value" with reference to prevailing rates on last due date for receipt of tenders shall be refunded by the contractor to the Govt. / deducted by the Govt. from any payment due to the contractor. Similarly imposition of any new "taxes directly related to contract value" after the last due date for receipt of tenders shall be reimbursed to the contractor and abolition of any "taxes directly related to contract value" prevailing on last due date for receipt of tenders shall be refunded by the contractor to the Govt. /deducted by the Govt. from the payments due to the contractor.

(b) (ii) The contractor shall, within a reasonable time of his becoming aware of variation in percentage rates and/or imposition of any "taxes directly related to contract value" give written notice thereof to the OC Contract stating that the same is given pursuant to this Special Condition, together with all information relating thereto which he may be in a position to supply. The contractors shall submit the other documentary poof /information as the OC may require.

(b) (iii) The contractor shall, for the purpose of this condition keep such books of account and other documents as are necessary and shall allow inspection of the same by a duly authorized representative of Govt., and shall further, at the request of the OC furnish, verified in such a manner as the OC Contract may require, any documents so kept and such other information as the OC may require.

AE (C)
ASW
For Accepting Officer

(Signature of the Contractor)

SPECIAL CONDITIONS (CONTD)

(b) (iv) Reimbursement for increase in percentage rates /imposition of "taxes directly related to contract value" shall be made only if the contractor necessarily & properly pays additional "taxes directly related to contract value" to the Govt. without getting the same adjusted, against any other tax liability or without getting the same refunded from the concerned Govt. Authority and submits documentary proof for the same as the OC may require".

12. SECURITY OF DOCUMENTS

The contractor shall not communicate any classified information regarding works/organisation either to the sub contractor or others without prior approval of the Engineer-in-Charge. Any violation on this aspect will be forfeit the right of the contractor to claim any amount due to the contractor whatsoever held with organisation.

13. FOREIGN EXCHANGE/IMPORT LICENCE

No foreign exchange and/or import license will be arranged by the Department in the connection of work under this contract.

14. CONTRACTOR'S VEHICLES/PLANT AND EQUIPMENT AT SITE

(a) The contractor shall furnish to the Engineer-in-Charge a distribution return of his plant/equipment on the site of works, stating the following particulars: -

i) Particulars of Plant/equipment i.e. Make, Manufacture's No, Model No, if any, Registration No, if any, capacity, yearn of manufacture, year of purchase etc.

ii) Total quantity on site of work.

iii) Location indicating quantity at the site of work.

(b) For the purpose of this condition, plant/equipment shall include vehicles, trucks, Cranes, Heavy Lifting Equipment, Welding Machine, Gas cutter and lorries but not the workmen's tools and/or any manually operated tools/equipment.

(c) The Engineer-in-Charge shall record the particulars supplied by the contractor as aforesaid, in the works diary and send a return to OC Contract for record in his office.

(d) The first return shall be submitted immediately after any plant or equipment is brought to the site. Thereafter every week changes in the return shall be furnished in the following form: -

S/No	Particulars of plant/ equipment	Total No at site of work	Location	Remarks

Addition Since…….

Reduction Since……..

(e) A complete return showing the upto-date position of plant/equipment at site shall be submitted on 15th of every month till the works are completed and the site cleared.

(f) The contractor's attention is invited to condition 34 of General Conditions of Contracts according to which no tool, plant/equipment shall be removed off the site without written approval of the OC Contract.

AE (C)
ASW
For Accepting Officer

(Signature of the Contractor)

SPECIAL CONDITIONS (CONTD)

15. FIXING OF PERMANENT AND TEMPORARY BENCH MARKS:

Pmt Bench Mark be fixed at any nearby safe location or considered from any existing Permanent Building. RL be transferred and TBM be fixed at an interval of appx 200 mtr along the existing alignment at safe place. These temp Bench Marks should remain intact till completion of the work.

16. TOTAL STATION EQUIPMENT:

The total station eqpt with its accessories be provided by the contractor and will remain at site till completion of job.

17. MOBILISATION ADVANCE (Amended vide HQ DGBR letter No. 24556/सी.स.म./ दन्तक/सामान्य/92/ई8 dated 25 Nov 2021): -

(a) Mobilisation advance shall be restricted to 10% of Contract Agreement amount.

(b) Applicable in cases, where the total amount of Mobilization Advance does not Exceed Rs. 500 lakhs.

"Mobilization Advance against non-Revokable Bank Guarantee.

(i) Interest bearing mobilization advance restricted to 10% of Contract Agreement amount shall be given to the Contractor if he so desires and on his specific written request, on production of non-revokable Bank Guarantee(s) for the corresponding amount on an approved form of scheduled Bank. The Bank Guarantee(s) shall indemnify the Govt. Against non-refund of mobilisation advance and also against default on Contractors part in performance of the contract. The rate of interest shall be 10% per annum simple interest.

(ii) The mobilisation advance shall be paid to the Contractor within 30 days of acceptance of the Bank Guarantee(s) furnished by him, by Accepting Officer. The amount of mobilisation advance together with interest shall be recovered from the payments made to the Contractor against "Advance on account", under condition 64 of IAFW-2249, General Conditions of Contracts.

(iii) The amount of mobilisation advance shall be recovered in suitable number of equal monthly/** fortnightly instalments as stipulated here after. The first instalment of recovery shall be effected from the 'Advance on Account' payment made immediately following the payment of mobilisation advance and the last instalment of recovery shall be effected during the (third/fourth) *** month preceding the month in which the due date of completion stipulated in the first work order falls.

** Delete whichever is inapplicable.
***Specify "third month" in respect of contract having a period of completion of 24 months or less and "fourth month" in respect of contracts having a period of completion exceeding 24 months.

(iv) The Contractor shall furnish a number of Bank Guarantees equal to number of installations for recovery, each to match the quantum of recovery to be effected from the 'Advance on Account'. In case, recovery is not possible to be effected from any particular 'Advance on Account' for reasons of non-submission of claim for payment of 'Advance on Account' any other reason whatsoever, the recovery due shall be made by encashing the Bank Guarantee.

AE (C)
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For Accepting Officer

(Signature of the Contractor)

SPECIAL CONDITIONS (CONTD)

(c) Applicable in cases where the Total amount of Mobilisation Advance Exceeds Rs. 500 lakhs.

"Mobilization Advance against non-Revokable Bank Guarantee.

(i) Interest bearing mobilisation advance restricted to 10% of Contract Agreement amount shall be given to the Contractor if he so desires and on his specific written request, in two installments, on production of non-revokable Bank Guarantee(s) on an approved from a schedule Bank. The Bank Guarantee (s) shall indemnify the Government against non-refund of mobilisation advance and also against default on Contractor's part in performance of the Contract. The rate of interest shall be 10% per annum simple interest.

(ii) The first installment of mobilisation advance shall be Rs.500 lakhs and shall be paid to the Contractor within 30 days of acceptance of the Bank Guarantee(s) for Rs.500 lakhs furnished by him, by the Accepting Officer. The second installment of balance mobilization advance shall be paid to the Contractor after 6 months of payment of the first installment provided Bank Guarantee(s) for the corresponding amount has/have been furnished by the Contractor, at least one month in advance and accepted by the Accepting Officer.

(iii) The total amount of mobilisation advance together with interest shall be recovered from the payments made to the Contractor against "Advances on Account", under Condition 64 of IAFW-2249, MES General Conditions of Contracts.

(iv) The amount of mobilisation advance shall be recovered in monthly**/fortnightly installments as stipulated hereinafter.

** Delete whichever is inapplicable.

(aa) Against the first installment of mobilisation advance of Rs.500 lakhs, the first installment of recovery shall be effected from the 'Advance on account' payment made immediately following the payment of mobilisation advance of Rs.500 lakhs and the last installment of recovery shall be effected during the third/fourth month *** preceding the month in which the due date of completion stipulated in first Work Order falls. The various installments of recovery shall be equal amounts.

" Specify third months in respect of contract having a period of completion of 24 months or less and fourth month in respect of contracts having a period of completion exceeding 24 months.

(bb) Against the second installment of mobilisation advance, the first installment or recovery shall be effected from the 'Advance on Account' payment made immediately following the payment of mobilisation advance of second installment and the last installment of recovery shall be effected during the third/fourth month** preceding the month in which the due date of completion stipulated in first Work Order falls. The various installments of recovery shall be equal amounts. The recovery in installments of this mobilisation advance shall be of in addition to the recovery in installments of the mobilisation advance of first installment.

** Specify third months in respect of contract having a period of completion of 24 months or less and fourth month in respect of contracts having a period of completion exceeding 24 months.

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For Accepting Officer

(Signature of the Contractor)

SPECIAL CONDITIONS (CONTD)

(v) The Contractor may furnish one Bank Guarantee or a number of Bank Guarantee (s) equal to number of installments for recovery, each to match the quantum of recovery to be effected from the 'Advance on account'. In case recovery is not possible to be effected from any particular 'Advance on Account' for reasons of non-submission of Claim for payment of 'Advance on Account' or for any other reasons whatsoever, the recovery due shall be made by encashing the Bank Guarantee."

(d) Advance Mobilisation Guarantee format will be followed as updated format Form DPM-16 prescribed by MoD in defence procurement Manual (present format enclosed at annexure I to special conditions). The authenticity of such BGs shall also be invariably verified from the issuing bank, confidentially and independently by the organization.

(e) There shall be a 15% interest charged on delayed recoveries either due to the late submission of bill by the contractor or any other reason besides the reason giving rise to the encashment of Bank Guarantee as stated above.

(f) Utilization certificate from the contractor for the mobilization advance

18. Blank

19. FOSSILS

19.1 All fossils, coins, articles of value or antiquity, and structures and other remains or items of geological or archaeological interest found on the site shall be placed under the care and authority of the Employer. The contractor shall take reasonable precautions to prevent Contractor's Personnel or other persons from removing or damaging any these findings.

19.2 The Contractor shall, upon discovery of any such finding, promptly give notice to the Engineer-in-Charge/OC Contract, who shall issue instructions for dealing with it. If the Contractor suffers delay and/or incurs Cost from complying with the instructions, the Contractor shall give a further notice the Engineer- in-Charge/ OC Contract describing in detail the delay sustained by him and cost measured by him for following the instructions of the Engineer-in-Charge/OC Contract in dealing with the fossils along with all supporting documents/proof, within 7 days of the occurrence. The Contractor then be certified for the following: -

(a) An extension of time for any such delay, if completion is or will be delayed due to such act in following the instructions of the Engineer-in-Charge/OC Contract.

(b) Payment of any such cost, which shall be included in the Contract Price.

19.3 After receiving this further notice, the Engineer-in-Charge/OC Contract shall examine the case with facts and figures and disagreements if any will be communicated to the contractor.

19.4 In case of any disputes, the matter shall be referred to the Accepting Officer whose decision shall be final and binding.

20. TIME AND PROGRESS CHART

(a) The time and progress chart to be prepared as per the General Condition of Contract shall consist of detailed network analysis and a time schedule. The critical path network will be drawn jointly by the OC Contract and the Contractor soon after acceptance of the Tender. The time scheduling of the activities including a network for the preliminary arrangements for mobilization of resources e.g. manpower, plants and machineries will be done by the Contractor, so as to complete the work within stipulated time.

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For Accepting Officer

(Signature of the Contractor)

SPECIAL CONDITIONS (CONTD)

(b) On completion of the time schedule a firm calendar date schedule will be prepared and submitted by the contractor to the OC Contract who will approve if after due scrutiny. The schedule will be submitted in quadruplicate within six weeks from the date of handing over the site.

(c) During the currency of work, the Contractor is expected to adhere to the time schedule and this adherence will be a part of the contractor's performance under the contract. During the execution of the work, the Contractor is expected to participate in the review and updating the network undertaken by OC Contract. These reviews may be undertaken at the discretion of the OC Contract either as periodical appraisal measure or when the quantum of work ordered on the Contractor is substantially changed through deviation order or amendments. Any revision of the schedule as a result of the review will be submitted by the Contractor to the OC Contract within a week who will approve it after due scrutiny. The Contractor will adhere to the revised schedule thereafter. In case of the contractor's not agreeing to the revised schedule the same will be referred to the Accepting Officer whose decision will be final, conclusive and binding. OC's approval to the revised schedule resulting in a completion date beyond the stipulated date(s) of completion shall not automatically amount to grant of extension of time. Extension of time shall be considered and decided by the appropriate authority mentioned in condition 11 of General Conditions of Contracts and separately regulated.

(d) The Contractor is expected to mobilize and employ sufficient resources to achieve the detailed time schedule within the broad framework of the accepted methods of working and safety.

(e) No additional payment will be made to the contractor for any multiple shift work or other incentive methods contemplated by him in his work schedule even though the time schedule is approved by the department.

21. PERMIT FROM LOCAL AUTHORITIES FOR PLYING VEHICLES

Contractor shall make his own arrangements for obtaining necessary permit from local authorities for plying his equipments for the work in accordance with the rules and regulations of the land.

22. ELECTRICITY AND WATER SUPPLY

No electricity or water will be supplied by the department. The contractor shall make his own arrangement for execution of the work.

23. RATE QUOTED

(a) Unit rate shall be deemed to include the provisions for all materials, stores, labour, process, operations and requirements detailed in particular specifications irrespective of whether these appear as specific items or not in the Schedule A.

(b) The rate quoted shall also include transportation of equipment upto work site including loading/unloading.

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For Accepting Officer

(Signature of the Contractor)

SPECIAL CONDITIONS (CONTD)

24. APPOINTMENT OF ARBITRATOR IN CASE OF CONTRACT AGREEMENTS TO BE EXECUTED BETWEEN BRO AND GOVT OF INDIA UNDERTAKINGS/ ENTERPRISES.

In the event of any dispute or difference between the parties hereto, such dispute of difference shall be resolved amicably by mutual consultation or through the good offices of empowered agencies of the Government. In the event of any such dispute or differences relating to the interpretation and application of the provisions of contracts where such resolution is not possible then the unresolved dispute or differences shall be referred by either party to the Arbitration of one of the Arbitrators in the department of Public Enterprises to be nominated by the Secretary to the Government of India In charge of the Bureau of Public Enterprises, and in such case the **Arbitration and Conciliation Act** shall not be applicable to the arbitration under this clause. The award of the Arbitrator shall be binding upon both the parties in the dispute. Provided, however, any party, aggrieved by such award, may make a further reference for setting aside or revision of the award to the law Secretary, Department of Legal Affairs, Ministry of Law & Justice, Govt. of India. Upon such reference the dispute shall be decided by the Law Secretary or the Special Secretary/Additional Secretary when so authorized by the Law Secretary, whose decision shall bind the parties finally and conclusively. The parties to the dispute will share equally the cost of arbitration as intimated by the Arbitrator.

25. MEASUREMENT

Measurements pertaining to the work completed under this contract will be recorded and signed in the measurement book (IAFW-2261) by the Junior Engineer after taking in to account that the required laboratory tests have been done as per the limits stipulated and as per the frequencies laid down in the “Particular Specifications” of this contract agreement and MORTH Specifications for Road and Bridge Works (Latest revision) and connected documents thereof and test results are found satisfactory and proper records are maintained.

(a) The measurement recorded by the Junior Engineer shall be 100% checked and signed by the Engineer-in-Charge.

(b) 25% test check will be carried out by OC Contract on each day of measurement by the Engineer-in-Charge.

(c) 5% test check will be carried out by the Cdr Task Force before making payment to the Contractor.

(d) The measurements should also be signed by the contractor as token of acceptance of the measurement.

(e) In case of discrepancies in arriving out work done details, the decision of the Accepting Officer will be final and binding for both the parties.

26. ACCEPTANCE OF WORK DONE

The Engineer-In-Charge shall exercise control over the quality of materials and work done by carrying out tests for the specified properties as per frequencies given in particular specifications and specifications of MORTH (Ministry of Road Transports and Highways) for Roads and Bridge (latest revision).

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For Accepting Officer

(Signature of the Contractor)

SPECIAL CONDITIONS (CONTD)

27. BLANK

28. BLANK

29. RECORD/CONSUMPTION OF MAJOR CONSTRUCTION STORES / MATERIALS

(a) (i) For the purpose of keeping a record of Major Construction Stores like **Cement**, **Bitumen, Bitumen Emulsion, Antistripping Agent, Warm Mix Additives Steel and filler materials** consumed in works, the contractor shall maintain a pucca bound register in the form approved by the Engineer-in-Charge/OC Contract showing daily quantity used in works. The register shall be signed daily by the contractor's representative and the Engineer-in-Charge/OC Contract in token of their verification of its correctness. The check will not, however, absolve the contractor of his responsibility to justify the consumption of bitumen at the time of finalization of his work.

(ii) The register shall be kept at site in the safe custody of the contractor during progress of the work and shall, on demand, be produced for verification of inspecting officers.

(b) (i) The quantity of materials such as paints, water proofing compound and the like as directed by the Engineer-in-Charge (the quantity of which cannot be checked after incorporation in the works), shall be recorded in the register and signed by the contractor and the Engineer-in-Charge as a check to ensure that the required quantity has been brought to site for incorporation in the work.

(ii) Materials brought to site shall be stored as directed by the Engineer-in-Charge in Measurement Book and shall be suitably marked for identification.

(iii) The contractor shall, on demand produce the OC original receipted vouchers in respect of the supplies. Vouchers so produced shall be verified and stamped by Engineer-in-Charge indicating contract number. The contractor shall ensure that the materials are brought to site in original sealed containers/packing, bearing manufacturer's marking except in the case of the requirement of materials(s) being less than smallest packing.

(iv) Contractor shall produce original vouchers from the manufactures and/ or their authorized agents for the full quantity of the following materials, as applicable as a prerequisite before submitting for payment for any advances on account of the work done and/or materials collected in accordance with condition 64 of General Condition of Contracts IAFW-2249.

(a) Cement / Lime.
(b) Steel items.
(c) Paint

30. PAYMENT

Payment to the parties will be made in INR in the following manner: -

(a) No advance payment will be made to the contractor against any material if not properly safeguarded against loss / damage due to natural calamities / theft. (Condition 64 of IAFW-2249 shall be deemed amended to this extant).

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For Accepting Officer

(Signature of the Contractor)

SPECIAL CONDITIONS (CONTD)

(b) No payment shall be made for any rejected work

(c) Taxes (Income tax, GST, Labour Cess etc) shall be deducted at source from the payment due to contractors as per prevailing laws / statutory orders and TDS certificate shall be issued to the contractor.

(d) All payments will be made by e-payment / account payee cheque.

31. CO-OPERATION WITH OTHER AGENCIES

The contractor shall permit free access and generally afforded reasonable facilities to other agencies or departmentally workmen engaged by the Govt to carry out their part of the work, is any, under separate arrangements.

32. SUPPLY OF COLOUR RECORD PHOTOGRAPHS, ALBUMS AND VIDEO CDs

Contractor shall provide/supply of colour record photographs, Album and video CDs at various stages/facts of the work without any extra cost as per clause 121 of MoRT&H specification for road and bridge works (Fifth Revision).

33. FIELD LABORATORY : To maintain proper quality control at site, contractor shall establish adequately equipped field laboratory without any extra cost. The following minimum testing equipments shall be provided in field laboratory:-

(a) Electrically operated, thermostatically controlled oven range upto 2000C sensitivity 10C.
(b) Balance 20 kg capacity self indicating type.
(c) Water bath-electrically operated and thermostatically controlled with adjustable shelves, sensitivity 10C.
(d) Thermometers:-
(i) Mercury in glass –range upto 2500C.
Mercury in Steel –range upto 3000C with 30 Cm stem
(e) Gas Stove or electric hot plate.
(f) Set of Sieves with lid &pan : 450 mm dia - 63mm to 75 micron.
(g) First aid box.
(h) AIV & Los Angles Abrasion test apparatus.
(j) Flakiness and Elongation test gauges.
(k) Core cutter apparatus 10 cm dia,10/15 cm height, complete with dolly, rammer etc.
(l) Dry bulk density test apparatus complete.
(m) Standard measures of 30,15,3 litres capacity along with tamping rods.
(n) Standard weights.
(o) Centrifuge type bitumen extractor complete with petrol/benzene.
(p) Marshall Stability test apparatus with complete accessories.
(q) Field density bottle along with cutting tray, Chisel, hammer and standard sand.
(r) 3 mtr straight edge.
(s) Camber board.
(t) Core cutting machine with 10 cm dia diamond cutting edge.
(u) Equipment for measuring density of WMM. DBM & AC by sand replacement method.

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(Signature of the Contractor) For Accepting Officer

SPECIAL CONDITIONS (CONTD)

34. TRAFFIC MOVEMENT

Contractor shall ensure that no hindrance to traffic movement shall occure during execution of work. However, if the traffic movement disrupt due to land slide or any other un-foreseen reason, then contractor shall make all efforts to restore traffic movement within time as directed by the OC Contract/Engineer-in-Charge. If contractor is unable or willing to restore traffic movement, Engineer-in-Charge may take action as per condition 8 of IAFW-2249. Contractor shall immediately intimate regarding closure of the road to Engineer-in-Charge and local administrative authorities.

35 VENUE OF ARBITRATION: Place of arbitration hearing shall be at New Delhi.

36. DEFECT LIABILITY PERIOD (Refer Condition 46ofIAFW2249).

Defect Liability period shall be **thirty six calendar months** irrespective of what is specified in Condition 46 of IAFW 2249. Performance Guarantee of **10% of contract sum(Amended vide HQ DGBR letter No. 24556/सी.स.म./दन्तक/सामान्य/92/ई8 dated 25 Nov 2021)** as submitted in terms of Condition 19 of IAFW-2249 shall be retained till expiry of defect liability period and shall be refunded to the contractor after the expirationofdefectliabilityperiodprovidedalwaysthatthecontractorshallfirsthavebeen paid the final bill and have rendered a No-demand certificate(IAFA-451) in terms of condition 68 of IAFW-2249.

37. RE-IMBURSEMENT / REFUND ON VARIATION IN PRICES OF BITUMEN

(This special condition is applicable only in contracts having original completion period more than 18 Months)

Increase or decrease in prices of Bitumen shall be adjusted on the basis stipulated hereinafter irrespective of the actual variation in prices to the contractor: -

$E_B = (Q_B) \times (B_1 - B_O) \times 1.15$

Where:-

E_B = Variation in price of Bitumen to be adjusted. (In Rs.)

Q_B =Quantity of Bitumen, brought at site for incorporation in work / incorporated in work (in MT)

B_O = Ex-refinery price of Bitumen inclusive of all taxes / duties at “refinery nearest to the work site” of Indian Oil Corporation as available on web site of IOC Ltd (i.e.www.iocl.com) as on the last date of receipt of tender. (In Rs/ MT)

B_1 = Ex-refinery price of Bitumen inclusive of all taxes / duties at “refinery nearest to the work site” of Indian Oil Corporation as available on web site of IOC Ltd (i.e.www.iocl.com) as on the date of purchase of bitumen. (In Rs/ MT)

(Factorof 1.15 has been used to cover contractor’s overhead and profit)

Notes:-

1. No adjustments, whats over, due to variation in prices of materials and fuel on account of coming into force of any fresh law or statutory rule or order as provided in condition 63 of IAFW-2249 or otherwise than provided in this condition shall be made. In short once this special condition is operative condition 63 of IAFW-2249 stands superseded.

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For Accepting Officer

(Signature of the Contractor)

SPECIAL CONDITIONS (CONTD)

2. No adjustment in prices shall be made for any work done with materials brought at site after the stipulated date of completion given in work order No. 1 or extension of time granted under condition 11 of IAFW-2249 (whichever is later) for the work under the contract.

3. Any dispute arising out of interpretation of application of this special condition shall be referred to the Accepting Officer whose decision shall be final and binding.

4. For purpose of calculation of retention money, liquidated damages, sales tax / service tax on works contracts, deduction of income tax at source and recovery of water charges (in case of unmetered supply) the value of contracts as revised by the above price variation will be taken into account.

38. CONCILIATION

1. Conciliation shall be conducted as laid down u/s 61 to 81 of Arbitration and Conciliation Act 1996 (Part III) unless specified otherwise here-in-after.

1.1.1 The scope of conciliation shall be restricted to the following types of disputes with financial limits as indicated therein: -

(a) Disputes relating to levy of compensation for delay in completion, actual amount of compensation.

(b) Disputes relating to technical examination of works.

(c) Disputes relating to interpretation of the provisions of the contract with reference to their application to parties.

(d) Disputes relating to non return of Schedule 'B' stores over-issued to contractor.

(e) Disputes relating to assessment of loss/damage occurred in executed work only (and not for contractor's material & V/E/P) due to natural calamities.

(f) Any other disputes having fair chances of being resolved by conciliation and considered fit to be conciliation by the parties.

1.2 COMMENCEMENT OF CONCILIATION PROCEEDINGS

1.2.1 The party initiating conciliation shall send to the other party a written invitation to conciliate, briefly identifying the subject of the dispute.

1.2.2 Conciliation proceedings shall commence when the other party accepts in writing the invitation to conciliate.

1.3 Number of Conciliators

1.31 There shall be a sole conciliator.

1.4 Appointment of Conciliator

1.4.1 All disputes brought out in Para 1.1.1 (a) to (f) above shall be referred to the Sole Conciliator viz Serving Officer not below the rank of Superintending Engineer having degree in Engineering or equivalent to be appointed by the concerned ADGBR or in his absence the Officer Officiating as ADGBR specifically delegated by the ADGBR in writing.

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For Accepting Officer

(Signature of the Contractor)

SPECIAL CONDITIONS (CONTD)

1.5 STATUS OF EFFECT OF SETTLEMENT AGREEMENT

1.5.1 The settlement agreement signed by the parties as a result of conciliation proceedings shall have the same status and effect as it is an arbitral award on agreed terms.

39. DISPUTE RESOLUTION BOARD (DRB) APPLICABLE FOR CONTRACTS OF VALUE MORE THAN Rs.10 crore.

(a) During execution of this works or after completion or after determination/cancellation/ termination of the contract all disputes between the parties to contract arising out of the contract (except those for which decision of Accepting Officer or any other officer is expressed to be final and binding). Including any disagreement by either party with any action, inaction, opinion, instruction, certificate or valuation by the Accepting Officer or his nominee, the matter in dispute shall, in the first place be referred to the Dispute Resolution Board (DRB). In case of disagreement with the decision of such DRB, any pray may invoke arbitration clause.

(b) The constitution of the DRB shall be a three member body as under:-

(a) Chairman : DDG of the concerned ADGBR. Where DDG is not posted in the ADGBR, any other senior level Col/Director posted in ADBR shall be nominated by ADGBR at his sole discretion.

(a) Member 1
(b) Member 2

} Col/Director rank Officers of ADGBR or of any other CE (Project) be nominated by ADGBR

(c) The name of Chairman and members shall be notified by the Accepting Officer within one month of the date of acceptance of Contract.

(d) Once the DRB is constituted the members and Chairman shall disclose in writing their neutrality and impartiality about any personal interest in the work.

(e) The dispute shall be referred to the Chairman of DRB by the concerned party after giving notice to the other party for invoking of this clause.

(f) The DRB shall decide the dispute in accordance with the terms of the Contract, principle of natural justice, equity and fair play.

(g) The DRB may fix oral hearing at a place, date and time as decided by the Chairman.

(h) The requisite administrative support to the DRB shall be provided by the Accepting Officer.

(i) All the contract documents pertaining to the case shall be provided by the Accepting Office for reference by the DRB.

(j) DRB shall give its decision on the disputes within three months of notice from any party invoking the DRB clause. This period can be extended by one month with the consent of the parties.

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(j) DRB shall give its decision on the disputes within three months of notice from any party invoking the DRB clause. This period can be extended by one month with the consent of the parties.

(k) All the decisions given by the DRB shall be by majority and such decisions shall be communicated in writing by Chairman to the parties.

(l) If the decision of the DRB is not to he satisfaction of either party or if the DRB fails to given decision within the laid down time either party shall indicate his reservations on the decision to Accepting Officer within 30 days of such decision and to refer that dispute for arbitration.

(m) It shall be mandatory for the party invoking arbitration on any particular dispute to have first exhausted the remedy provided under the DRB clause for that particular dispute.

(n) The mandate of the DRB shall terminate on completion of one year from the date of completion/determination/cancellation/termination of the contract.

(o) If any member or Chairman of the DRB is unable to function due to any reason whatsoever, or he resigns his appointment, concerned ADGBR shall fill the vacancy so caused within 125 days of happening of such vacancy.

(p) Any dispute referred to the DRB and having been decided by the DRB and not objected to by either party within 30 days shall attain finality and shall not be referable to arbitration.

(q) Accepting Officer shall ensure implementation of the decisions of the DRB dwhich attain finality, i.e. except those which are objected by him or by contractor within 30 days as per Para 2 above.

(r) Findings and decision of DRB shall be admissible as evidence, to the extent permissible as per law, in the subsequent Arbitration and/ or litigation.

(s) DRB Chairman/member shall not in any case, be liable to be called as witness or to produce any evidence in any Arbitration or departmental proceedings of any kind.

(t) During execution of work the disputes may be referred to the DRB as per the requirement of each party after having exhausted the decision making process provided in the contracts. In case of completion of work or after determination/cancellation/termination of the contract all the disputes including payment/non-payment/delay in final bill shall be simultaneously referred to the DRB within six months of completion/determination/cancellation/termination of contract.

(u) The department case before the DRB shall be presented by Accepting Officer himself and/ or Dir (Contract) of CE Project assisted by Task Force Commander and his SW, OC RCC/BCC and any other officer and legal counsel nominated by Accepting Officer. The Contractor may present his case by himself and/ or by his nominated reps & authorized legal/technical counsel.

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For Accepting Officer

(Signature of the Contractor)

40. **ARBITRATION (REFER CLAUSE 70 OF CONDITION OF CONTRACT OF IAFW-2249)**

All disputes or differences arising as aforementioned, other than those for which the decision of the Accepting Officer or any other person is by the contract expressed to be final and binding shall be referred to sole arbitrator under condition No 70 of General Conditions of contract IAFW-2249 after written notice by either party of the contract to the other of them. In addition to above Arbitration and conciliation (Amendment) Act 2015 will also prevail.

41. LEGAL JURISDICTION: Legal jurisdiction for this contract agreement shall be **"Courts at Siliguri/Kolkata in the State of West Bengal"**.

42. **HIRING CHARGES OF LAND:** Payment of rent for road side land if any where crusher and HMP plants will be installed based on the requirement of Daily works will be payable by Contractor and this will not be reimbursable by the Deptt.

43. CONTRACT LABOUR (R&A) ACT 1970

The contractor shall get himself registered with Asst Labour Commisiioner, Siliguri as required under contract labour (Regulation and Abolition) Act 1970. If he does not fall within the purview of said act, he shall obtain a no objection certificate from ALC, Jalpaiguri to above effect. A copy of the certificate of registration or the no objection certificate (as the case may be) shall be submitted by him to the Accepting Officer within 15 days of the award of the work. In the event of his non-compliance, the contractor shall be liable for punitive action under CL (R&A) Act 1970.

44. LOSS OR DAMAGE ON ACCOUNT OF ENEMY ACTION

(a) If as a result of enemy action, the contractor suffers any loss or damage, the Government shall reimburse to the contractor such loss or damages, to the extend and in the manner herein after provided:-

(i) The loss suffered by him on account of any damage or distruction of his equipment (as defined in condition 11 (2) above), the amount of losses assessed by the Accepting Officer of the contract on this account shall be final and binding.

(ii) Compensation paid by him under any law for the time being in force to any workmen employed by him for any injury caused to him or the workmen's legal successor for loss of the workmen's life.

(b) No requirement shal be made nor shall any compensation be payable under the above provisions unless the contractor had taken Air Defence Precautions ordered in writing by OC concerned or in the absence of such orders, reasonable precautions. No re-imbursement shall be made nor shall any compensation be payable for any equipments not laying on the site of work at the time of enemy action.

45. REGISTRATION FEE/TRADE TAX/INCOME TAX ETC.

Tendered rates/amount shall also be deemed to include the payment of all taxes like Registration fee, Trade Tax, Income Tax and other taxes/levies to be paid to the Govt of India/Royal Govt of Bhutan already in force and as may be modified from time to time. The contractor may ascertain full details on this respect from the concerned department(s).

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For Accepting Officer

(Signature of the Contractor)

46. ADJUSTMENT OF TAX CONSEQUENT UPON AMENDMENT TO CONSTITUTION

The tendered rate shall also be inclusive of all statute levies and State / Union Territory / shall tax on works contract payable under the respective statutes pursuant to the constitution stipulated by the tenderers regarding sales tax on works contracts will not be considered and such tender will be liable for reject

47. ESCALATION:- No claim of reimbursement in increase of labour wages, cost of POL and materials is admissible under this contract including extended period, if any.

48. INCOME TAX:- Indian Income Tax @ 2% and BCT (@ 3% for Indian Contractors and @ 2% for Bhutanee Contractors) will be deducted at source as applicable.

49. DEDUCTION OF TAX AT SOURCE:- Indian Income tax and BCT shall be deducted at source as applicable

50. REGISTRATION:- Contractor is required to get his firm registered with GST and Asst Labour Commissioner of the area under Contract Labour (R&A) Act and Building and other construction workers Act. A Copy of valid registration certificate issued will be submitted to OC Contract while processing RARs / Bills.

51. MANDATORY REQUIREMENT FOR MAKING PAYMENTS: E-PAYMENT THROUGH NEFT/RTGS/ECS/EBS (THIS SUPERSEDES CONDITION 66 OF GENERAL CONDITIONS OF CONTRACT OF IAFW-2249.

51.1 All payment will be made through E-payment and hence tenderers must furnish NEFT Form duly signed by the Bank Authorities.

Appendix-A to special conditions No 51

NEFT / RTGS MANDATE FORM

1.	Name of Firm / contractor as per account in the Bank	
2.	Beneficiary's Account Number (As appearing on the Cheque Book)	
3.	Name of Bank where a/c is held	
4.	Name of Branch	
5.	Address of Branch	
6.	Telephone No. of Branch	
7.	IFSC Code of Branch	
8.	9-digit MICR Code Number of the Bank & Branch	
9.	E-mail ID of Contractor	

Note:- **Please attach a blank cancelled cheque for verification of the above particulars.**

I, hereby, declare that the particulars given above are correct and complete. If the transaction is delayed or not effected due to incomplete or incorrect information of the bank details, I will not hold the payment releasing authority responsible for it.

Dated: Signature of the Contractor (Seal)

CERTIFICATE BY BANK

Certified that the particulars furnished above are correct as per our records.

Seal of Bank (Signature of the branch manager of the Bank)
Dated :

AE (C)
ASW
(Signature of the Contractor) For Accepting Officer

SPECIAL CONDITIONS (CONTD)

52. PLANNING AND DESIGNING IN PURVIEW OF VULNERABILITY ATLAS OF INDIA

Vulnerability Atlas of India (VAI) is a comprehensive document which provides existing hazard scenario for the entire country and presents the digitized State/UT-wise hazard, maps with respect to earthquakes, winds and floods for district-wise identification of vulnerable areas. It also includes additional digitized maps for thunderstorms, cyclones and landslides. The main purpose of this Atlas is its use for disaster preparedness and mitigation at policy planning and project formulation stage.

This Atlas is one of its kind single point source for the various stakeholders including policy makers, administrators, municipal commissioners, urban managers, engineers, architects, planners, public etc. to ascertain proneness of any city/location/site to multi-hazard which includes earthquakes, winds, floods thunderstorms, cyclones and landslides. White project formulation, approvals and implementation of various urban housing, building and infrastructures schemes, this Atlas provides necessary information for risk analysis and hazard assessment. The Vulnerability Atlas of India has been prepared by Building Materials and Technology Promotion Counsel under Ministry of Housing and Urban Affairs, Government of India and available at their website www.bmtpc.org . It is mandatory for the bidders to refer Vulnerability Atlas of India for multi-hazard risk assessment and include the relevant hazard proneness specific to project location while planning and designing the project in terms of:

(i) Seismic zone (II to V) for earthquakes.

(ii) Wind velocity (Basic Wind Velocity:55, 50, 47, 44, 39 &33 m/s)

(iii) Area liable to floods and Probable max surge height

(iv) Thunderstorms history

(v) Number of cyclonic storms/severe cyclonic storms and max sustained wind specific to Coastal region

(vi) Landslides incidences with Annual rainfall normal

(vii) District wise Probable Max. precipitation

AE (C)
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For Accepting Officer

(Signature of the Contractor)

SPECIAL CONDITIONS (CONTD)

Annexure-I to special conditions

FORMAT FOR BANK GURANTEE FOR ADVANCE PAYMENT

From:

Bank_____

To
The President of India
Sir,

1. With reference to contract Agreement No_____ concluded between the president of India, hereinafter referred to as "The Government" and M/S_____ hereinafter referred to as the "the contractor" for _____ as detailed in the above contract agreement hereinafter referred to as "the said contract" and in consideration of the Government having agreed to make an advance payment in accordance with the terms of the said contract to the said contractor, we the _____bank, hereinafter call 'the Bank' hereby irrevocably undertake and guarantee to you that if the said contractor would fail to provide works in accordance with the terms & conditions of the said contract for any reason whatsoever or fail to perform the said contract in any respect or should whole or part of the said on account payments at any time become repayable to you for any reason whatsoever, we shall, on demand and without demur pay to you all and any sum up to a maximum of Rs._____(Rupees _____only) paid as advance to the Contractor in accordance with the provisions contained in clause_____ of the said contract.

2. We further agree that the Government shall be the sole judge as to whether the contract has failed to provide works in accordance with the terms & conditions of the said contract or has failed to perform the said contract in any respect or the whole or part of the advance payment made to contractor has become repayable to the Government and to the extent and monetary consequences thereof by the Government.

3 We further hereby undertake to pay the amount due and payable under this Guarantee without any demur merely on a demand from the Government stating the amount claimed. Any such demand made on the Bank shall be conclusive and binding upon us as regards the amounts due and payable by us under this Guarantee and without demur, However, our liability under this Guarantee shall be restricted to an amount not exceeding Rs_____ Rupees _____ only).

4. We further agree that the Guarantee herein contained shall remain in full force and effect for a period upto_____(03 months+due date of recovery of advance) unless the Government in his sole discretion discharges the Guarantee earlier.

5. We further agree that any change in the constitution of the Bank or the constitution of the contractor shall not discharge our liability hereunder

6. We further agree that the Government shall have that fullest liberty without affecting in any way our obligations hereunder with or without our consent or knowledge to vary any of the terms and conditions of the said contract or extend the time of development/delivery from time to time or to post pone for any time or from time to time any of the powers exercisable by the Government against the contractor and either to forebear or enforce any of the terms and conditions relating to the said contract and we shall not be relieved from our liability by reason of any such variation or any indulgence or for bearance shown or any act omission on the Government or by any such matter or thing whatsoever which under the law relating to sureties would but for this provision have the effect of so relieving us.

7. We lastly undertake not to revoke the Guarantee during the currency of the above said contract except with the prior consent of the Government in writing.

Yours faithfully,

Place: _____ For_____ Bank

Date : _____ (Authorised Attorney)

Seal of Bank

PARTICULAR/TECHNICAL SPECIFICATIONS

DESIGN AND CONSTRUCTION INCLUDING PLATE LOAD TEST OF 18 MTR SPAN RCC T-BEAM BRIDGE AT KM 51.019 ON ROAD CONFLUENCE-HAA UNDER 19 BRTF PROJECT DANTAK IN BHUTAN

1. **GENERAL**

1.1 The work required to be carried out under this contract broadly comprises of the following:-

(a) Setting out benchmarks, centreline pillars and laying out the bridge scheme on ground and getting it approved from the Accepting Officer.

(b) Excavation of foundation up to the given foundation level , insitu test and laboratory test of foundation strata to ascertain suitability of strata to place foundation. Explanatory boring extending to a depth 1.5times the proposed base width where specified.

(c) Detailed design and preparation of detailed construction drawings, getting it proof checked from IIT and obtaining approval thereof from HQ CE(P) Dantak, making modifications as required and submission of the requisite number of copies of approved drawings and design calculations.

(d) Construction of the bridge as per the approved design and drawings and as per specifications mentioned hereinafter.

(e) Load testing of the superstructure of the bridge.

(f) Site clearance.

(g) Any temporary river training or river diversion works required for execution of works. Any loss or damages to the existing structure while carrying out river training or diversion works shall be made good by the contractor, without any extra cost to the department.

(h) The lumpsum quoted cost shall be deemed to include all costs towards all preparatory work or any other work not specifically list but required for successful completion of the bridge.

1.2 This contract does not include any work of approaches and approach slabs.

1.3 To cater for any change in the design requirements (other than ‘Clear carriageway’ and‘ load classification’ etc)the formula EE given in **Annexure-I to Schedule ‘A’** shall be applicable for pricing the deviations, if ordered for the following items:-

(i) Rate per running meter increase or decrease in length of the bridge. For this purpose ,length of the bridge shall be measured as the distance between center to center of end bearings or distance between outer ends of the abutments in case of PSC cantilever bridges where abutments are monolithic to superstructure.

(ii) Rate per running meter increase or decrease in height of substructure due to change in RL of foundation& deck level of the bridge. For this purpose, the height of substructure shall be taken from foundation level given in the tender drawing to top of bridge deck at crown level.

(iii) In case of change in type of foundation from open to well or otherwise due to ground condition and exposed soil parameter, no extra cost will be payable. However, variation in depth foundation with respect to original one will be adjusted suitably as brought out above.

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For Accepting Officer

(Signature of the Contractor)

(PARTICULAR/TECHNICAL SPECIFICATIONS CONTD…)

1.4 Limit State Method of Design shall be adopted for the bridge in accordance with relevant IRC/BIS Codes and MoRTH Specifications for Road and Bridge Works(Fifth revision).

2. LOCATION

2.1 The approximate location of the bridge is as under:-

Srl No	Name of Bridge	Name of Road	Distance in Kms from Nearest Rail Head Rangia	Remarks
(a)	At Km 51.019	Confluence-Haa	239.02Km (67Km inPlainarea,121Km in Hill Area& 51.02 Km in High Altitude Area)	Bridge proposed at approx. Km 172.02 from Phuentsholing

2.2 Key plan showing the location of the bridge is given in Key Plan drawing enclosed with tender documents.

3. SETTINGOUTBENCH MARKS,CENTER LINEANDPILLARSETC

3.1 The contractor shall layout the bridge scheme on ground and get it approved from the Accepting Officer. There after, concrete or masonry pillars indicating the exact centerline adopted for the bridge shall be erected about 20 meters (minimum) beyond the abutments at either end of the bridge to enable check being maintained on the centerline through out the period of construction. The pillars shall be of substantial section to retain their true position during the progress of the work. The dimensions and strength of the pillars shall be adequate for the theodolite/total station to be accommodated on them for taking readings. Sufficient number of bench marks and other reference pillars shall be provided at suitable locations to enable complete check being maintained on the accuracy of various levels and position. The cost of work shall be deemed to be included int he tendered lump sum.

3.2 The Accepting Officer, due to prevailing site condition may change the site of the bridge. In the event of his decision to change the site, the contractor shall not be entitled to any extra payment as long as the design requirement remains unaltered .Any change in the design requirements ,whether in consequence of the change of site or otherwise, will however be treated as deviation and its financial effect shall be worked out in accordance with the provisions made elsewhere in the contract.

4. SITEAND DESIGN DATAOF THE BRIDGE

4.1 BRIDGE DETAIL

4.1.1	Site of bridge	As shown in Drawing enclosed with Tender documents.
4.1.2	Length of bridge	18 mtr length (Center to Center of bearings)
4.1.3	Span arrangement	Single Span

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4.2 **RIVER DETAILS**

4.2.1	Clear linear waterway at HFL	18mtr
4.2.2	Highest flood level	RL2715.93mtr
4.2.3	Lowest wate rlevel	RL2710.69mtr
4.2.4	Nature of foundation strata	SMB at Confluence side bank and Rock strata at Haa side bank .Exact nature of founding strata will be ascertained through SSI to be conducted by the successful tenderer.
4.2.5	Max scour depth	5.70Mtr
4.2.6	Max scour level for Piers	Not applicable
4.2.7	Surface velocity of water at HFL	8.54Mtr/sec
4.2.8	Minimum vertical clearance above HFL required	1.50mtr
4.2.9	Minimum over head clearance required from the crown ofcarriage way	Not applicable

4.3 **SUB STRUCTURE**

4.3.1	Type of Foundation	Open foundation
4.3.2	Foundation Level of Abutments	RL2716.90Mtr (Haa side) and RL 2708.20 Mtr (Confluence side)(Based on Non scour criteria). However, final RL will be decided by Deptt based on Plate load Test conducted by contractor on award of contract. Above founding RL shall be reference for ordering deviations in foundation depth.
4.3.3	Foundation level of Piers	NA
4.3.4	Seismic Arrangement	Reaction Block and seismic arrester shall be provided asper clause 219.9 of IRC-6–2017

4.4 **SUPERSTRUCTURE**

4.4.1	Type of superstructure	RCC T Beam and slab (As per MORT&H Standard drawing No. SD 231)
4.4.2	Clear carriageway width.	7500 mm
4.4.3	Crash barriers.	RCC Crash barriers on both sides as per clause 109.6.3Fig1 of IRC: 5–2015.
4.4.4	Footpath	1.50mwidebothside.
4.4.5	Railings	RCCRailingonbothsidesasperclause109.6.3 Fig1&Clause 109.7 of IRC: 5–2015.
4.4.6	Minimum overall width of superstructure	12.00 mtr
4.4.7	Transverse slope in the deck	2.5%withcurvedridgeasperClauseNo.2702.3ofMoRT&H (Roadswing)SpecificationsforRoads and Bridges.

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4.4.8	Wearing Course	RCC wearing coat 75mm thickness to be kept uniform as per Clause No.2702.2 of MoRT&H (Roads wing) Specifications for Road and Bridge Works.
4.4.9	Service/utility arrangement	Required on both sides
4.4.10	Expansion Joint	Strip seal expansion joint
4.4.11	Bearings	POT and POT-cum-PTFE(asperIRC-83(part-III)-2002
4.4.12	Return wall	5.0Mtr behind the abutments
4.4.13	Dirt Wall	Minimum thickness–300 mm

4.5 **DESIGN DATA**

4.5.1	Design live load	Two lanes of IRC Class A or one lane of (Considering two lanes)Class70RasperIRC:6-2017, which ever produces severe stresses.
4.5.2	Service/Utility load	750Kg/m on each side
4.5.3	Foot path load	400Kg/Sqm modified as per relevant clause206.1ofIRC:6-2017.
4.5.4	Seismic coefficient	(a)The bridge shall be designed for seismicz one-V in accordance with Clause 219 of IRC: 6-2017. (b) Importance factor(I)=1.20 (c) Reaction block or other type of seismic arresters shall be provided asperclause219.9of IRC:6-2017.
4.5.5	Snow load	Not applicable
4.5.6	Temperature effects	Maximum (+) 35^0C& Minimum (+)7^0C Design to be done as per the Provisions given in Clause No.215 of IRC:6-2017. The superstructure shall also be checked for the effects of distribution of temperature across the deck depth. The temperature distribution for bridge deck maybe taken asper IRC6-2017. The thermal stresses shall be taken care of by providing adequately designed on tensioned reinforcement subject to crack width limitations stipulatedinIRC:112-2011.

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4.5.7	Wind velocity and wind load	Asper Clause No.209ofIRC: 6-2017.
4.5.8	Buoyancy	Buoyancy to be allowed as per relevant clause ofI RC 6–2017.
4.5.9	Differential settlement	25mm
4.5.10	Property of backfill materials for foundation	
	(a) Bulk density of the material used as backfill	2.0T/Cum
	(b) Angle of internal Friction backfill material	36^{0}
	(c) Angle of wall friction	22.5^{0}
	(d) Submerged weight of backfill material	1.00T/Cum
4.5.11	Properties of soil up to foundation level	To be verified based on insitu and laboratory test at foundation level. However, tentative values given below.
	(a) Bulk density of the material	1.8T/Cum
	(b) Cohesion “C”	0T/ Sqm
	(c) Angle of internal friction	36^{0}
	(d) Submerged weight of soil “Y sub”.	1.0T/Cum
	(e)Safe bearing capacity	Tentative-70T/sqm@RL2716.90Mtr (Haa Side) and 2708.20 Mtr (Confluence side).However, to be confirmed based on in-situ and laboratory tests at the founding level.
4.5.12	Frictional Coefficient between foundation and founding soil	
	(a) Co-efficient of base friction (as per clause706.3.4 of IRC 78-2014)	0.50- Between concrete and soil 0.80- For good rock 0.70- For fissured rock
	(b)Factor of safety against	
	(asperclause706.3.4of IRC 78-2014)	**Overturning Sliding Deep-seated failure**
	(i) Non seismiccase	2.00 1.5 1.25
	(ii) Seismic case	1.50 1.25 1.15
4.5.13	Allowable tension at foundation base, if any	No tension is permitted at foundation base in any combination of load.
4.5.14	Type of concrete	Design mix standard concrete, proportioned by weight of its ingredient
4.5.15	Exposure condition for mix design of concrete	Severe

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4.5.16	Grade of steel	
	(a)Grade of Reinforcement Bar	High Yield Strength Deformed steel bar Fe 500D conforming to IS :1786
	(b) Structural steel	Quality 'B0' for Normal areas (Minimum temperature above zero deg Celsius) and Quality "C" for High Altitude Areas (Minimum temperature sub-zero) of any grade conforming to IS:2062-2011.
	(c) Pre-stressing Steel	Not applicable.

4.6 **PLATE LOAD TEST**

4.6.1	At given foundation level	All field test viz plate load test, penetration test and Van shear test and Laboratory test viz soil classification, tri-axial shear, unconfined compression, density, moisture content & gradation be conducted to determine SBC and suitability of foundation strata to place foundation and determine soil parameters for design.
4.6.2	Below given foundation level	
	(a) Whether exploratory bore holes to be conducted	-
	(b) Ifyesthe next intend Nos of bore holes	-

4.7 **DRAWINGS**: The drawings forming part of this contract are:-

4.7.1	Departmental Drawing	As shown in Drg No. (Key plan drawing enclosed with Tender documents).
4.7.2	Contractor's drawings	Detailed design and drawings for complete construction of subject bridge duly proof checked from any **IIT** and approved by CE(P) Dantak will be submitted by the Contractor. Contractor will also submit copy of all the approved drawings on digital format (CD).

5. **PLATE LOAD TEST.**

5.1 Plate load test should be carried out as per IS:1888

6. **FOUNDATIONS**

6.1 **GENERAL**

6.1.1 A Bridge can have open foundation, well foundation or pile foundation for its abutments and piers. The foundation for this bridge shall be as specified in the particular specification (Site and Design Data)and NIT drawing with due regard to the conditions peculiar to the Site and with due consideration for existing structures and design para meters given at Clause4above.

6.1.2 Structurefoundedonrockshallbeembeddedintosoundintegralandcontinuousrockand takenatleast1.50 minsidethestrataasstipulatedinIRC:78-2014. Wherever the foundation will be resting on rock, the same is required to be anchored. The minimum anchorage reinforcement shall be 28-mm dia HYSD steel barsat1.0mC/C along the periphery taken at least1.50m into the rock through minimum65mmdiameterdredgehole.Fulldevelopmentlengthofanchoringbar(minimum1.5m)be anchored into concrete above the founding level. Tenderer's lump sum should include such cost,if any.

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6.1.3 In case concreting of foundation is done under water, atleast10%extra cement shall be added over and above that required for the mix specified. Nothing extra shall be admissible on this account over and above the quoted lumpsum amount.

6.1.4 In case of open foundation, filling of surrounding ground will be as perIRC:78-2014. In case of excavation in rock the PCC filling should be limited to 0.5m above the top of footing.

6.1.5 Founding level specified will be the top of the leveling course.

6.1.6 In checking the stresses at the base of all the foundations ,it shall be ensured that under any combination specified in IRC:78-2014, there should be no tension for any type of soil including soil mixed with boulders, soft erodible or fissured rock. HoweverforhardrocktheprovisionsofIRC:78-2014shall apply.

6.1.7 The contractor shall carryout trench excavation. Open excavation to large depth is not advisable as this disturbs the bed and bank to very large extent. Therefore, to avoid disturbance, only trench excavation should be followed. Tenderer has to devise suitable method to reach the foundation level either by trench excavation or by sinking the well to required level. Lump sum quoted rates by the tenderer shall be inclusive of whatever method is adopted by him.

6.1.8 If any change in the depth of foundation becomes necessary on account of alteration in design requirement as compared to the design requirement stipulated in the tender documents, such variation (increase/decrease) in depth of foundation shall be adjusted through a deviation order priced at the rates quoted in Annexure to Schedule “A”. The variation in depth of foundation shall be reckoned with reference to the levels indicated in tender drawing. These rates shall be deemed to include structural alterations etc, necessitated by any variations in the design requirement and the cost of the extra efforts involved n redesigning.

6.1.9 If during construction, problems are encountered that necessitate changes in type of foundation i.e. from open foundation to well foundation for any reason including change in soil parameters, the same has to be done at no extra cost to the Government and department’s liability shall be limited only to the extent of lumpsum fixed rate quoted by the contractor in **Schedule“A**”. However, variation in the depth of foundation with respect to that the one shown in the NIT drawing will be adjusted suitably through deviation order priced at the rate quoted in Annexure‘J’ to Schedule ’A’.

6.2 **OPEN FOUNDATION**

6.2.1 Openfoundationsifadoptedshallmeettherequirementsasspecifiedinclause707of IRC: IRC:78-2014.

6.2.2 In case of deep excavation for open type foundations, the contractors shall use suitable methods like sheeting and bracing etc,as approved by the OC Contract to reach the proper foundation level without any extra cost for the method adopted by the contractor.

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6.2.3 In case where the contractor on his own desires to take the foundation to a level below those specified in the design data for taking advantage of the relief offered by the passive resistance of soil or increased bearing capacity of the soil to meet with the design requirements of the data specified in tender documents, nothing extra will be payable to the contractor on this account..

6.2.4 In seismic zone, the weight of soil likely to be resting on top of the foundation shall be taken into account while computing the seismic force.

6.2.5. Open foundations shall be designed/proportioned in such a way that ledge length of at least 3.0m is maintained all around.

6.3 WELL FOUNDATION

6.3.1 Foundations supporting the superstructure located in deep water channels shall comprise of properly dimensioned wells. Where well foundation is proposed, the design and construction of well shall conform to the stipulation given at Clause 708 of IRC-78-2014 and Section 1200 of MoRT&H Specifications for Road & Bridge Works (Fifth revision).

6.3.2 The stability and design of well foundation shall be done under the most critical combination of loads and forces as per Clause 706 of IRC-78-2014. The pressure on foundation shall satisfy the provision of Clause 706 of IRC-78-2014. In case of cohesion soil the suitability of well shall also be checked with respect to the provisions of IS-45..

6.3.3 A single circular well shall be generally adopted in design and shall have uniform steining thickness throughout. The thickness of steining should be such that it is possible to sink the well without excessive kentledge and without getting damaged during sinking or during rectifying the excessive tilts and shifts. The well shall have a minimum outer diameter of 7.00 metre and steining thickness not less than 1.0 metre. Single circular well having external diameter exceeding 12.0m shall require special treatment as specified in Clause 708.1.2 of IRC:78-2014.

6.3.4 Masonry wells or PCC wells are not permitted.

6.3.5 No tension is permitted at the base of well in any combination of load..

6.3.6 The cutting edge of well shall be made of structural steel and shall be strong enough to facilitate sinking of well through the type of strata excepted to be encounter. The weight of cutting edge shall not be less than 40 kg/per meter length..

6.3.7 In V shape cutting edge the inclined plate should meet the vertical plate in a way that full strength connection by welding is feasible

6.3.8 The well curb shall be in reinforced concrete having concrete mix minimum M-35 Grade with minimum reinforcement of 72 Kg/per cum excluding bond rods..

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6.3.9 In case blasting is anticipated for facilitating sinking through boulders and rocks, the inner face of well curb shall be protected with steel plates of thickness not less than 10 mm upto the top of well curb. Further, if considered necessary, the steining upto 3.0 mtr height shall also be protected with 6 mm thick plate. In any case, this extra height of the steel plate should not be more than 3.0 metres unless there is specific requirement. The curb as well as 3.0 mtr height of steining above the curb shall be provided with additional hoop reinforcement of 10 mm dia bar at 150 mm spacing. Additional reinforcement above this height upto two times the thickness of steining should be provided to avoid cracking arising out of sudden change in effective section due to curtailment of plate.

6.3.10 The stresses in well steining shall be checked at such critical sections where tensile and compressive stresses are likely to be maximum and also where there is change in the area of reinforcement or in concrete mix

6.3.11 The well steining shall be designed as a reinforced concrete column section subjected to combined axial load and bending. The amount of vertical reinforcement provided in the steining shall not be less than 0.20 percent of the actual gross cross sectional area of the steining. On the inner face, a minimum of 0.06 percent (of gross area) steel shall be provided. Transverse reinforcement in steining shall be provided in accordance with the provisions for a column but in no case shall be less than 0.04 percent of the volume per unit length of the steining

6.3.12 The stability of well shall also be checked for the construction stage where there is no superstructure and the well is subjected to design scour, full pressure due to water current and/or full design earth pressure. 6.3.13 As far as possible, the wells shall be sunk to plumb without any tilts and shifts. No well shall be permitted in pre-dredged hole. The tilt of any well 1(horizontal) in 80 (vertical) and a resultant shift of 150 mm due to translation (both additive) in a direction which will cause most severe effect shall be considered in the design of well foundations. If the actual tilts and/or shifts of any well exceed the above limits, then the Contractor shall have to carry out, at his own cost, suitable remedial measures to bring the tilt and shift within permissible limits. If it is not possible, the well so sunk shall be regarded as not conforming to specifications and classified as a sub-standard work. The Accepting Officer, in his sole discretion, may consider accepting such a well provided that calculations for foundation pressures, steining stresses etc, accounting for actual tilt and shift furnished by the Contractor show that the well is safe, remedial measures to bring the stresses within permissible values is carried out by the Contractor at his own cost and the Contractor is subjected to reduction in rates as penalty in accordance with Clause 1216 (g) of MoRTH Specifications (Fifth revision). In case the Accepting Officer, in his sole discretion, rejects the well, the Contractor shall dismantle the rejected well to the extent directed by the Accepting Officer and remove the debris. Further, the Contractor shall at his own risk and cost, complete the bridge with modified span arrangement acceptable to the Accepting Officer.

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6.3.14 Bottom plug shall be provided in all wells and shall extend to a height of 300 mm above well curb. Below the cutting edge, a suitable sump of 150 mm shall also be provided. The concrete mix used in bottom plug shall have a minimum cement content of 330 Kg/m 3 and a slump of 150mm to permit easy flow of concrete through tremie to place fill-up all cavities. For under water concreting the concrete shall be placed by tremie pipe under still water and cement content of mix be increased by 10 per cent.

6.3.15 The filling of well above bottom plug shall be done with sand, free from organic matter. Sand filling shall commence 7 days after bottom plug. A 300 mm thick plug of M-25 concrete shall be provided over the filling.

6.3.16 The bottom of well cap shall generally be laid at low as possible, but above the LWL in active channel. Where the bed level is higher than the LWL, the bottom of well cap may be suitably raised. Longitudinal bars coming from well steining shall be anchored into well cap. Design of the well cap shall be based on any rational method, considering the worst combination of loads and forces as per Clause 706 of IRC :78-2014.

6.3.17 The well shall as far as possible be sunk true and vertical through all types of strata. Sinking or loading of the well with kentledge shall be commenced only after the steining has been cured for at least 48 hours. For safe sinking of wells, necessary guidance may be taken from Appendix-4 of IRC:78. Complete history of sinking of each well giving details of concreting, sinking and problems met, if any, shall be maintained in the format given in **Appendix 1000/l of MoRTH** Specifications (Fifth Revision).

6.4 PILE FOUNDATIONS

6.4.1 Piles transmit the load of a structure to competent subsoil strata by the resistance developed from bearing at toe or skin friction along the surface or both. The construction of pile foundation requires a careful choice of piling system depending upon subsoil conditions, load characteristics of structures, permissible limits of total and differential settlement, unsupported length of pile under scour and any other site specific requirement.

6.4.2 Design and construction of Pile Foundations, wherever proposed, shall be governed by IS:2911 subject to limitations/stipulations given in Clause 709 of IRC:78-2014, Section 1100 of MoRTH Specifications for Road and Bridges (5 th revision) and these tender documents. Appendix-5 of IRC:78-2014 gives the design formulae and their applicability. Geotechnical capacity of piles for various factors shall be estimated in accordance with Clause 709.3 of IRC:78.

6.4.3 The complete subsurface investigations of strata to ascertain the nature of strata around the pile shaft and below the tip shall be carried out. Depth of boring shall not be less than:

(i) 1.5 times estimated length of pile or 15m below the proposed founding level.

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(ii) 15 times diameter of pile in ordinary/ jointed rock but minimum 15m in such rock.
(iii) 4 times diameter of pile in hard rock but minimum 3m in such rock

6.4.4 Bored Cast-in-situ Concrete piles shall be used. Minimum diameter of concrete piles shall be one meter for bridges. A group of two or more piles shall be adopted to support any abutment/pier. Maximum rake to be permitted in pile shall not exceed 1 in 6. Concreting shall be done by tremie method in accordance with Clause 709.6.2 of IRC:78.

6.4.5 The values regarding grade of concrete, minimum cement content, maximum water cement ratio and slump shall be as under:

(i)	Minimum Grade of Concrete	:M35
(ii)	Minimum Cement Content	:400kg/m^3
(iii)	Maximum Water Cement ratio	: 0.40
(iv)	Slump	:150–200 mm

6.4.6 A pile as a structural member shall have sufficient strength to transmit all the load effects from structure to soil and its structural capacity examined as a column. The pile shall also be designed to withstand the temporary stresses, if any. The permissible stresses shall be as per IRC:112. The test pile shall be separately designed to carry test load safely to the foundation.

6.4.7 The reinforcements in pile shall be provided complying with the requirements of IRC:112, as per design requirements. The area of reinforcement shall not be less than 0.40 per cent nor greater than 2.50 per cent of the actual area of cross section of piles. The clear spacing between vertical bars shall not be less than 100 mm. Grouping of not more than two bars together can be made for achieving the same. Lateral reinforcement shall be provided in the form of spirals with minimum 8 mm diameter HYSD bars, spacing not more than 150 mm. For inner layer of reinforcement, separate links tying them to each other and to outer layers shall be provided.

6.4.8 Casting of pile cap should be at a level higher than low water level and concreting shall be done in dry condition. Pile caps shall be of reinforced concrete. A minimum offset of 150mm shall be provided beyond outer faces of the piles in the group. If the pile cap is in contact with earth at the bottom, a leveling course of minimum 80mm thick plain cement concrete (M-25) shall be provided. The top of the pile shall project 50 mm into the pile cap and reinforcements of pile shall be fully anchored in pile cap.

6.4.9 The requirements and steps for design and installation of pile shall be as brought out under Clause 709.2 of IRC:78-2014.Testing of Piles (Initial and Routine) shall be done as per the procedure laid down in IS:2911, Part-IV. Important considerations, inspections and precautions as given under Clause 709.6 of IRC:78 shall be adhered to for pile works.

6.4.10 Permissible tolerances for piles and pile caps shall be as per Clause 1116 of MoRTH Specifications for Road and Bridge works (Fifth Revision)

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6.5 ADDITIONAL DESIGN ASPECTS FOR FOUNDATIONS

6.5.1 Thefollowingdesignaspectsshallalsobetakenintoconsiderationinthedesignoverand above IRC Code requirement: -

(a) The founding level indicated in the departmental scheme is only the minimum level up to which the foundation will have to be taken on scour consideration or otherwise. The tenderer shall make preliminary design calculations to arrive at the probable founding level for his proposed scheme..

(b) For open foundations, passive reliefs due to earth and wall friction are not to be considered in the design.

(c) No allowance for skin friction is permissible in the design of substructure. Maximum horizontal forces will include the seismic forces on complete back fill behind the abutment and resting on abutment raft or well cap or pile cap or well steining etc.

(d) The vertical component of both the active and passive pressure of soil is to be neglected in the design

(e) The stability of pier wells in cohesive soil and abutment wells both in cohesive and non-cohesive soils shall be checked in accordance with IRC: 78-2014. The stability of wells in non-cohesive soils shall be checked as per IRC:45

(f) The weight of water filled in well and substructure above scour will be taken into account while calculating seismic force.

6.6 APPROVAL OF FOUNDATIONS

6.6.1 The contractor shall get the foundation strata approved by the Accepting Officer before laying concrete for the foundations.

6.6.2 Complete details about properties of foundation strata and its safe bearing capacity including details with regard to tilt & shift (in case of well foundation) shall be presented to OC, Contract for obtaining approval of Accepting Officer.

7 SUBSTRUCTURE

7.1 GENERAL

7.1.1 In case of plain concrete substructure, surface reinforcement at the rate of 2.5 kg/m 2 shall be provided in each direction, i.e., both horizontally and vertically. Spacing of such bars shall not exceed 200 mm. In case of substructure in highly corrosive atmosphere (as per Clause 14.3.1 of IRC:112-2011), the surface reinforcement can be dispensed with if specifically allowed but the dimension of the substructure should be so proportioned to keep the stresses only up to 90 percent of the allowable stress.

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7.1.2 For the design of substructure below the level of the top of bed block, the live load impact shall be modified by the factors given in Clause 208.7 of IRC:6-2017.

7.1.3 Structures designed to retain earth fill shall be proportioned to withstand pressure calculated in accordance with any rational theory. No structure shall, however, be designed to withstand to horizontal pressure less than that exerted by a fluid weighing 480 kg/m^3, in addition to the live load surcharge if any

7.1.4 The backfill behind the wing and return walls shall conform to the specifications in Appendix-6 of IRC: 78-2014 with provision for proper drainage.

7.1.5 If foundations are designed on Non-Scour criteria, provision at Clause 219.6 of IRC:6-2017 shall not be applicable. Seismic forces shall be considered in the design.

7.1.6 Weep holes shall be provided on all structures such as abutment, wing wall and return wall to permit water to flow out without building up pressure in back fill. Weep holes shall be provided with 100mm diameter PVC/HDPE pipe. The weep holes shall extend through the full width of concrete masonry with slope of about 1 vertical to 20 horizontal towards the draining face. The spacing of weep holes shall be one meter in either direction with lowest at 150mm above the low water level or ground level whichever is higher or as directed by Engieer-in-Charge

7.2 ABUTMENTS

7.2.1 The abutments will carry superstructure from one side. It should be designed /dimensioned to retain earth from the approach embankment. Spill through type abutments shall not be permitted.

7.2.2 The abutment may be plain or reinforced concrete. The abutment may be solid type or buttressed type or counter fort type. Counter fort type abutment may be treated as T or L type as the case may be and the slab may be designed as continuous over counter forts.

7.2.3 The abutment should be designed to withstand earth pressure in normal condition in addition to load and forces transferred from superstructure. In addition, any load acting on the abutment itself, including self-weight, is to be considered.

7.2.4 All abutments shall be designed for a live load surcharge of 1.20 m height of earth fill.

7.2.5 Fully earth-retaining abutments should be designed considering saturated unit weight of earth during H.F.L. or L.W.L. condition. In case of footings, the submerged unit weight of soil where considered shall not be less than 1000 kg/m 3

7.2.6 The weight of earth filling material on heel may be considered. In case of toe, the weight may be considered if the bed is protected.

7.2.7 In case of abutments having counter-fort, the minimum thickness of the front wall should not be less than 300 mm and the thickness of the counter-fort should not be less than 300 mm.

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7.2.8 In case of box type abutments, weep holes shall be provided similar to hollow piers as per Clause 710.2.9 of IRC: 78-2014.

7.3 ABUTMENTPIER

7.3.1 Abutment piers may have to be provided at locations where there may be a need of increasing waterway subsequently. The design of such abutment pier shall be such that it should be possible to convert them to the similar shape as pier in the active channel.

7.4 DIRTWALLS,WING WALLSAND RETURN WALLS

7.4.1 Return walls shall be of sufficient length but not less than 4.0 mtr to retain the roadway to the required extent and to provide protection against erosion. The cantilever returns where adopted should not be more than 4 meters long.

7.4.2 A dirt wall shall be provided to prevent the earth from approaches spitting on bearings. A screen wall extending to full depth shall be provided to prevent slipping of back fill.

7.4.3 The return walls may be of solid or counter-fort type. The material used may be plain or reinforced concrete or masonry.

7.4.4 Dirt wall/ballast wall and screen wall shall be provided with minimum thickness of 300 mm.

7.4.5 The return walls should be designed primarily to withstand the earth pressure in addition to self-weight.

7.4.6 The top of the return walls shall be carried above the top of embankment by at least 100 mm to prevent any soil from being blown or washed away by rain over its top. A drainage arrangement for return wall/wing wall may be provided similar to that for the abutment specified in IRC 78-2014.

7.4.7 n case of open foundations, wing and return wall should be provided with separate foundations with a joint at their junction with the abutment.

7.4.8 The return walls may be provided at right angles to the abutment. Return walls shall be designed to withstand a live-load surcharge equivalent to 1.2 m height of earth fill

7.4.9 The box type return wall at right angles at both ends of the abutments connected by wall type diaphragm may be adopted where found suitable. However, in such cases, no reduction in the earth pressure for the design of the abutment should be considered. The top of diaphragm should slope inwards to the centre of carriageway for facilitating proper rolling of the embankment behind the abutment.

7.4.10 The foundation of return shall be taken adequately into the firm soil.

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7.4.11 The spilling of soil at the ends of the wing wall/return wall shall be assumed to be at the slope of 1 ½ horizontal to 1 vertical. The contractor shall be deemed to have allowed in his design to prevent the spills from fouling the clear linear waterway at HFL and bearings. Tenderer to note that in no case the length of the cantilever type wing wall/return wall shall be more than 4.0 m, if provided, and any increase in the span of bridge on this account to suit other tender stipulations shall not be acceptable to the department. Tenderer may provide open foundation for wing walls/return walls and the same shall be laid at a depth not lesser than 2.5m below the natural ground level with proper construction joints between such a wall and the abutment. However, the gravity return wall foundations shall not be made to rest on filled up soil. By providing such return wing wall, the tenderer has to ensure the provision of effective linear waterway and other tender clauses to the satisfaction of the department. Further the tenderer has to ensure the soundness of such a nonload bearing structure(s) by way of suitable design as laid down in relevant clauses of tender/relevant codes..

7.4.12 In case of cantilever return wall, bottom of the cantilever portion of the return wall should be embedded in embankment for 500 mm and top of the return wall shall be carried up to 100 mm above the top of the slope of embankment (above 100mm) to prevent any soil from blown/or washed by rain over its top. Back filling behind the abutment up to the original ground level shall be carried out by the contractor as per the laid down procedure to ensure proper compaction and reconstruction of the original SBC before excavation. Wherever, boulder or soil filling inside the abutment has been taken into account in the design. The same shall be carried out by the contractor up to the design level with suitable filter media as per IRC: 78 - 2014. The back filling will be done with boulders and granular materials only. SBC at foundation level of return wall shall be checked by plate bearing/other suitable test if necessary for safety of the design and same shall be deemed to be within the lump sum cost.

7.5 RETAINING WALLS

7.5.1 The retaining walls shall be designed to withstand earth pressure including any live load surcharge and other loads acting on it including self-weight in accordance with the general principles specified for abutments. Stone, masonry and plain concrete walls shall be of solid type. Reinforced concrete walls may be of solid, counter-fort, buttressed or cellular type. The minimum thickness of reinforced concrete retaining wall shall be 300 mm.

7.5.2 The vertical stems of cantilever walls shall be designed as cantilevers fixed at the base. The vertical or face walls of counter-fort type and buttressed type shall be designed as continuous slabs supported by counter-forts or buttresses. The face wall shall be securely anchored to the supporting counter-forts or buttresses by means of adequate reinforcements.

7.5.3 Counter-forts shall be designed as T-beams or L-beams. Buttresses shall be designed as rectangular beams. In connection with the main tension reinforcement of counter-forts, there shall be a system of horizontal and vertical bars or stirrups to anchor the face walls and base slab to the counter-fort. These stirrups shall be anchored as near to the outside faces of the face walls and as near to the bottom of the base slab as practicable.

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7.6 PIERS

7.6.1 Piers in stream and channel should give a minimum interference to flood flow. In general, piers should be placed parallel with the direction of stream current at flood stage.

7.6.2 Where necessary, piers shall be provided at both ends with suitably shaped cut waters as given in IRC:6. However, cut and ease water where provided shall extend up to affluxed HFL or higher, if necessary, from consideration of local conditions.

7.6.3 n general, Piers may be in PSC, RCC or PCC. Masonry piers are not permitted. Pier may be solid or hollow. The multi-column piers are not permitted. The thickness of walls of hollow concrete piers shall not be less than 500 mm.

7.6.4 Piers shall be designed to withstand the load and forces transferred from the superstructure and the load and forces on the pier itself, apart from the effect of its self-weight.

7.6.5 Hollow piers shall be provided with suitably located weep holes of 100mm diameter for enabling free flow of water to equalize the water levels on inside and outside; considering rate of rise/fall of flood water. The pier walls should be checked to expected differential water-head pressure and silt pressure. In absence of detailed calculations, a minimum difference of 1.50m in water levels on two sides shall be assumed.

7.6.6 The lateral reinforcement of the walls of hollow circular RCC pier shall not be less than 0.3 percent of the sectional area of the walls of the pier. This lateral reinforcement shall be distributed 60 percent on outer face and 40 percent on inner face.

7.7 WALL PIERS

7.7.1 When the length of solid pier is more than four times its thickness, it shall also be checked as a wall.

7.7.2 The reinforced wall should have minimum vertical reinforcement equal to 0.3 percent of sectional area.

7.7.3 For eccentric axial load, the wall should be designed for axial load with moment. The moments and the horizontal forces should be distributed taking into account the dispersal by any rational method.

7.7.4 Horizontal reinforcement should not be less than 0.25 percent of the gross area and open links (or S-loops) with hook placed around the vertical bar should be placed at the rate of 4 links in one running meter

7.7.5 When walls are fixed with superstructure, the design moment and axial load should be worked out by elastic analysis of the whole structure.

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7.8 PIER AND ABUTMENT CAPS

7.8.1 The width of the abutment and pier caps shall be sufficient to accommodate: -

(i) The bearings leaving an offset of 150 mm beyond them.

(ii) The ballast wall.

(iii) The space for jacks to lift the superstructure for repair/replacement of bearings, etc.

(iv) The equipment for pre-stressing operations where necessary.

(v) The drainage arrangement for the water on the cap

7.8.2 The thickness of cap over the hollow pier or column type of abutment should not be less than 250 mm but in case of solid plain or reinforced concrete pier and abutment, the thickness can be reduced to 200 mm.

7.8.3 Pier/abutment caps should be suitably designed and reinforced to take care of concentrated point loads dispersing in pier/abutment. Caps cantilevering out from the supports or resting on two or more columns shall be designed to cater for the lifting of superstructure on jacks for repair/replacement of bearings. The locations of jacks shall be predetermined and permanently marked on the caps.

7.8.4 In case bearings are placed centrally over the columns and the width of bearings/pedestals is located within half the depth of cap from any external face of the columns, the load from bearings will be considered to have been directly transferred to columns and the cap beam need not be designed for flexure.

7.8.5 Except the portion under bearings, the top surface of caps should have suitable slope in order to allow drainage of water.

7.9 CANTILEVER PIERANDABUTMENTCAP

7.9.1 When the distance between the load/centre line of bearing from the face of the support is equal to or less than the depth of the cap (measured at the support) the cap shall be designed as a corbel.

7.9.2 The equivalent square area may be worked out for circular pier to determine the force of support for calculating bending moments..

7.9.3 In case of wall pier and the pier cap cantilevering out all around the measurement of distance for purpose of the design as bracket and the direction of provision of reinforcement should be parallel to the line joining the centre of load/bearing with the nearest supporting space of pier.

7.9.4 Where a part of the bearing lies directly over the pier, calculation of such reinforcement should be restricted only for the portion which is outside the face of the pier. Moreover, in such cases the area of closed horizontal stirrups may be limited to 25 percent of the area of primary reinforcement.

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7.10 PEDESTALS BELOWBEARINGS

7.10.1 The pedestals should be so proportioned that a clear offset of 150mm beyond the edges of bearings is available.

7.10.2 The height of pedestal should be between 150mm and 500mm. Where the depths of substructure from two adjacent spans on a common pier differ and require use of pedestals of more height below one of the spans, the shape of pier cap or the diaphragm of superstructure shall be modified to restrict the height of pedestals to 500mm.

7.10.3 The allowable bearing pressure on the loaded area shall be calculated as per Clause 710.10.3 of IRC:78-2014.

7.10.4 The two layers of mesh reinforcement- one at 20mm from top and the other at 100mm from top of pedestal or pier cap each consisting of 8mm bars at 100mm in both directions, shall be provided directly under bearings.

8 BEARINGSAND EXPANSION JOINTS

8.1 BEARINGS

8.1.1 Large capacity bearings such as POT, POT-cum PTFE bearings shall be provided unless specified otherwise in Schedule ‘A’. Pot bearings shall consist of a metal piston supported by a disc of unreinforced elastomer confined within a metal cylinder to take care of rotation. Horizontal movement, if required, shall be provided by sliding surfaces of PTFE pads sliding against stainless steel mating surfaces, with system of sealing rings. Pot bearings shall consist of cast steel assemblies.

8.1.2 The materials, design and manufacturing of bearings shall comply with various provisions of IRC: 83-Part.III. The components of POT/PTFE bearings shall be designed/manufactured conforming to Clause 2006 of MoRT&H Specifications for Road and Bridge works, (Fifth revision) and IRC-83 (Part-III)- 2002. The properties of elastomer to be used for the components of bearings shall comply with provisions of Table 2000-1 of MoRT&H Specifications (Fifth Revision). The confined elastomer inside the POT shall have properties as given in Table 1 of IRC: 83 (Part-II)-2015 and Table 2000-4 of MoRT&H Specifications for Road and Bridge works (Fifth revision).

8.1.3 Fitting and fixing in position of bearings shall be carried out in a workman like manner according to the instructions and to the satisfaction of the OC contract.

8.1.4 Load testing of the bearings shall be carried out by the Contractor for a load of 1.25 times of design load at no extra cost to the Government and a certificate produced for perusal/record of the OC Contract.

8.1.5 In order to ensure proper distribution of heavy loads, portions of girders and abutments in contact with the bearings shall be suitably reinforced with mild steel reinforcement.

8.1.6 The contractor must ensure sufficient working space around the bearings and submit a plan for jacking up the superstructure for the purpose of replacement of bearings.

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8.1.7 The bearings shall be designed to resist both horizontal and vertical seismic effects as specified in the code of practice.

8.1.8 Suitable easy access to the bearings shall be provided for inspection and maintenance. Provision shall be made for jacking up the superstructure so as to allow repair/replacement of the bearings

8.1.9 **CERTIFICATIONAND MARKING**

(a) Bearing should be transported to bridge site after final acceptance by inspection authority appointed by OC Contract/Accepting Officer alongwith an authenticated copy of the certificate of acceptance. An information card listing the required bearing characteristics, duly certified by the manufacturer should also be appended with the certificate.

(b) All bearings shall have suitable index markings in indelible ink or flexible paint, which if practicable, shall be visible even after installation, giving the following information:-

(i) Name of manufacturer
(ii) Month and year of manufacture
(iii) Bearing designation
(iv) Type of bearing
(v) Load and movement capacity
(vi) Centre line markings to facilitate installation
(vii) Direction of major and minor movement ,if any
(viii) Preset, if any

8.2 **EXPANSION JOINTS**

8.2.1 The expansion joints shall be “Strip Seal expansion Joint” conforming to Section 2600 of MoRT&H Specifications for Road and Bridge works (Fifth revision). Its components and their salient specifications are as under: -

8.2.2 **Edge Beam:** This shall be either extruded or hot rolled steel section or cold rolled cellular steel section with suitable profile to mechanically lock the sealing elements in place throughout the normal movement cycle. Further, the configuration shall be such that the section has a minimum thickness of 10 mm all along its cross section (Flange & Web). Thickness of lips ho ld ing the seal shall not be less than 6 mm. The minimum height of the edge beam shall be 80 mm.

8.2.3 **Anchorages:** : Edge beams shall be anchored to the deck by reinforcing bars, or anchor plates cast in concrete or a combination of anchor plate and reinforcing bars, Anchor bars, shall engage the main structural reinforcement of the deck and in case of anchor plates or loops, this shall be achieved by passing transverse bars through the loops or plates. The minimum thickness of anchor plate shall be less than 0.70 times the diameter of anchor loop or 12mm, whichever is higher. Total cross sectional area of bar on each side of the joint shall not be less than 1600mm 2 per meter length of the joint and the center to center spacing shall not exceed 250mm. The ultimate resistance of each anchorage shall not be less than 600 KN/m in any direction.

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8.2.4 **Material**

(a) The steel for edge beams shall conform to any of the steel grade corresponding to RST 37-2 OR 37-3(DIN), ASTM A36 or A588, CAN/CSA Standard G40.21 Grade 300W and Quality BO of IS: 2062. For subzero condition, material for steel shall conform to Quality C of IS: 2062

(b) Anchorage steel shall conform to Quality B0 of IS: 2062-2011 and subzero condition, Quality C of IS: 2062 or equivalent.

(c) All steel sections shall be protected against corrosion by hot dip galvanizing or any other approved anticorrosive coating with a minimum thickness of 100 micron..

(d) The sealing element shall be made of Chloroprene Rubber (CR). The properties of chloroprene rubber shall be as specified in Table 2600-1 “Properties of Chloroprene Seal”, MoRT&H Specifications for Road and Bridge Works (Fifth Revision).

8.2.5 **FABRICATION(PRE-INSTALLATION)**

(a) The strip seal joint system and all its component parts including anchorages shall be supplied by the manufacture system supplier.

(b) The width of the gap to cater for movement due to thermal effect, pre-stress, shrinkage and creep, superstructure deformations (if any) and sub-structure deformations (if any) shall be determined and intimated to the manufacturer. Depending upon the temperature at which the joint is to be installed, the gap dimension shall be preset.

(c) Each strip seal expansion joint system shall be fabricated as a single entity unless stage construction or excessive length prohibits monolithic fabrication. It shall fit the full width of the structure as indicated on the approved drawing. The system shall be preset by the manufacturer prior to transportation. Presetting shall be done in accordance with the joint opening indicated on the drawing.

(d) The manufacturer prior to transportation. Presetting shall be done in accordance with the joint opening indicated on the drawing.

(e) The finally assembled joint shall then be clamped and transported to the work site 8.2.6 **HANDLING ANDSTORAGE.**

(a) For transportation and storage, auxiliary brackets shall be provided to hold the joint assembly together.

(b) The manufacturer/supplier shall supply either directly to the Engineer or to the Bridge Contractor all the materials of strip seal joints including sealant and all other accessories for the effective installation of the joints.

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(c) Expansion joint material shall be handled with care. It shall be stored under cover on suitable wooden padding to prevent damage.

8.2.7 **INSTALLATION**

8.2.7.1 Taking the width of gap for movement of the joint into account, the dimensions of the recess in the decking shall be established in accordance with the drawings or design data of the manufacturer. The surfaces of the recess shall be thoroughly cleaned and all dirt and debris removed. The exposed reinforcement shall be suitably adjusted to permit unobstructed lowering of the joint into the recess.

8.2.7.2 The recess shall be shuttered in such a way that dimensions in the joint drawing are maintained. The formwork shall be rigid and firm.

8.2.7.3 Immediately prior to placing the joint, the presetting shall be inspected. Should the actual temperature of the structure be different from the temperature provided for presenting correction of the presetting shall be done. After adjustment, the brackets shall be tightened again.

8.2.7.4 The joint shall be lowered in a pre-determined position. Following placement of the joint in the prepared recess, the joint shall be leveled and finally aligned and the anchorage steel on one side of the joint welded to the exposed reinforcement bars of the structure upon completion, the same procedure shall be followed for the other side of the joint. With the expansion joint finally held at both sides, the auxiliary brackets shall be released, allowing the joint to take up the movement of the structure

8.2.7.5 High quality concrete shall then be filled into the recess. The packing concrete must feature low shrinkage and have the same strength as that of the superstructure, but in any case, not less than M-35 grade. Good compaction and careful curing of concrete is particularly important. After the concrete has cured, the movable installation brackets and shuttering still in place shall be removed.

8.2.7.6 Rolled up neoprene strip seal shall be cut into the required length and inserted between the edge beams by using a crow bar pushing the bulb of the seal into the steel grooves of the edge beams. A landing to a bead shall be formed in the thickened end of the edges of the seal which would force the thickened end against the steel beam due to wedge effect when the strip seal is buttoned in place.

8.2.7.7 As soon as the concrete in the recess has become initially set, a sturdy ramp shall be placed over the joint to protect the exposed steel beams and neoprene seals from the site traffic. Expansion joint shall not be exposed to traffic before the carriageway surfacing is placed.

8.2.7.8. The carriage way surfacing shall be finished flush with the top of the steel sections. The actual junction of the surfacing/wearing coat with the steel edge section shall be formed by a wedge shaped joint with a sealing compound. The horizontal leg of the edge beam shall be cleaned beforehand. It is particularly important to ensure through and careful compaction of the surfacing in order to prevent any premature depression forming in it.

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8.2.8 **Acceptance Criteria**

(i) All steel elements shall be finished with corrosion protection system.

(ii) For materials the acceptance test shall conform to the requirements in at Para 8.2.4 above. The manufacturer/supplier shall produce a test certificate accordingly, conducted in a recognized independent laboratory, in India or abroad.

(iii) The manufacturer shall produce test certificates indicating that anchorage system had been tested in a recognized laboratory to determine optimum configuration of anchorage assembly under dynamic loading.

(iv) Prior to acceptance 25 percent of the completed and installed joints, subject to a minimum of one joint, shall be subjected to water tightness test. Water shall be continuously ponded along the entire length for a minimum period of 4 hours for a depth of 25mm above the highest point of deck. The width of ponding shall be at least 50mm beyond the anchorage block of the joint on either side. The depth of water shall not fall below 25mm anytime during the test. A close inspection of the underside of the joint shall not reveal any leakage.

(v) Investigation of fatigue strength of the edge beam section with anchorages to withstand 2x10 load change cycles of 85 KN vertical load and 10 KN of horizontal load without showing sign of distress shall be required. The supplier shall produce a test certificate in this regard conducted in a recognized laboratory, in India or abroad.

(vi) As strip seal type of joints is specialized in nature, generally of the proprietary type, the manufacturer shall be required to produce evidence of satisfactory performance of this type of joint.

9. SUPERSTRUCTURE

9.1 GENERAL

9.1.1 The type of bridge superstructure shall be as specified under Schedule “A” and Site and Design Data of these specifications and design shall conform to relevant IRC & BIS Codes, MoRT&H Specifications, requirements of these specifications and sound engineering practice. All design data including climatic data, temperature differential etc will be accounted for in the design of superstructure. The superstructure shall be resting on bearings as specified in these documents and designed as per relevant IRC Codes.

9.1.2 Common type of bridge superstructures are steel truss superstructure (through type/deck type)/steel girder with RCC deck slab, post tensioned pre-stressed concrete (box girder/I-girder system and composite RCC deck slab) and arch type (steel/PSC).

9.1.3 The following type of construction shall not be acceptable: -

(a) Series of arch span.
(b) The superstructure of such a design, which may lead to collapse of series of span due to failure of one of the piers or span

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(c) An unbalanced cantilever type of superstructure, which involves the use of one hinge or articulation in each span.

(d) Hinge arrangement in balanced cantilever type of bridge.

9.1.4 Department prefers the span arrangements as given in Site and Design Data of these specifications. Any change in length of the bridge or deck level due to site conditions shall be considered as deviation and shall be priced as per the formulae provided elsewhere in the tender documents.

9.2. STEEL SUPERSTRUCTURE

9.2.1 GENERAL

9.2.1.1 The design of steel superstructure shall conform to IRC: 24-2010. IRC: 22-2015 shall be referred in case of concrete work composite with steel. Limit State Method of design shall be followed. The steel superstructure shall have steel trusses with RCC deck slab having thickness not less than 200 mm.

9.2.1.2 For all members of the steel superstructure, the minimum thicknesses of plates and rolled sections shall conform to Clause 504.7 of IRC: 24-2010. The depth of the bottom chords and bracing shall be suitably adjusted to allow access for proper inspection of bearings and to facilitate construction. Splices in chord members shall not be permitted.

9.2.2 CROSS BEAMS/CROSS GIRDERS

(a) For the loaded chords, the corresponding panel points of the two trusses shall be joined by cross beams, also called as Cross Girders. Also, the corresponding panel points of unloaded chords of the two trusses shall be connected by suitably designed members to act as horizontal bracing.

(b) These cross beams will support stringers running parallel to the length of the truss. Preferably, the RCC deck slab will be supported by stringers. If stringers are not provided, RCC deck slab may be supported directly by cross beams.

(c) Cross beams and/stringers shall be designed as composite structure in accordance with IRC: 22-2015. Properly designed shear connectors shall be provided on crossbeams/stringers. Spacing of shear connectors shall not exceed 250mm c/c.

(d) If chord members are fabricated using built up sections, the loaded chord members shall be adequately strengthened at the locations where cross girders are connected to the chords for proper transfer of loads from cross girder to the chord member without local overstressing of the connected chord section. Similar precaution shall be taken with cross girders while connecting stringers with cross girders.

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9.2.3 **MINIMUMDEPTH.** Minimum effective depth of trusses preferably shall not be less than "1/10" of the effective span.

9.2.4 **SPACINGOFTRUSSESAND GIRDERS:** The distance between the centre of trusses and finders shall be sufficient to prevent over turning or over stressing due to lateral forces. This distance shall not be less than "1/20" of the span.

9.2.5 **JOINTSANDSTRINGERS:** The stringers shall be of steel. They shall be securely fastened to cross beams except where arrangement is made to permit expansion. Suitable arrangements for supporting such stringer shall be designed. Stringers should have free ends below the expansion joints in decking.

9.2.6 **BRACINGS**: In all spans bracing shall be provided to transmit to the abutments the effect of the lateral and longitudinal forces, wherever the overhead clearance permits. Lateral diagonal bracings should preferably be provided in the planes of both upper and lower chords of through spans. The floor system may be taken as part of the bracing system provided, if it is designed for that purpose. Wherever the depth of the girder allows, intermediate sway bracing may be provided. Sway bracing when provided shall be proportioned to transmit to the chord supported on bearings through the web members at least 50% of the panel lateral load and the vertical members shall be designed to resist the resulting bending moment. Through truss spans shall be provided with portal bearings as deep as the clearance will allow. Also, diagonal bracings joining top chords of the two trusses at joints in horizontal plane shall be provided. In Deck type spans, in addition to the lateral diagonal bracings provided in the planes of upper and lower chords, diagonal bracings in form x-frames joining top and bottom chords at diagonally opposite panel points shall be provided in vertical plane at all panel points.

9.2.7 **ENDCROSSGIRDER**: End cross girders or cross frames shall be provided in all square ended truss and girder spans and as far as possible in skew spans. These shall preferably be designed to permit use of jacks for lifting the superstructure. Cross girders and cross frames shall also be provided at all intermediate points along the length of girder.

9.2.8 **RIVETS.RIVETBARSANDHSFGBOLTS**: All rivets and rivet bars shall conform in all respects to IS: 1148/1149 Specifications for rivet bars for structural purposes. The riveting shall be done by hydraulic or pneumatic machine. High Strength Friction Grip (HSFG) bolts shall conform to IS: 3757 and IS:4000, with appropriate nuts and washers. Connections made with rivets and HSFG bolts shall conform to Clause 512.5 and Clause 512.6 of IRC: 24-2010. A HSFG bolt completely tightened shall not be reused under any circumstances. Bearing type bolted connections shall not be permitted.

9.2.9 **WELDING**: Mild steel electrodes shall comply with the requirements of the IS:814 Specification for covered electrodes for metal arc welding of mild steel and procedure shall comply with provisions of IS:816, IS:1024 and IS:9595, as appropriate. The welding be carried out as specified in Clause 512.4 of IRC: 24- 2010.

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9.2.10 **SOLIDWEBGIRDERS**: Solid web girders shall be proportioned on the basis of the amount of inertia of the cross section with the vertical axis at the centroid of the section. In computing the maximum stress, the stress calculated on this basis shall be increased in the ratio of gross to effective area of the flange section. The slenderness ratio of a girder shall not exceed 300. The flanges of the plate girder shall be connected to the web by sufficient rivets, bolts or welded to transmit the horizontal shear force combined with any vertical loads which are directly applied to the flange. The thickness of the web plates shall not be less than 8mm.

9.2.11 **ASSEMBLINGSTEEL**: The part shall be accurately assembled as shown on the bearings and match marks shall be followed. The material shall be carefully handled so that no parts will be bent, broken or otherwise damaged. However, any error in the shop fabrication or deformation, resulting from handling and transportation which prevents proper assembling and fitting up to of parts by moderate use of drifts or by a moderate amount of reaming and slight chipping or cutting shall be reported immediately to Engineer-in Charge and his approval of the method of erection obtained.

9.2.12 **GUSSET PLATES:** Gusset plates shall be so shaped and connectors so arranged as to avoid stress concentrations. The gusset plates must not be less than 9 mm thick and should be of ample thickness to resist shear, direct stresses and flexural action on the weakest or critical section of maximum stress. Re-entrant cuts shall be avoided as far as possible.

9.2.13 **SPLICES:** As for as possible, splices shall be avoided in the members. Splices shall not be permitted in any chord members for any reasons whatsoever.

9.2.14 **DURABILITY REQUIREMENTS**

(a) The design, fabrication and erection details of exposed structures should be such that good drainage of water is ensured. Standing pool of water, moisture a c c u m u l a t i o n and rundown of water for extended duration are to be avoided.

(b) The details of connections should ensure that:

(i) All exposed surfaces are easily accessible for inspection and maintenance.
(ii) All surfaces not so easily accessible are completely sealed against ingress of water..

(c) Steel surfaces shall be provided at least one coat of primer of immediately after its surface preparations, such as sand blasting to remove of mill scale and rust to expose steel.

(d) Steel without protective coating shall not be stored for long duration in outdoor environment.

(e) Surfaces to transfer forces by friction as in HSFG connections shall not be painted. However, it shall be ensured that moisture is not trapped on such surfaces after pretensioning of bolts by proper protective measures.

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(f) Members to be assembled by welding shall not be pre-painted at the adjacent to the location of such welds. However, after welding appropriate protective coatings shall be applied in the region. If the contact surfaces cannot be properly protected against ingress of moisture by surface coating, they should be completely sealed by appropriate welds.

(g) Pre-painted members shall be protected against abrasion of the coating during transportation, handling and erection.

9.2.15 **EXTRASAFETYMARGINTOLOWTEMPERATURE**: The permissible stresses shall be reduced by 15% for secondary stress due to low temperature. Also, structural steel conforming to Quality “C” of IS: 2062 shall be used for subzero conditions.

9.3 PSC /RCC SUPERSTRUCTURE

9.3.1 GENERAL

9.3.1.1 In case of T-Beams or I-Beams, the thickness of the web shall not be less than 200mm plus diameter of duct hole and the minimum thickness of deck slab including that at cantilever tips shall be 200mm. The number of longitudinal beams/girders shall not be less than three.

9.3.1.2 In case of PSC Box Girders, the thickness of the web shall not be less than “d/36 plus twice the clear cover to the reinforcement plus diameter of the duct hole” (where “d” is the overall depth of the box girder measured from the top of the deck slab to the bottom of the soffit) or “200mm plus diameter of duct holes”, whichever is greater. Where cables cross within the web, suitable increase in the thickness over and above shall be made. In case of cast in situ cantilever construction, if the prestressing cables are anchored in the web, uniform thickness of the web shall not be less than 350 mm nor less than that recommended by the pre-stressing system manufacturer, subject to design requirements.

9.3.1.3 The thickness of the bottom flange of box girder shall be not less than 1/20th of the clear web spacing at the junction or 200mm whichever is more. The minimum top flange thickness shall not be less than 200mm. For top and bottom flange having pre-stressing cables, the thickness of such flange shall not be less than 200mm plus diameter of duct hole.

9.3.1.4 In case of segmental construction for bridges located in marine environment continuity of untensioned reinforcement from one segment to the next must be ensured, by providing full lap length as necessary..

9.3.1.5 For cantilever construction, preference shall be given to box type cross section with diaphragms provided at supports. Sudden change in depth of superstructure shall not be permitted. For reducing the thermal effect suitable ventilation may be provided for hollow box sections

9.3.1.6 In case of multi-beam arrangement, the number of diaphragms shall not be less than three. For bridges having beam and slab type of superstructure, the number of longitudinal girders shall not be less than three. The depth of the end cross diaphragms shall be suitably adjusted to allow access for proper inspection of bearings and to facilitate positioning of jacks for further lifting up of the superstructure..

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9.3.1.7 Haunches of minimum size 300 mm (horizontal) and 150mm (vertical) shall be provided at the four extreme inner corners of box section. For all other corners, fillets of suitable size may be provided.
9.3.1.8 The minimum clear height inside the box girders shall be 1.5m to facilitate inspections.

9.3.1.9 The depth of the suspended span at the articulation should be equal to the depth available at the cantilever tip. Drop in spans with halved joints (articulations) shall not be provided as far as practicable

9.3.1.10 Cross girders or diaphragms in box girders shall be provided as under:

(a) Cross girders monolithic with the deck slab shall be provided at bearings and also at the ends of cantilever. Intermediate cross girders/diaphragms shall be provided depending upon design requirements.

(b) Diaphragm spacing for curved girders shall be given special consideration.

(c) Thickness of diaphragms shall not be less than the minimum web thickness.

9.3.1.11 The cross beam of a superstructure at abutment position should be suitably designed to withstand the superstructure load, necessitated due to jacking up of the superstructure. A drawing showing the arrangement for jacking up the superstructure shall also be submitted along with the design. The abutment cap should be wide enough to facilitate jacking operation.

9.3.1.12 Only stress relieved low relaxation strands (Class-2) conforming to IS:14268 shall be used. In absence of actual testing, the design value of relaxation for long term losses shall be taken as three times the 1000 hours value measured at initial stress of 70 percent UTS. For initial stress other than 70 percent of UTS, the values given in Table 6.2 of IRC:112-2011 may be used. The thousand hour relaxation loss value shall be obtained from the manufacturer of pre-stressing steel. This data shall be independently cross checked to ascertain its veracity. The 1000 hour relaxation value shall not be more than 2.5 percent of 0.70 UTS, tested at 0.7 UTS and 20 degree Celsius. For periods less than 1000 hours, the value of relaxation loss may be taken as per Table 6.3 of IRC:112- 2011.

9.3.1.13 Limit State Method of Design as per IRC:112 shall be followed. In case of segmental construction of superstructure, the ultimate shear capacity and flexure capacity of section shall be multiplied by factors of 0.90 and 0.95 respectively and then considered in the design accordingly.

9.3.1.14 The maximum permissible jacking force (inclusive of any over stressing shall not exceed 70 percent of the minimum ultimate tensile strength (UTS) of the pre-stressing steel. The maximum force shall be adopted as per IRC 112-2011.

9.3.1.15 The limit state of serviceability of the structure shall also be checked for 10% higher and 10% lower pre-stressing forces and the same shall satisfy the codal requirements as per clause No. 7.9.5 of IRC: 112-2011.

9.3.1.16 Minimum diameter of un-tensioned reinforcement should be 10 mm.

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9.3.2 **POSTTENSIONED STRESSING**

9.3.2.1 Tensioning force shall be applied in gradual and steady steps, in such a manner that the applied tensions and elongations can be measured at all times. The sequence of stressing, applied tensions and elongations shall be in accordance with the approved drawing. It shall be ensured that in no case, the load is applied to the concrete before it attains the strength specified on the approved drawing or as stipulated by the prestressing system supplier, whichever is more. After prestressing steel has anchored, the force exerted by the tensioning equipment shall be decreased gradually and steadily so as to avoid shock to the prestressing steel or anchorage..

9.3.2.2 The tensioning force applied to any tendon shall be determined by direct reading of the pressure gauges or dynamo-meters and by comparison of the measured elongation with calculated elongation. The calculated elongation shall be invariably adjusted with respect to the modulus of elasticity of steel for the particular lot as given by the manufacturer.

9.3.2.3 The difference between calculated and observed tension and elongation during prestressing operation shall be regulated as under:

(a) If calculated elongation is reached before the specified gauge pressure, continue tensioning till the specified gauge pressure is attained, provided the elongation does not exceed 1.05 times the calculated elongation. If 1.05 times the calculated elongation is reached before the specified gauge pressure is attained, stop stressing and inform the Designer & B & T Dte, HQ DGBR.

(b) If calculated elongation has not been reached at the specified gauge pressure, continue tensioning by intervals of 5 kg/sq. cm until the calculated elongation is reached, provided the gauge pressure does not exceed 1.05 times the specified gauge pressure.

(c) If the elongation at 1.05 times the specified gauge pressure is less than 0.95 times the calculated elongation, the following measures must be taken, in succession, to determine the cause of discrepancy:

(i) Check the correct functioning of the jack, pump and leads.

(ii) De-tension the cable. Slide it in its duct to check that it is not blocked by mortar which has entered through the holes in the sheath. Re-tension the cable, if free.

(iii) Re-establish the modulus of elasticity of steel for the particular lot from an approved laboratory. If the required elongation is still not obtained, further finishing operations such as cutting or sealing should not be undertaken without approval of Designer and B & T Dte, HQ DGBR.

(d) When stressing from one end only, the slip at the end remote from the jack, shall be accurately measured and appropriate allowance made in the measured extension at the jacking end

9.3.2.4 A complete record of prestressing operations along with elongation and jack pressure shall be maintained in the format given in Appendix 1800/ll of MoRT&H Specifications for Road and Bridge Works (Fifth Revision).

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9.3.2.5 The positioning of prestressed cables shall be such as to facilitate easy placement and vibration of concrete in between the tendons. Use of high capacity tendons shall be preferred to avoid grouping/clustering of cables and to reduce the number of cables. However, while two or more rows of cables have to be used, the cables shall be vertically in line with adequate space to enable easy flow of concrete.

9.3.2.6 The number of stages of prestressing and grouting shall be reduced to the minimum, preferably not more than 2. Wherever 2 stage prestressing is contemplated, at the location of the 2 nd stage cables in the sheathing already provided, a preformed dummy core shall be provided and pulled out after the first stage prestressing and grouting is over. Thereafter, the cables for the 2 nd stage shall be threaded into performed duct by a threading machine or any contrivance. In such situation, it shall be ensured that cable or group of cables proposed to be grouted later are located at a clear distance not less than 100 mm from the cables or group of cables being grouted earlier. However, in segmental construction, where it may be necessary to adopt multi-stage prestressing, the clear spacing between the first and subsequent group of cables shall be minimum of 150 mm. Anchoring of cables in the top deck surface shall be avoided. All anchorages shall be properly sealed after prestressing and grouting operations are over. All wires/strands in one cable should be stressed simultaneously by using multi stressing jack. Prestressing steel shall be continuously protected against corrosion, until grouted.

9.3.2.7 Grouting of prestressed tendons shall be carried out immediately of stressing in accordance with provisions in Appendix 1800/lll and a record of grouting operations shall be maintained in the format given in Appendix 1800/lV of MoRT&H Specifications. The following additional specifications for grouting shall be ensured over and above those contained in IRC:112- 2011 & MoRT&H Specifications:-

(a) Mixing of grout must be done in colloidal mixer such that the grout mix is maintained in a homogenous colloidal state during the entire grouting process.

(b) The temperature of the grout after accounting for the ambient temperature of the structure shall not exceed 30ºC.

9.3.2.8 Prestressing operation and grouting shall be entrusted only to specially trained and qualified personnel.

9.3.3 **PRE STRESSING STEEL, SYSTEM AND ACCESSORIES**

9.3.3.1 The prestressing steel shall be uncoated stress relived low relaxation seven ply Class-2 strands conforming to IS:14268 and procured from reputed manufacturers. The manufacturer shall supply high tensile strands in coils of sufficiently large diameters, such as tendons shall retain their physical properties and shall be straight as they unwind from the coil. Tendons of any type that are damaged, kinked or bent shall not be used. The packing of prestressing strand shall be removed only just prior to forming of cables for placement.

9.3.3.2 All tensioning equipment and prestressing accessories shall be procured from authorized manufacturers with in house testing facilities. The stressing equipment, de-stressing/restressing facilities, and grouting arrangements shall be compatible with tendons.

9.3.3.3 Sheathing pipes, Anchorages and other accessories to be used shall conform to provisions of IRC:112 and shall be procured only from reputed manufactures having proven track record.

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9.3.3.4 Anchorages of single brand shall be used in a bridge. Mixing of anchorages of different brands in the same bridge span shall not be permitted.

10. SPECIFICATIONS FOR BRIDGE COMPONENTS

10.1 **DECKING:** Minimum thickness of the deck slab including that at tips shall be 200 mm. The tip of decking shall have a cross slope of 2.50% with curved ridge. The cross slope of 2.5% shall be achieved by varying thickness of deck slab. The wearing coat shall be of uniform thickness.

10.2 **DRAINAGE:** Drainage shall conform to IRC :5 - 2015. The spacing of drainage spouts shall not be more than 6m. A complete drainage system for the entire deck and footpath shall be provided to ensure that the drainage water gets collected and disposed off quickly from the deck and footpath to a safe location.

10.3 **WEARING COAT:** Cement concrete wearing coat shall be laid separately over the bridge deck and shall have uniform thickness of 75mm in M-35 Grade Cement concrete. Steel reinforcement of 8mm diameter HYSD bars at 150 mm spacing in both directions shall be provided at mid depth of the wearing coat. In a length of one metre near the expansion joint additional reinforcement of 8mm diameter HYSD bars shall be provided in both directions to make the spacing as 75mm. A bituminous filling of 25 mm thickness along the face of the kerb to a depth equal to the thickness of the wearing coat should be provided up to the junction of the wearing coat and kerb.

10.4 **HAND RAILINGS:** Type of hand railings shall be as specified in Site and Design data given under particular specifications. Hand railings shall conform to MoRT&H Specifications, IRC:5-2015 and IRC:6-2017 and shall also be provided on return walls for their complete length. In case of through type steel truss bridges, steel pipe hand rails shall be provided towards truss side. In case of PSC/RCC and deck type steel truss superstructures, RCC hand railings shall be provided.

10.5 **WELDING:** Welding at site, in general, shall not be permitted unless otherwise specifically stated by the department. In special cases, all such welding works shall conform to IS: 1024 (Code of practice for use of welding in bridges and structures subject to dynamic loading). Welding of HYSD bars shall be prohibited and instead mechanical splices of proven quality should be used. Cover to any splice shall not be less than 50 mm.

10.6 **FOOTPATHS:** Footpaths 1.50 meter wide shall be provided on both side of the carriage of the bridge. In case of through type steel truss superstructure, foot paths shall be provided within both side trusses i.e. towards inner side (carriageway side) of trusses and will be separated from bridge carriageway by crash barriers.

10.7 CRASH BARRIERS

10.7.1 Type of crash barriers shall be as specified in design data of these specifications. Typical shapes and dimensional details of crash barriers and their locations on the bridge decks with or without footpaths shall be as per IRC:5 -2015 and shall conform design requirements of IRC:6-2017. These may be suitably modified and augmented depending on the developments in design and future functional requirements in individual cases.

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10.7.2 Crash barriers shall be of reinforced concrete and their design shall take into consideration the following factors:

- Impact of vehicles colliding with the barrier..
- Safety of occupants of a vehicle colliding with the barrier.
- Safety of other vehicles near the collision site.
- Safety of vehicles or pedestrians underneath the bridge.
- Aesthetics and freedom of view from passing vehicles.

10.7.3 Crash barriers shall provide a smooth and continuous face on the traffic side and shall be suitably extended into the approaches. Exposed rail ends, posts and sharp changes in the geometry of the railings shall be avoided. Suitable reflective (luminous) devices shall be provided on the traffic face of the barrier at intervals to ensure adequate visibility during night and foggy conditions..

11. CONSTRUCTION JOINTS

11.1 Construction Joints shall be kept to the minimum and modern slip form methods shall be adopted. No construction joints shall be provided in the splash zone..

11.2 Construction joints should be positioned to minimize the effects of the discontinuity on the durability, structural integrity, and appearance of the structure. As far as possible joints should be positioned in non-aggressive zones, but if aggressive zones can't be avoided, joints should be accessible for preparation and concreting. The preparation of the joints is more likely to be satisfactory where the cross-section is relatively small, and where reinforcement is not congested. As far as possible, joints for fair-faced concrete should be located where they conform with the architectural features of the construction. Unless they are marked in this way, the positions of the joints are always obvious, even when the concrete is given a textured finish. If substantial changes in the cross-section of a member are necessary, the joints should be formed where they minimize stresses caused by temperature gradients and shrinkages. Joints should be located away from regions of maximum stress caused by loading, particularly where shear and bond stress are high. In beams and slabs, therefore, joints should not generally be near the supports. Construction joints between slabs and ribs in composite beams should be avoided..

11.3 The minimum number of joints should be used and their construction should be simple. They should be either horizontal or vertical, because concreting sloping surface is usually, unsatisfactory. Where concrete is placed in vertical members e.g. walls, columns and the like, lifts of concrete shall finish level or in slopping members, at right angles to the axis of the member, the joint lines matching the features of the finished work. Concreting shall be carried out continuously up to the construction joints laitance bolt on the horizontal and vertical surfaces of the concrete should be removed before fresh concrete is cast. The surface should be roughened to promote good adhesive. Various methods for removal can be used, but they should not dislodge the coarse aggregate particles. Concrete may be brushed with a stiff brush soon after casting while the concrete is still fresh and while it has hardened, it may be treated by wire brushing or with a high pressure water jet followed by drying with an air jet, immediately before the new concrete is placed. Fully hardened concrete should be treated with mechanical hand tools or grit blasting, taking care not to split or crack soft aggregate particles. The best time for treating the joints is a matter of judgment because it depends on the rate of setting and hardening

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(which is itself dependent on the temperature of the concrete). Before further concrete is cast, the surface should be thoroughly cleaned to remove debris and accumulated rubbish, one effective method being by air jet. Whether there is likely to be even a short delay before placing the next concrete lift, protruding reinforcement should be protected. Before the next lift is placed, rust, loose mortar, or other conditions are particularly aggressive and there has been a substantial delay between lifts, the concrete should be cut back to expose the bars for a length of about 50 mm to ensure that contaminated concrete is removed. In all cases, when construction joint surface is not contaminated with release agents, dust or curing membrane and that the reinforcement is fixed firmly in position at the correct cover.

11.4 When the form work is fixed for the next lift, it should be inspected to ensure that no leakage occurs from the fresh concrete. The practice of first placing a layer of mortar or grout when concreting joints is not recommended. The old surface should be soaked with water, without leaving puddles immediately before starting concreting, then the new concrete should be thoroughly compacted against it. When fresh concrete is cast against existing mature concrete or masonry, the old surfaces should be thoroughly cleaned and soaked to prevent the absorption of water from the new concrete. Standing water should be removed shortly before the new concrete is placed and the new concrete should be thoroughly vibrated in the region of the joint.

12. **CEMENT CONCRETE**

12.1 Cement, fine aggregates, coarse aggregates, mineral admixtures and water constitute the main material ingredients of concrete. Concrete shall be designated by type and its grade designation based on characteristic strength as described in Table 6.4 of Clause 6.4.1 of IRC:112-2011. All concrete to be used in bridge works shall be standard concrete or high performance concrete and the design mix shall be established by laboratory /field testing and controlled at site by conducting tests to confirm suitability of constituent materials, as per the relevant codes mentioned in Clause 18.4 of IRC:112-2011. The Concrete shall meet the acceptance criteria as per clause 18.6 of IRC:112-2011. Mix design shall be modified if it does not meet the acceptance criteria. All controlled concrete works shall be done by **weigh batching** in all stages of work.

12.2 The minimum grade of concrete for different structural components shall be as follows: -

(i) For bottom plug/top plug/intermediate plug, the concrete mix shall be designed (in dry condition) to attain a concrete strength of M-25, thereafter the considerations required for under-water concreting taken. The entire concrete shall be laid by tremie pipe conforming to the prescribed specifications.

(ii) Other Members

Member	Minimum grade of Concrete
PCC Members	M30
RCC Members	M35
PSC Members	M40

12.2 From durability considerations strict control on the cement content and water cement ratio and in the process of concrete making, laying, compaction and curing must be exercised, the aim being to achieve a dense and impermeable concrete. The following limits in respect of cement content and water cement ratios shall be maintained:

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Structural Member	Min cement content for all exposure conditions (for 20 mm nominal size of crushed stone aggregate)	Maximum water cement ratio
PCC Members	360kg/cum	0.45
RCC Members	400kg/cum	0.40
PSC Members	400kg/cum	0.40

12.3 The minimum clear cover to the reinforcement bar closes to the concrete surface shall be 50 mm. Use of concrete cover blocks to maintain the cover is required. Cladding or any of the supplementary protective measures shall be adopted as considered adequate.

12.4 The cement content shall be as low as possible but not less than the quantities specified in clause No. 11.2 above but in no case shall exceed 450 Kg/m³ of concrete.

12.5 The total water soluble sulphate content the concrete mix expressed as SO3 shall not exceed 4% mass of cement used in the mix.

12.6 Total chloride content in concrete shall not exceed 0.1% of the mass of cement used.

12.7 Contractor shall submit a concrete mix design as per IS:10262, based on the material available/ proposed to be used, to achieve the specified strength of design mix concrete, to the OC Contract for approval. OC Contract will satisfy himself about the efficiency of design mix concrete and approve the same. Contractor will provide all facilities and materials required for the same at no extra cost to the department.

12.8 All Form work and false work shall be properly designed in accordance with IRC: 87-1999.The staging and shuttering scheme will be got approved from the OC contract before execution.

12.9 Form Vibrators shall be used in addition to internal vibrators.

12.10 For curing of concrete; procedures as laid down in MoRT&H Specifications for Roads and Bridge Works (Fifth Revision) shall be followed.

13. CONSTRUCTION MATERIALS

13.1. AGGREGATES

13.1.1 All coarse and fine aggregates shall conform to IS: 383 and shall be tested to conform to IS:2386 Parts I to VIII. It shall also conform to relevant provisions contained in IRC : 112- 2011. Aggregate shall also be tested to ascertain alkali-silica reaction and such aggregates shall not be used. Fine aggregates conforming to Zone I & II of IS:383 only shall be used for bridge works.

13.2. WATER

13.2.1 The quality of water must conform to the provisions contained in IRC: 112-2011.

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13.2.2 The permissible limits for solids must satisfy the following:-

Items	Tested as per	Permissible Limit
Organic	IS:3025(Pt.18)	200 mg/lit
Inorganic	IS:3025(Pt.18)	3000mg/lit
Sulphates (SO3) Chlorides (as Cl-)	IS:3025(Pt.24) IS:3025(Pt.32)	500 mg/lit 250 mg/lit
Suspended matter	IS:3025(Pt.17)	2000mg/lit
ThepH value,	IS:3025(Pt.22/23)	shall notbelessthan 6.

13.3**.** **CEMENT**

13.3.1 **CEMENT TYPES**:

13.3.1.1 The cement for use under this contract shall be any of the following:

(a) Ordinary Portland Cement 33 Grade conforming to IS: 269

(b) Ordinary Portland Cement 43 Grade conforming to IS:8112

(c) Ordinary Portland Cement 53 Grade conforming to IS:12269

(d) Portland Pozzolana Cement conforming to IS: 1489 (Part-1)

13.3.1.2 For concrete made with Portland Pozzolana cement, or mineral admixtures, the setting time and rate of gain of strength are different from those of concrete made with OPC alone. Cognizance of such modified properties shall be taken in deciding de-shuttering time, initial time of prestressing, curing period and for early are loading. Compatibility admixture and super plasticizers with Portland Pozzolana and mineral admixtures shall be ensured by trials. Some other properties of concrete such as modulus of elasticity, tensile strength, creep and shrinkage are not likely to be significantly different. For design purpose, it will be sufficiently accurate to take the same values as those for concrete made with OPC..

13.3.2 **MAKE OFCEMENT:** Cement to be used shall be from reputed make. The approved makes/companies are the Associated Cement Companies Ltd, Grasim Industries Ltd, Ultra Tech Cement, The India Cement, Dalmia Cement, Andhra Cement Ltd, Century Cement, Saurashtra Cement, Binani Cement, Madras Cement, Mangalam Cement, Birla Corp Ltd, Orient Cement, Lafarge Cement, Shree Cement, JK Cement, JK Lakshmi Cement, Jaypee Rewa Cement, Ambuja Cement, Star Cement Meghalaya. The particulars of the manufacturer/supplier of cement along with the date of manufacture shall be obtained from the contractor for every lot of cement separately. The documents in support of the purchases of cement shall be verified by the Engineer in charge and OC. In addition to above cement from cement companies located in North East Zone like HM Shakti Cement, Valley Strong Cement, Adhunited Star Cement etc will be permitted if Cement Company is registered with DGS&D and meet the BIS quality standards..

13.3.3 **TESTINGOFCEMENT:** The manufacturer/supplier is to carry out inspections and testing of cement in accordance with the relevant BIS provisions. The contractor shall submit the Manufacturer's Test Certificate in original along with the Test Sheet giving the result on each physical test as applicable and the chemical composition of the cement or authenticated copy thereof, duly signed by the manufacturer with each consignment. The Engineer-in-Charge shall record these details in the Cement Acceptance Register after due verification. The OC shall also organize independent testing of random samples of cement drawn from various lots from the National

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13.3.3 **TESTING OF CEMENT:** The manufacturer/supplier is to carry out inspections and testing of cement in accordance with the relevant BIS provisions. The contractor shall submit the Manufacturer's Test Certificate in original along with the Test Sheet giving the result on each physical test as applicable and the chemical composition of the cement or authenticated copy thereof, duly signed by the manufacturer with each consignment. The Engineer-in-Charge shall record these details in the Cement Acceptance Register after due verification. The OC shall also organize independent testing of random samples of cement drawn from various lots from the National Test House, SEMT CME, Regional Research Laboratories, Engineering College, Govt. Approved Laboratories, Zonal Laboratories as per IS:3535-1986 (Method of Sampling hydraulic Cement), IS : 4031 (Methods of physical test for hydraulic grey cement) and IS : 4032-1985 (Method of Sampling hydraulic grey Cement). In all such cases the sample should be forwarded for testing under the seal and signature of Engineer-in-Charge. In order to undertake departmental testing, requisite facilities shall be organized. The cost of test shall be borne by the contractor irrespective of results.

13.3.4 **STORAGE OF CEMENT**: Cement shall be stored over dry platform at least 20 cm high in such a manner as to prevent deterioration due to moisture or intrusion of foreign matter. In case of storeroom, the stack should be at least 20 cm away from floors and walls. Inspection should be carried out once a day. It should be ensured that tested and untested cement are segregated and stored separately with distinct identification.

13.3.5 **DOCUMENTATION:** The contractor shall submit original vouchers from the supplier for the total quantity of cement supplied under each consignment to be incorporated in the work. All consignment received at the work site shall be inspected by the OC Contract along with the relevant documents before acceptance. The original vouchers and the Test Certificates shall be defaced by the Engineer-in-Charge indicating CA No and kept on record in the office of OC Contract duly authenticated and with cross reference to the Control Number recorded in the Cement Acceptance Register. The Cement Acceptance Register will be signed by JE (Civ), Engineerin-Charge, OC Contract and the Contractor. The Accepting Officer may order a Board of Officers for random check of cement and verification of connected documents. The entire quantity of all cement shall also be suitably recorded in the Pucca Bond Register for record purposes before incorporation in the work and shall be signed by the Engineer-in-Charge and the Contractor. Schedule of supply shall be so ensured so as to match with the progress contemplated in the CPM prepared for the Project.

13.4 **ADMIXTURES**

13.4.1 To improve the workability of concrete and cement grout, admixture conforming to IS : 9103 shall be permitted, subject to satisfactory proven use. Admixtures generating hydrogen, nitrogen, etc should not be used. However, concrete admixtures and super plasticizers shall only be used after proper evaluation of their performance in the concrete mixes with regard to materials and mix proportions to be used in the work. Admixtures and super plasticizers must not contain harmful constituents like chlorides, ions etc., in such amounts which may affect durability.

13.5 **TESTING FACILITIES**

13.5.1. Testing facilities shall be provided by the contractor at work site viz. cubes test, slump test for concrete and moisture test, sieve test, abrasion value test, impact value test for coarse and fine materials to be incorporated into work to the satisfaction of the Engineer-in-Charge. Universal testing machine facilities shall be made available by the contractor at site for testing reinforcement and structural steels.

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14. STRUCTURAL STEELAND REINFORCEMENTSTEEL

14.1. GENERAL

14.1.1. All structural steel shall before fabrication comply with the following Indian Standards:

IS:2062 -Weldable Structural steel

IS:961 -Structural Steel(High Tensile)

IS:8500 -Weldable Structural Steel (High Strengths Qualities) IS:11587

-Structural Weather Resistant steel

14.1.2 All reinforcing steel to be used in works shall conform to IS:1786. For plain and reinforced cement concrete (PCC and RCC) or pre-stressed concrete (PSC) works, the reinforcement/untensioned steel, as the case may be, shall consist of the following grades of reinforcing bars.

Grade Designation	**Bar Type Conforming to Governing Specifications**	**Characteristic Strength f_yMPa**	**Elastic Modulus GP**
Fe 415 or Fe 415D	IS:1786 High Strength Deformed Steel Bars (HSD)	415	200
Fe 500 or Fe500 D	IS:1786 High Strength Deformed Steel Bars (HSD)	500	200
Fe 550 or Fe 550D	IS:1786 High Strength deformed Steel Bars (HSD)	550	200
Fe 600	IS :1786 High Strength Deformed Steel Bars (HSD)	600	200

14.1.3 If any grade of steel given in the above table is not available, steel of next higher grade may be used. For bridges located in seismic Zones (iv) and (v), reinforcing steel of Fe 500D or higher grade shall be used for ensuring better ductility of structure.

14.1.4 Hot dipped galvanized reinforcing steel shall be provided wherever specified. The coating shall conform to IS: 12594-1988.

14.2. FABRICATION

14.2.1. All works shall be done in accordance with approved drawings and laid down specifications. It shall be ensured that all parts of an assembly fit together. All members shall carry mark number and item number and, if required, serial number. Method of marking shall be commensurate with the process of manufacture and such as to ensure retention of identity at all stages. The parts shall be match marked.

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14.2.2. The Contractor shall submit his programme of fabrication work to the OC Contract for his approval at least 15 days before the planned commencement. This programme shall include the proposed system of identification and erection marks together with the complete detail of fabrication and welding procedures. Contractor shall also submit for approval of OC Contract, a Quality Assurance Plan according to the nature of fabrication work (whether welded, bolted or riveted) which should clearly define the points of checking and inspection during the stages of fabrication as well as supply of materials.

14.3 **ERECTION**:

14.3.1. The Contractor shall submit to the OC Contract a detailed erection scheme showing stage wise activities with complete drawings and working phase wise instructions. The erection scheme shall be in strict conformity to the assumptions made in structural design of the bridge superstructure. This is to be based on detail stage wise calculation and take into account specification and capacity of erection equipment, machinery, tools, tackles to be used and temporary working loads as per codal provisions.

14.3.2. The scheme shall also take into account site conditions such as hydrology, rainfall, flood timings and intensity, soil and sub soil conditions in the river bed and bank, maximum water depth, temperature and climatic conditions and available working space.

14.3.3. Before starting work, the contractor shall obtain necessary approval of the accepting officer as to the method adopted for erection, the number and the character of tools and plants. The approval of the accepting officer shall however not relieve the contractor of his responsibility for the safety of his method or equipment or from carrying out the work fully and in accordance with the drawings and specification.

14.4. **HANDLINGANDSTORAGEOFSTEEL**: All material, consumables, including raw steel or fabricated material shall be stored specification wise and size wise above the ground upon leveled platforms, skids or other supports. They shall be kept free from dirt and other foreign matters and shall be protected from corrosion and distortion. The electrodes shall be stored specification wise and shall be kept in dry warm conditions in properly designed racks. The bolts, nuts, washers and other fasteners shall be stored in gunny bags on racks above the ground with protective oil coating. in gunny bags.

14.5 **STRAIGHTENINGAND BENDINGOFMATERIAL**

14.5.1. The straightening of plates, angles and other shapes shall be done by methods not likely to produce fracture or any injury. Hammering shall not be permitted. Heating of metal, if permitted by OC Contract for special cases, shall be followed by as slow cooling as possible. Straightening by heating shall be done under controlled procedure and temperature of the steel shall not be more than 650 OC. Heating and cooling rate shall be appropriate to the particular type of steel and shall be as agreed and approved by OC Contract. Accelerated cooling shall not be permitted.

14.5.2. Following the straightening of a bend or buckle, the surface shall be carefully inspected for evidence of fracture. Members having sharp kinks and bends shall be rejected.

14.6 **SHOP ERECTIONANDMATCH MARKING**

14.6.1. Before being dispatched, the steel work shall be temporarily erected in the fabrication shop for inspection by the Engineer-in-Charge either wholly or in such portion as the Engineer- in-Charge may require so that he may be satisfied both in respect of the alignment and fit of all connections. For this purpose, sufficient number of parallel drifts and service bolts screwed up shall be employed. All parts shall fit accurately and be in accordance with drawing and specifications.

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14.6.2. The camber diagram showing camber at each panel point, method of shop assembly and any other relevant detail shall be submitted to Engineer-in-charge for approval.

14.6.3. The field connections of main members of trusses, arches, continuous beams, spans, bends, plate girders and rigid frame shall be assembled, aligned and accuracy of holes and camber checked by the Engineer-in-charge. Only thereafter shall reaming of sub-sized holes to specified size, be taken up.

14.6.4. The assembly shall be dismantled only after final drilling of holes has been completed and the work has been passed by the Engineer-in-charge. Before dismantling, each part shall be carefully marked for re-erection with distinguishing marks and stamped with durable markings. Drawings showing these markings correctly shall be supplied to the Engineer-in- charge.

14.7. **FIELD INSPECTION:**

14.7.1. No protective treatment shall be applied to the work until the appropriate inspection and testing is carried out by Engineer-in-Charge and OC Contract. The stage inspection shall be carried out for all operations so as to ensure the correctness of fabrication and good quality. Girder dimensions and camber shall not be finally checked until all welding and heating operations are completed and the members had cooled to a uniform temperature.

14.8. **TESTING**

14.8.1. Structural Steel shall be tested for mechanical and chemical properties as per various IS codes as may be applicable and shall conform to the requirements specified in IS:2062, IS: 11587, IS: 8500 and IS: 961.

14.8.2. The reinforcing steel shall be tested to conform to requirements of IS:1786..

14.8.3. Bolts and bolted connection joints with HSFG bolts shall be inspected and tested according to IS:4000.

14.8.4. Rivets and rivet bolts shall be inspected as per Clause 1904.6 of MoRT&H Specifications for Roads & Bridge Works (Fifth revision) and tested for compliance of codal requirements.

14.8.5. Welding procedure, welded connections and testing shall be in compliance with codal requirements. All facilities necessary for stage inspection during welding and on completion shall be provided to the OC Contract or his inspecting authority by contractor/fabricator.

14.9. **PROCUREMENT**:

14.9.1. All structural steel/ reinforcement shall be procured by the contractor directly from SAIL, TISCO, RINL (Vizag Steel), Essar Steel Ltd, Lloyds Steel Industries Ltd, Jindal Iron and Steel Co. Ltd, Jindal Vijay Nagar Steel Ltd, IISCO, Jindal Strips Ltd, and Trade Arbed. On Receipt of the consignment of steel at the fabrication yard, the contractor shall inform the same verbally as well as in writing to the OC Contract within a week based on which the OC Contract shall depute the engineer-in-Charge to the fabrication yard for inspection, testing and approval of the lot for fabrication with respect to its quality and the grade as per tender stipulation, and stamping with the departmental insignia. The contractor shall also submit the original copy of invoice along with the manufacturer's test certificate to the Engineer-inCharge during his inspection. On arrival of fabricated components at site, the same shall be verified by the Engineer-in-Charge and the OC contract and approved for incorporation in the structure.

14.9.2. Only new steel shall be delivered to the site. Every bar shall be inspected before assembling on the work and defective, brittle or burnt bars shall be discarded. Bars with cracked ends shall be discarded. For the steel procured from original producers also, the Engineer/Employer may carry out occasional checks on materials through third party as mentioned above, for confirming the test results shown in the certificates, in case of any doubt regarding the quality of steel supplied.

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15. **APPROVAL OF DESIGNS**

15.1. On opening of financial bid, the lowest tenderer on receipt of acceptance letter from the accepting officer should ensure submission of details, design calculations and supported working drawings for all structures based on provisions made in this tender document, various codes and sound engineering design and construction practice within 60 days from the date of receipt of acceptance letter to Bridge & Tunnel Dte/HQ DGBR who will examine the details, drawings & design calculations submitted by the contractor for its adequacy with respect to contract provisions and codal stipulations and make modifications as deemed fit. The contractor shall be bound to make all such modifications in the said details, drawings and calculations as the DDG (B & T) of HQ DGBR, New Delhi may consider necessary, so as to comply the standard code and specifications mentioned in these or in their absence to comply with the accepted principles of sound engineering practice. Outcome of scrutiny of drawings, design/specifications and or comments thereon will be communicated to the contractor by the officer duly authorized by the DDG (Br & Tnl) of HQ DGBR. After complying with observations/comments/ modifications communicated as above, the Contractor shall resubmit the detail and design drawings duly proof checked by Indian Institute of Technology (IIT) to B & T Dte of HQ DGBR, New Delhi where the same shall be re-examined by DDG (B & T) and Approval accorded. Approval(s) to drawings, design/specifications and or comments thereon will be communicated to the contractor by the officer duly authorized by the DDG (B & T) of HQ DGBR. In the event of any disputes arising as whether any modifications are necessary or not, the decision of the DDG (B & T) of HQ DGBR shall be final and binding. If as a result of the scrutiny of afore described, any modifications in the contractor's drawings and calculations etc are rendered necessary in order to ensure that the designs are safe and comply with the various requirements laid down in these contract documents, the contractor shall not be entitled to any extra payment on this account. On receipt of communication regarding approval to the contractor's design and calculations, the contractor shall supply to the B & T Dte of HQ DGBR within a period of 15 days of the receipt of such communications, sixteen copies of the approved drawings for use by the department. The work on construction of the bridge(s) shall proceed as per the approved detailed working drawings.

15.2. During the currency of the work in case any changes are required in the approved design due to ground conditions or any technical reasons, the contractor shall submit the complete detailed working drawings and design calculations in respect of such changes of the bridge for technical scrutiny to the Bridge & Tunnel Dte of HQ DGBR. The details, drawing and design calculations for such changes as and when submitted by the contractor will be examined by DDG (B & T) of HQ DGBR, New Delhi and shall be subject to his approval. The contractor shall be bound to make all such modification in the said details, drawings and calculations as the DDG (B & T) of HQ DGBR may consider necessary, so as to comply the standard code and specifications mentioned in these or in their absence to comply with the accepted principles of sound engineering practice. Preliminary Approval(s) to drawings design/specifications and or comments thereon will be communicated to the contractor by the officer duly authorized by the DDG (B & T) of HQ DGBR. After complying with observations/comments/modifications communicated as above, the Contractor shall resubmit the detail and design drawings duly proof checked by Indian Institute of Technology (IIT) to B & T Dte of HQ DGBR, New Delhi where the same shall be re-examined by DDG (B & T) and final approval accorded. In the event of any disputes arising as whether any modifications are necessary or not, the decision of the DDG (B & T) of HQ DGBR shall be final and binding. If as a result of the scrutiny of afore described, any modifications in the contractor's drawings and calculations etc, are rendered necessary in order to ensure that the designs are safe and comply with the various requirements laid down in these contract documents, the contractor shall not be entitled to any extra payment on this account. On receipt of communication regarding approval to the contractor's design and calculations, the contractor shall supply to the DGBR within a period of 15 days of the receipt of such communications, sixteen copies of the approved drawings for use by the department. The work on construction of the bridge(s) shall proceed as per the approved detailed working drawings.

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15.3. Proof checking of the design and drawings submitted by the contractor shall be got done by the Contractor from **Indian Institute of Technology** (IIT) at his own cost. Contractor's quoted lump sum amount shall be deemed to include the charges for the proof checking.

15.4. **Notwithstanding the approval to the design and calculations submitted by the contractor, the contractor shall be responsible for the stability of the bridge in accordance with the provisions of the contract and approvals accorded as herein before stated shall not absolve him of his responsibility for the safety of the structures designed and constructed by him**.

15.5. Design folder along-with detailed calculations will be submitted in digital format (CD etc) in original file formats i.e. Office Excel sheets, Auto CAD, Word etc. Files in PDF format shall not be accepted. Analysis by using software will be submitted along with relevant input/output files and explanatory notes modeling/ methodology used.

15.6. All designs, calculations, drawings etc in respect of this bridge shall be the sole property of DGBR.

16. **LOAD TESTINGOF BRIDGE**

16.1. **GENERAL**

16.1.1. On completion of the work, the bridge will load tested in accordance with IRC-SP-51: 2015. The lump sum amount quoted by the contractor for the bridge shall be deemed to include all expenses involved in load testing of superstructure of the bridge. All arrangements for carrying out the tests shall be made by the contractor and shall conform to the procedure which may be laid down for the purpose by the Accepting Officer and in accordance with IRC SP: 51 – 2015.

16.1.2. The Engineer-in-Charge may also instruct that a load test on any part of the bridge structure, if in his opinion such a test is deemed necessary for any one or more of the reasons specified below, will be carried out at no extra cost to the Deptt

(i) The work test cubes failing to attain the specified strength.

(ii) Shuttering being prematurely removed.

(iii) Improperly cured.

(iv) Any other Circumstances attributable to the negligence on the part of the contractor, which in the opinion of the Engineer-in-Charge results in the structure or part there of being less than the expected Strength.

16.2. **LOADTESTSCHEME**

16.2.1. The Contractor shall submit all necessary calculations and details of arrangements for load testing of the bridge, which shall include the magnitude of the test load, method of carrying out the test, the application of loads, duration of keeping the load, the deflections at each load level, the equipment to be used and observation to be made during and after placing the loads in position etc., as per IRC SP: 51 – 2015 to Br & Tnl Dte/HQ DGBR. The Br & Tnl Dte, after examination, will convey their comments thereon to the Contractor who will comply with the same and resubmit load testing scheme and calculations duly proof checked from IIT. Thereafter, approval of DDG (B & T) of HQ DGBR shall be conveyed to the Contractor.

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16.2.2. The Contractor shall make all necessary arrangements for the observations, the centering, staging, equipments, etc. that may be needed for measuring the settlements, deflection etc., required for the test to the entire satisfaction of the Engineer-in-Charge, and provide labour, and make all observations during the test

16.3. **MEASREMENTOF DEFLECTIONS**

16.3.1. Deflection shall be measure at critical locations as decided by the Engineer-in-Charge by means of the dial gauges fixed on firm supports, independent of the structure to be tested.

16.4. **MONITORING OFTEMPERATURE EFFECTS**

16.4.1. Prior to conducting actual load test, the deflection values and ambient temperature data shall be collected from dawn to dusk for two or three consecutive days at one hour intervals. Temperature Vs deflection data collected on these days and a curve drawn for each dial gauge location shall be taken as the basic temperature correction. The temperature – deflection characteristics will be a linear line drawn between points of minimum temperature-least deflection and maximum temperaturemost deflection. The deflection reading at any location and temperature during load test is superimposed on the basic curve. The difference between the two values gives the true deflection for the location under reference corresponding to the same temperature.

16.5. **TESTPROCEDURE**

16.5.1. The load test shall be done during such period of the day when the variation in temperature is least. Preferably this should be during the early hours of day.

16.5.2. Prior to load testing, the superstructure of the span to be tested shall thoroughly be examined for any signs of distress (such as any existing hair cracks etc.) and marked/recorded so as to differentiate them from any distress that may occur during the load test. These signs of distress shall be closely watched during the test.

16.5.3. The position of the wheels for the critical vehicle and worst positioning on the deck shall be predetermined and indicated. The initial observations without load shall be observed

16.5.4. The test load shall be applied to the structure at the predetermined position by increments as prescribed in the IRC guidelines. The load shall be applied in a minimum of time with an interval of only five minutes between load stages for purpose of deflection readings.

16.5.5. The deflection shall be observed at every load stage and in the final loaded position. Corresponding ambient temperature shall also be measured.

16.5.6. The load shall then be removed by decrements as prescribed in the IRC guidelines after a test load retention period of minimum 24 hours and record of deflections made and temperature as before

16.5.7. Should there be any doubt about the observations made during a load test, the process of loading and unloading in stages with deflection observations shall be repeated.

16.6 **CRITERIAOFACCEPTANCE**

(a) The load test results, if found satisfactory, shall be accepted and approved by the Accepting Officer

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(b) The load test shall be treated as satisfactory, if

(i) The actual deflections are equal to or less than the theoretical deflections.

(ii) The recovery of deflections on removal of load is not less than 85%.

(iii) The bridge structure shows no signs of distress or defects during the load tests

16.7. Any defect noticed in the structure or any damage done to the bridge at the time of testing which affects or is likely to affect the strength of the bridge shall be rectified by the contractor at his own cost by remedial measures or replacement as approved by the Engineer-in-Charge/OC Contract.

16.8. When the tests are declared by the Engineer-in-Charge as having been completed, the contractor shall remove all loading which might still be on the bridge as well as on the surroundings

17. PAINTING

17.1. With a view to provide protection against corrosion, all exposed steel work shall be protected by a minimum three coats of paint. The Coating System No.6 as given in Table D-2 of Annex-D of IRC:24-2010, which has a desired life over 20 years shall be adopted for painting the steel work in this contract. Necessary guidance shall be taken from Section 1906 of MoRT&H Specifications for Road and Bridge works (Fifth Revision). The painting shall consist of a primary coat of paint or shop coat before erection at site. After erection, the surface shall be given two more coats of paint, one under coat followed by a finishing coat. The shade of paint shall be done in accordance with IS:1477 (Part 1- Code of Practice for painting of ferrous metals in buildings and allied finishes) and as per IRC:24-2010. Alternatively, painting with paints using Nano-technology providing effect equivalent to Coating System 6 of IRC: 24-2010 or better can also be used with approval of Accepting Officer

18. AESTHETICAPPEARANCE

18.1. The structure shall be made aesthetically matching with surrounding and to the complete satisfaction of the Accepting Officer.

19. COMPLETION DRAWINGSAND PHOTOGRAPHIC RECORD

19.1. On completion of construction the contractor shall supply three sets of all the completion drawings, duly approved and properly bound, as per which the bridge has been constructed, to the Accepting Officer for reference and record.

19.2. The contractor shall also supply three sets of photographs along with the films of all such important activities duly put in good albums, to the Accepting Officer for record purpose.

20. CODES OFPRACTICE

20.1. The design of the bridge and its construction shall be in strict conformity with the following codes of practices specification and standards:

(a) **IRC:5 -2015**– Indian Roads Congress standard specification and code of practice for road bridges Section-I, as applicable to General features of design.

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For Accepting Officer

(Signature of the Contractor)

(PARTICULAR/TECHNICAL SPECIFICATIONS CONTD…)

(b) **IRC: 6 - 2017** - - Indian Roads Congress standard specification and code of practice for road Bridges Section-II, as applicable to load and stresses..

(c) **IRC:22-2015** – – Indian Roads Congress Standard Specification and code of practice for Road Bridges Section VI, applicable for composite construction for road bridges .

(d) **IRC:24-2010-** - Indian roads congress standard specifications and codes of practice for road bridges section V, steel road bridges.

(e) **IRC:45-1972**– Recommendations for estimating the resistance of soil below the maximum scour level in the design of well foundation of bridges..

(f) **IRC:78-2014**– – Indian Roads Congress Standard specification and code of practice for Road Bridges Section VII, applicable for foundation and substructure.

(g) **IRC: 83 - 1987 -** Standard specifications and code of practice for road bridges section IX/bearing/Part II- Elastomeric bearings.

(h) **IRC: 83- 2002-** Standard specifications and code of practice for road bridges section IX/bearing/Part III- POT, POT-CUM-PTFE, Pin and metallic Guide bearings..

(j) **IRC:112-2011**- Indian Roads Congress Code of practice for Concrete road bridges. Item not covered by this code will be governed by the Indian Standard Code of practice for pre- stressed concrete IS:1343 & Plain and reinforced concrete IS:456-2000.

(k) **IRC:SP:47–1998**– Guide lines on quality systems of road bridges..

(l) **IRC: SP : 51–2015**– Guide lines for load testing of bridges.

(m) **IRC: SP : 40–1993**– Guide lines on techniques for strengthening and rehabilitation of bridges.

(n) **IRC: SP: 37 – 2010 –** Guide lines for evaluation of load carrying capacity of bridges

(o) **IRC: SP-69-2005**- Guidelines & Specifications for Expansion Joints..

(p) **IS: 6066-1994**– Recommendation for pressure grouting of work foundation in river valley projects for all grouting and cable in charge works.

(q) **IS: 1893-2002**- Criteria for earth-quake resistant design of structure (third revision).

(r) **IS: 2911-2010–** Code of practices for design and construction of pile foundations.

(s) **IS:** 800–2007- General Construction in Steel-Code of Practice

(t) **IS:** 456- 2000- Plain and Reinforced Concrete-Code of practice

(u) **IS:** 1786-2000– Specifications for HYSD Steel

(v) **IS:** 2062-2011- Hot Rolled Medium and High Tensile Structural Steel

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(PARTICULAR/TECHNICAL SPECIFICATIONS CONTD…)

(w) **IS:** 14268– – Uncoated stress relieved strands of low relaxation

(x) Ministry of Road Transport & Highways Specification for Road and bridge works 2013 5 th Revision).

20.2. Any Standard specifications for criteria for road bridges, other than those specified above that may have been published by the Indian Roads Congress and in vogue prior to the date of issue of tenders shall also apply.

20.3. Any amendment issued to the standard specifications prior to the date of issue of tenders shall also be applicable.

20.4. In the event of conflict between the provisions of the departmental specifications and the IRC/BIS publication mentioned above, the severe case shall prevail.

20.5. For design, materials, specifications and construction procedures not covered by the Indian Codes, relevant Foreign Codes may be followed with approval of the department.

20.6. Whenever any issue raised is not catered for in any of the above codes, principles of sound engineering practice shall be followed in matters of design and construction and **the decision of the Accepting Officer shall be final and binding of all such issues**

20.7. One complete set of codes, standards and other specifications will be kept by the Contractor at each bridge site.

20.8. **Latest edition of relevant IRC/IS/BS codes shall be referred over old edition IRC/IS/BS codes wherever applicable as per discretion of Accepting Officer..**

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For Accepting Officer

(Signature of the Contractor)

SCHEDULE 'A'NOTES

NAME OF WORK: "**DESIGN AND CONSTRUCTION INCLUDING PLATE LOAD TEST OF 18 MTR SPAN RCC T-BEAM BRIDGE AT KM 51.019 ON ROAD CONFLUENCE-HAA UNDER 19BRTF PROJECT DANTAK IN BHUTAN**."

1. The span and foundation arrangements as indicated in the tender documents including drawings are the specific requirements to suit the site condition.

2. The scheme proposed by the Departments is shown in the Drawing attached with tender documents The scheme meets the waterway requirements. Alternative proposal is not acceptable.

3. The lump sum amount quoted by the tenderer in this schedule shall be deemed to include for the provision of all labour and materials, tools, plant, equipment and tackle, process, operations, testing and specific requirements details in this schedule in the particular specification and else wherein this tender document and for the fully, entire and final completion of the work in accordance with the provisions of these tender documents. The tenderer shall verify the site conditions and factors which may affect his quoting before submission of tender. No extra DO/amount shall be admissible on account of failure or misunderstanding on the part of tenderer.

4. The tenderer is required to quote his **"lump sum amount**" both in figures as well as in words under Column 6 of schedule 'A' and extend the amount to column 7 at ser page No 185 of tender documents.

5. The period of completion stipulated in column 8 of Schedule 'A' shall be reckoned from the date of handing over site of the bridge as indicated in the work order(s).This period of completion shall also cover the work included in Annexure I if ordered as a deviation. If the contractor does not take over the site on or before the date of commencement given in work order, the same shall be deemed as date of taking over site for reckoning the completion period of work.

6. Irrespective of the actual rate/expenditure the formula given in Annexure I to Schedule 'A' shall be applicable for pricing deviations, if ordered for increase/decrease in length of bridge and height of substructure due to ground conditions.

7. Lump sum tendered by the tenderer in respect of this work shall be deemed to include for all minor details of construction which are obviously and fairly intended and which may not have been specifically mentioned in the tender documents but which are essential for satisfactory execution and completion of work. In case of difference of opinion between the OC Contract and the Contractor as to what constitutes a minor detail of construction, the decision of Accepting Officer shall be final and binding.

8. The rates quoted by the contractor shall be deemed to be inclusive of all taxes (including GST on materials, GST on Works Contracts, Turnover Tax, Service Tax, Labour Welfare Cess/Tax Ecological and Environment Cess etc), duties, Royalties, Octroi & other levies payable under the respective statutes. No re-imbursement/refund for variation in rates of taxes, duties, royalties, Octroi & other levies, and/or imposition/abolition of any new/existing taxes, duties, Royalties, Octroi & other levies shall be made except as provided in special condition No.11 at srl page No 122 &123.

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For Accepting Officer

(Signature of the Contractor)

(SCHEDULE 'A' NOTES CONTD….)

9. In case of discrepancies in rates quoted in figure and words, the rates quoted in words shall prevail.

10. -Blank-

11. -Blank-

12. Ground profile indicated in GAD/Final Bridge Scheme is for guidance purpose only. The bidder shall ascertain existing ground profile at his own and accordingly will be quoted lump sum cost. No financial adjustment shall be made due to difference in ground profile as shown in GAD/Final Bridge Scheme as actually occurring on ground during execution of work.

13. The contractor shall design and construct the Pmt Bridge in such a way that the top level of deck slab exactly flush with the existing road level of already available approaches.

14. The following points may please be noted:-

(a) All the levels given in the tender/Final bridge scheme (Drawing attached with tender documents) are tentative and design shall be submitted by the contractor and will be finalized / approved by the department based on ground requirement.

(b) In case the foundation level is required to be increased/decreased based on the ground requirement and approved by department, the quoted rate shall be **adjusted suitably as per the formula specified at Annexure I to Schedule A for the purpose.**

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For Accepting Officer

(Signature of the Contractor)

SCHEDULE 'A'

IAFW-2159Revised1947

NAME OF WORK:"DESIGN AND CONSTRUCTION INCLUDING PLATE LOAD TEST OF18 MTR SPAN RCC T-BEAM BRIDGE AT KM 51.019 ON ROAD CONFLUENCE-HAA UNDER 19BRTF PROJECT DANTAK IN BHUTAN."

S/ No	Description ofwork	Drg No	Quantity	Unit	Rate (in figures and words)	Amount (in figures and words)	Period of completion
01	02	03	04	05	06	07	08
01	Design and construction including plate load test of 18mtr span (outer to outer) minor permanent bridge on open foundation with RCC T-beam girder bridge at Km 51.019 on road Confluence – Haa under project Dantak in Bhutan with span arrangement as per NIT drawing based on hydraulic data, plate load test, ground data, Special condition, Particular specification of the tender document including load testing of superstructure as specified, all preparatory works, POT and POT cum PTFE bearings, Seismic arresters on abutment cap at appropriate place, substructure and RCC T-Beam with slab type super structure, Suitable confirmatory test for SBC at founding level, Wearing coat having non skid surface, strip seal expansion joints, RCC hand railings, Kerbs, RCC crash barrier, guard posts, drainage arrangement over carriage way and footpath, service arrangement for utilities, painting with non corrosive paint as per fifth revision of MORTH (specifications for road and bridges) to all exposed steel works and kerbs, protective works, temporary river training works and diversions,1.5 mtr wide footpath both sides and all other items of work required and necessary for the complete construction of the bridge including curing but excluding works on approaches and approach slab.	**Key plan drawing attached with Tender documents.**	1.00	Nos	Rs.	Rs.	365 Days from the date of handing over the site

Total Rs……..(Rupees ……..……..……..Only)

AE (C)
ASW
For Accepting Officer

(Signature of the Contractor)

ANNEXURE-I TO SCHEDULE 'A'

NOTES:-

1. For pricing deviations (see Note No-6 of Schedule- 'A' on page 178)

2. For measurement of less than one meter, payment shall be proportionate to work out rate per meter

3. Order regarding increase/decrease of deck level shall be given before start of work and will be reckoned from given RL of approved GAD deck level.

4. Data for calculation of height of substructure shall be taken from RL of foundation level given in the tender drawing to the RL of top of deck level. Founding level and Deck level as shown in NIT drawing shall be taken as reference points for pricing deviation.

5. The length of the bridge structure will be taken as the overall length measured along the center line of the bridge between c/c of abutment bearings.

6. The following formula shall be applicable for pricing deviations for this bridge only, if ordered:-

Increase/decrease of height of substructure, increase/decrease of bridge length

Per metre= $\frac{0.75X \text{ quoted sum in Rupees}}{\text{Total height of all supports of substructure in Mtrs+Length of bridge in mtrs*}}$

(*Length of bridge will be taken as the overall length measured along the centre line of the bridge between inner faces of dirt walls)

AE (C)
ASW
For Accepting Officer

(Signature of the Contractor)

SCHEDULE 'B'

ISSUEOF MATERIAL ETC TO THE CONTRACTOR

(See Condition 10 of General Conditions of Contract)

Name of Work:"**DESIGN AND CONSTRUCTION INCLUDING PLATE LOAD TEST OF18 MTR SPAN RCC T-BEAM BRIDGE AT KM 51.019 ON ROAD CONFLUENCE-HAA UNDER 19BRTF PROJECT DANTAK IN BHUTAN**."

Srl No	Particulars	Rate at which Material will be issued o the contractor		Place of issue by Name	Remarks
		Unit	Rate (Rs)		
Nil					

AE (C)
ASW
For Accepting Officer

(Signature of the Contractor)

SCHEDULE 'C'

LIST OF TOOLSANDPLANT (OTHER THANTRANSPORT) WHICH WILL BEHIREDTOTHECONTRACTOR

(See Condition 15,34 &35of General Conditions of Contracts IAFW-2249)

NAME OFWORk:"**DESIGN AND CONSTRUCTION INCLUDING PLATE LOAD TESTOF18 MTR SPAN RCC T-BEAM BRIDGE AT KM 51.019 ON ROAD CONFLUENCE-HAA UNDER 19BRTF PROJECT DANTAK IN BHUTAN**."

Srl No	Quantity/ Particulars	Details of crew supplied	Hire charges per unit per working day	Stand by charges per unit per off day	Place of issue by name	Remarks
1	2	3	4	5	6	7
--- NIL ---						

SCHEDULE 'D'

TRANSPORT TOBEHIREDTOTHECONTRACTOR

(See Conditions 16&35of General Conditions ofContractIAFW-2249)

NAMEOFWORK: "**DESIGN AND CONSTRUCTION INCLUDING PLATE LOAD TEST OF18 MTR SPAN RCC T-BEAM BRIDGE AT KM 51.019 ON ROAD CONFLUENCE-HAA UNDER 19BRTF PROJECT DANTAK IN BHUTAN**."

Srl No.	Quantity	Particulars	Rate per Unit per working day	Place of Issue by Name	Remarks
1	2	3	4	5	6
----------NIL----------					

AE (C)
ASW
For Accepting Officer

(Signature of the Contractor)

TENDER

To,
The President of India
Through the Chief Engineer
Project DANTAK*(*Referred to also as Accepting Officer elsewhere in the tender documents).

Having examined and perused the following documents forming part of tender documents:-

1. Particular/technical specifications.
2. Ministry of Road Transport & Highways (MoRT&H) specifications for Road and Bridge works (Fifth Revision) published by Indian Road Congress New Delhi.
3. Drawings detailed in the list of drawings/specifications/other tender documents.
4. Schedule 'A', 'B', 'C' & 'D' attached here to
5. Special Conditions of the Contract
6. General Conditions of Contracts IAFW-2249 (1989 Print) including amendments 1 to 48 and errata No 1 to 20.
7. All other documents forming part of tender documents

Should this tender be accepted, I/we agree:-

To execute all the works referred to in the said documents upto the terms and conditions contained or referred to therein at the rates contained in the aforesaid Schedule 'A' or at such other rates to be fixed under the provision of condition 62 of IAFW-2249 and to carry out such deviations as may be ordered vide condition **7 of General Condition** of Contracts upto maximum of **10 percent** and further agree to refer all disputes as required by condition **70** of the General Conditions of the Contract (IAFW-2249) to the Sole Arbitration of a serving Engineer Officer to be **appointed by the Director General Border Roads, New Delhi or in his absence, by the officer officiating as Director General Border Roads,** whose decision shall be final, conclusive and binding. However, in case of disputes with **PSE** and or **PSU** the same will be referred to a Sole Arbitrator to be appointed by Secretary, Bureau of Public Sector Enterprises (refer Special condition 24 of tender documents).

Signature of Contractor
in the capacity of_____
duly authorized to sign the tender for and on behalf of
Witness: (Name in Block letters)
M/s_____
Address_____(In Block letters)
Postal address: - _____

AE(C)
ASW
(Signature of the Contractor) For Accepting Officer

A C C E P T A N C E

_____alterations have been made in this documents and as evidence that these alterations were made before the execution of this contract agreement, they have been initialed by the contractor and Shri_____, HQ CE (P) DANTAK. The said Officer(s) is/are hereby authorised to sign and initial on my behalf the documents, forming part of the contract on my behalf.

The above tender was accepted by me on…… day of …….. 2022 , on behalf of the President of India for the contract sum of Rs._____ (Rupees_____ _____ Only) at the item rates quoted in Schedule 'A' in favour of _____

_____

Signature

Chief Engineer
Project Dantak
Accepting Officer
For and on behalf of the
President of India

Signed this ____ day of _____2022

AE (C)
ASW
For Accepting Officer

(Signature of the Contractor)