सत्यमेव जयते

भारतीय राष्ट्रीय राजमार्ग प्राधिकरण
(सड़क परिवहन और राजमार्ग मंत्रालय, भारत सरकार)
National Highways Authority of India
(Ministry of Road Transport and Highways, Government of India)
जी-5 एवं 6, सेक्टर-10, द्वारका, नई दिल्ली - 110 075 • G-5 & 6, Sector-10, Dwarka, New Delhi-110075
दूरभाष/Phone : 91-11-25074100 / 25074200

भाराराप्रा/ नीति दिशानिर्देश/ विविध दिशानिर्देश/ 2026
नीति परिपत्र स. 18.140/2026 दिनाक 10th अक्टूबर 2026
{(ई-ऑफिस फाइल सं. DESIGN-17011/2/2026-Design Division (कम्प्युटर सं. 320668 पर लिया गया निर्णय)}

NHAI/Policy Guidelines/ Miscellaneous Guidelines/2026
Policy Circular No. 18.140 / 2026 dated 10th October, 2026
{(Decision taken on E-Office File No. DESIGN-17011/2/2026-Design Division (Comp No. 320668)}

विषय: भा.रा.रा.प्रा. परियोजनाओं के अंतर्गत महत्वपूर्ण संरचनाओं के डिजाइन एवं ड्रॉइंग की सूचीबद्ध आईआईटी/प्रतिष्ठित तकनीकी संस्थानों और फर्मों द्वारा स्वतंत्र प्रूफ चेकिंग की प्रक्रिया के संबंध में।

Sub: Independent Proof Checking of Design and Drawings of Critical Structures under NHAI Projects by Empanelled IITs / Reputed Technical Institutions and Firms: Procedure - Reg:-

बड़ी पुल संरचनाएं तथा अन्य महत्वपूर्ण/विशेष संरचनाएं दीर्घ डिजाइन सेवा अवधि वाली महत्वपूर्ण राजमार्ग परिसंपत्तियां हैं। इन संरचनाओं के डिजाइन तथा संबंधित हाइड्रोलाजिकल और हाइड्रोलिक अध्ययनों की स्वतंत्र प्रूफ चेकिंग, संरचनात्मक सुरक्षा, सेवा-योग्यता, टिकाऊपन तथा लागू आईआरसी कोड, विनिर्देशों एवं संबंधित संविदा करार के प्रावधानों के अनुपालन को सुनिश्चित करने के लिए आवश्यक है। भाराराप्रा परियोजनाओं में स्वतंत्र प्रूफ चेकिंग हेतु एक समान एवं सुदृढ़ संस्थागत तंत्र स्थापित करने के उद्देश्य से भाराराप्रा ने ब्रिज इंजीनियरिंग एवं हाइड्रोलिक इंजीनियरिंग के क्षेत्र में प्रमाणित विशेषज्ञता रखने वाले भारतीय प्रौद्योगिकी संस्थानों (आईआईटी) तथा अन्य प्रतिष्ठित सरकारी तकनीकी संस्थानों तथा प्रतिष्ठित फर्में को पैनल में सम्मिलित करने का निर्णय लिया है।

Major Bridge Structures and other critical/special structures constitute critical Highway Assets having long design service life. Independent proof checking of their design and associated hydrological & hydraulic studies is essential to ensure Structural safety, serviceability, durability and compliance with applicable IRC Codes, Specifications and Provisions of the respective Contract Agreement. With a view to establishing a uniform and robust Institutional Mechanism for independent proof checking across NHAI projects, NHAI has decided to empanel Indian Institutes of Technology (IITs)/ Government Technical Institutions and other Reputed Firms having demonstrated expertise in Bridge and Hydraulic Engineering.

2. **सूचीबद्ध संस्थान /फर्में, भाराराप्रा द्वारा चिन्हित महत्वपूर्ण संरचनाओं के डिजाइन कैलकुलेशन, संरचनात्मक विश्लेषण, डिजाइन ड्रॉइंग तथा जहां लागू हो, संबंधित हाइड्रोलाजिकल और हाइड्रोलिक अध्ययनों की स्वतंत्र प्रूफ चेकिंग करेंगे। प्रूफ चेकिंग की प्रक्रिया, समय सीमा, शुल्क और प्रयोज्यता के संबंध में विस्तृत दिशानिर्देश भाराराप्रा के सभी संबंधित तकनीकी प्रभागों/क्षेत्रीय कार्यालयों/पीआईयू द्वारा अनिवार्य अनुपालन के लिए इसके साथ संलग्न हैं।**

The empanelled Institutions/Firms shall undertake independent proof checking of Design Calculations, Structural Analysis, Design Drawings and, wherever applicable, Hydrological & Hydraulic studies of Critical Structures identified by NHAI. The detailed Guidelines regarding Procedure for Proof Checking, timelines, fee and applicability are **enclosed** herewith for mandatory compliance by all concerned Technical Divisions/Regional Offices/PIUs of NHAI.

Contd....2/-

3. **यह सक्षम प्राधिकारी के अनुमोदन से जारी किया जाता है।**
This issues with the approval of Competent Authority.

10/10/26

(सीएस. संजय कुमार पटेल/ CS. Sanjay Kumar Patel)
प्रभारी मुख्य महाप्रबंधक(समन्वय) (i/c) Chief General Manager (Coord.)

प्रति/ To:

भाराराप्रा मुख्यालय/आरओ/पीआईयू/सीएमयू/साइट कार्यालयों के सभी अधिकारी।

All Officers of NHAI HQ/ ROs/ PIUs/ CMUs/ Site Offices.

प्रतिलिपि/ Copy to:

1. **पुस्तकालय की साइट पर प्रकाशन के लिए पुस्तकालय को।**
Library for hosting the Circular on Library site.
2. **परिचालन के लिए वेब एडमिन को।**
Web Admin for Circulation.
3. **सचिव, सड़क परिवहन और राजमार्ग मंत्रालय के प्रधान निजी सचिव को सूचनार्थ।**
PPS to Secretary, MoRT&H for Kind Information.

Enclosure

Independent Proof Checking of Design and Drawings of Critical structures under NHAI Projects by Empanelled IITs/Reputed Technical Institutions and Firms: - Procedure.

Bridge structures constitute critical highways assets with a design service life of 100 years or more. Independent verification of design at the design stage is essential to ensure structural safety, serviceability, durability and compliance with applicable IRC Codes, Specifications and Concession Agreement provisions.

2. The existing provisions of proof checking of structures in various modes of contract are as below:

a. **EPC Contract**- As per Article 10 (Design and Construction) of Standard EPC Agreement, the Contractor is required to appoint a Proof Consultant. The contractor must propose a panel of three firms to the NHAI, NHAI will then select and consent to one firm.

Clause 10.2 (iv) (a) states "The Contractor shall prepare and submit, with reasonable promptness and in such sequence as is consistent with the Project Completion Schedule, three (3) copies each of the design and Drawings, duly certified by the Proof Consultant, to the Authority's Engineer for its approval. Provided, however, that in respect of Major Bridges and Structures, the Authority's Engineer may require additional drawings for approval in accordance with Good Industry Practice.

b. **HAM Contract**- Clause 12.3.2 states "For the design of all major bridges, viaducts, tunnels and other complex structures included in the Project Highway, the Concessionaire shall, at its own cost, appoint a Proof Consultant from the panel of firms of repute as may be specified by the Authority. The Proof Consultant shall review and certify the design and drawings of such structures in accordance with provisions of this Agreement and Good Industry Practice."

Schedule H states "In the case of major bridges, viaducts, tunnels and other complex structures, the Concessionaire shall submit to the Independent Engineer, four copies of the design and drawings duly reviewed and certified by the Proof Consultant."

c. **BOT Contract**-Clause 12.3.1. (d) States "The Concessionaire shall engage a Proof Consultant, at its own cost, for review and checking of designs of all major bridges (of length 50m and above) and other structures as per the requirements of the Schedule-H. The proof Consultant shall be from a panel of firms empaneled with the Authority."

Schedule H (Drawings) states "The Concessionaire shall engage a Proof Consultant to check and certify the design of all major bridges, tunnels and other structures as per the requirements of the Concession Agreement."

While the existing EPC, HAM and BOT Contract Agreements provide for proof checking of designs through Proof Consultants for specified structures, the existing provisions differ in respect of the scope of structures covered, manner of selection/appointment of Proof Consultants and the extent of institutional involvement. In order to establish a uniform and robust quality assurance framework across all modes of project implementation, NHAI has decided to institutionalize proof checking through empaneled IITs/ reputed technical institutions and other reputed firms for critical structures. The critical structures for this shall be major bridges/viaducts (all major river bridges with design discharge Q>= 3000 cumec and all structures/ bridges with any individual span (effective) >= 40m) and special structure designs identified by NHAI.

3. NHAI shall empanel Indian Institutes of Technology (IITs)/ reputed Government Technical Institutions and reputed firms having demonstrated expertise in bridge engineering and hydraulic engineering for undertaking independent proof checking of critical structures- Design calculations and structural analysis, Design drawings, along with Hydrological and hydraulic studies, where applicable. A MoU for this shall be executed with Indian Institutes of Technology (IITs)/ reputed Government Technical Institutions and reputed firms.

The empanelment shall be category-based depending upon the demonstrated domain expertise of the institution/firm and will be available on the NHAI website at https://nhai.gov.in/#/empanelment-technical-institutionsfirms

4. The workflow for the proof checking shall be as follows:

S. No.	Stage	Existing System for all structures (EPC/HAM/BOT Mode)	Proposed System for Critical Structures identified under this Circular
a.	**Submission of Design**	The Contractor/Concessionaire shall appoint a Design Director to prepare and submit design and drawings, as per the provisions of the applicable Contract Agreement.	The Contractor/Concessionaire shall appoint a Design Director to prepare and submit design and drawings, as per the provisions of the applicable Contract Agreement. The design shall be submitted to the AE/IE for approval/review in accordance with the applicable Contract/ Concession Agreement.
b.	**Selection of Proof Consultant / Institution**	The Proof Consultant shall be appointed/engaged in accordance with the provisions of the respective EPC/HAM/BOT Contract Agreement.	After approval of the design by the AE/IE, the Contractor/Concessionaire shall, with the recommendation/approval of the AE/IE, propose three Institutions/firms from the empaneled list valid as on the date of submission. The Regional Office (RO) shall select and approve one or more Institutions/firms, as considered appropriate based on the project requirements.
c.	**Proof Checking**	The design shall be reviewed and certified by the Proof Consultant in accordance with the applicable Contract Agreement and Good Industry Practice.	The design shall be referred to the selected empaneled Institution(s)/firm(s) for independent proof checking, along with the requisite documents/data as specified in Annexure-I. All communications with the Institution(s)/firm(s) shall be made through the Office of the Director or designated Nodal Officer of the Institution/Director of firm, as specified in the MoU.
d.	**Compliance with Observations**	The Contractor/Concessionaire shall address the observations of the Proof Consultant in accordance with the applicable Contract Agreement.	The Contractor/Concessionaire shall deliberate upon the observations of the empaneled Institution/firm and incorporate the same, as considered necessary, with the approval of the AE/IE.
e.	**Final Approval**	The AE/IE shall accord approval in accordance with the provisions of the applicable Contract Agreement.	The AE/IE shall accord final approval/ review in accordance with the provisions of the applicable Contract Agreement, after considering the observations/recommendations of the empaneled Institution/firm and compliance thereof.
Note: The existing contractual provisions relating to appointment/engagement of Proof Consultants under EPC, HAM and BOT Contracts shall continue to remain applicable for all structures other than critical structures.			

5. The scope of proof checking shall, at a minimum, cover all aspects specified in the Standard Proof-Checking Checklist (enclosed as Annexure II) issued by NHAI, with the relevant observations/comments duly recorded in the report.

6. For EPC/HAM/BOT projects, the cost of proof checking shall be borne by the respective Contractor. Where proof checking is introduced as an additional requirement under an existing Contract, the same shall be processed as a Variation/Change of Scope (CoS) in accordance with the provisions of the respective Contract Agreement and extant policy guidelines.

7. The proof checking shall be completed by the empaneled IIT / Technical Institution/firm within the timeline mutually agreed with the Contractor/ Concessionaire. Any delay in completion of proof checking shall not entitle the Contractor/ Concessionaire to any Extension of Time (EOT), compensation, or other claim against NHAI.

8. **Applicability**

8.1. The Circular shall come into force with effect from 01.12.2026. The policy shall be applicable to all NHAI projects executed under EPC/HAM/BOT Mode, and any other implementation mode as decided by NHAI.

8.2. The provisions of this Circular shall be applicable to all new EPC/HAM/BOT projects and to projects where the Contract has been awarded but design vetting/proof checking has not commenced as on the effective date of this Circular.

8.3. In projects where the Contract has already been awarded and design vetting/proof checking has been completed; the provisions of this Circular shall ordinarily not apply retrospectively. However, additional independent proof checking of major bridges or special structures of complex/critical nature may be undertaken through an empaneled IIT/Technical Institution/firm with the approval of the Competent Authority, subject to mutual agreement with the Contractor/Concessionaire. The cost of such additional proof checking shall be dealt with in accordance with the respective Contract Agreement and applicable provisions for Variation/Change of Scope (CoS), wherever applicable.

Annexure I

CHECKLIST FOR SUBMISSION OF DESIGN AND DRAWINGS FOR PROOF CHECKING

The Contractor/Concessionaire/Designer shall submit the following documents, design calculations, drawings and supporting information to the empanelled IIT/Technical Institution for proof checking. The submission shall be complete, duly indexed and signed by the authorized Design Consultant/Designer and Authority's Engineer (AE). Proof checking shall commence only after submission of the complete design package, as applicable to the project.

A. General Documents and Design Basis

- ☐ Design Basis Report/Design Criteria clearly indicating the scope and applicable structures.
- ☐ General arrangement drawings and location plan/structure inventory.
- ☐ Applicable Codes, Standards, Specifications and Guidelines used in design.
- ☐ Design parameters and assumptions adopted.
- ☐ Design life and durability requirements.
- ☐ Material properties and grades of concrete, reinforcement and structural steel.
- ☐ Loading criteria, load combinations and load factors.
- ☐ Seismic parameters, zone, soil type and response reduction factors, wherever applicable.
- ☐ Wind parameters and relevant design criteria, wherever applicable.
- ☐ Temperature, shrinkage, creep, differential settlement and other applicable effects.
- ☐ Construction stage and erection-stage loading/conditions.
- ☐ Design calculations with clear references to the relevant drawings and design inputs.
- ☐ Details of any deviation from standard drawings, specifications or approved design criteria, along with justification.

B. Geotechnical Investigation, Data and Reports

- ☐ Approved/accepted **Geotechnical Investigation Report (GIR)** for the complete project/structure.
- ☐ Details and locations of all boreholes, trial pits, CPT/CPTu or other field investigations.
- ☐ Borehole logs, soil/rock profiles and subsurface stratification.
- ☐ Field investigation and in-situ test results.
- ☐ Laboratory test results and relevant soil/rock test certificates.
- ☐ Groundwater table data, including seasonal variations, wherever applicable.
- ☐ Geotechnical design parameters adopted for each foundation location, with their basis.
- ☐ Soil classification and engineering properties, including unit weight, cohesion, friction angle, modulus, permeability, etc., as applicable.
- ☐ Rock properties, RQD, rock quality/classification and allowable bearing parameters, wherever applicable.
- ☐ Foundation bearing capacity and settlement analysis.
- ☐ Pile capacity calculations, including axial and lateral capacity, where applicable.
- ☐ Pile group analysis and settlement assessment, where applicable.
- ☐ Recommendations regarding foundation type, founding level and treatment of weak strata.
- ☐ Liquefaction potential assessment, where applicable.
- ☐ Slope stability analysis, where applicable.

- ☐ Seismic/geotechnical parameters and site-specific recommendations, wherever applicable.

- ☐ Scour-related geotechnical considerations for foundations in watercourses.
- ☐ Details of ground improvement, soil stabilisation or special foundation treatment, where proposed.
- ☐ Relevant geotechnical design assumptions and limitations.
- ☐ Details of any additional investigation carried out subsequent to the original GIR.

C. Hydrological and Hydraulic Data/Reports

- ☐ **Hydrological and Hydraulic Investigation/Design Report** for all bridges, culverts and structures affecting/affected by watercourses.
- ☐ Catchment characteristics and drainage area details.
- ☐ Design discharge/flood discharge and basis of its estimation.
- ☐ Historical flood data and available gauge/discharge records.
- ☐ Design return period adopted and justification.
- ☐ Rainfall data and relevant intensity-duration-frequency data, wherever applicable.
- ☐ Flood frequency analysis, where applicable.
- ☐ High Flood Level (HFL), Low Water Level (LWL), Normal Water Level (NWL) and other relevant water levels.
- ☐ Existing and proposed waterway/opening details.
- ☐ Hydraulic model/analysis, wherever required.
- ☐ Afflux calculations.
- ☐ Flow velocity and flow distribution at the structure.
- ☐ Scour depth calculations, including normal, contraction and local scour, as applicable.
- ☐ Proposed founding level with reference to calculated scour level.
- ☐ Waterway adequacy assessment.
- ☐ Backwater/flooding assessment, wherever applicable.
- ☐ River morphology, channel characteristics and bank stability assessment, where applicable.
- ☐ Details of existing/proposed upstream and downstream hydraulic structures affecting flow conditions.
- ☐ Details of flood protection, river training, pitching, launching apron and other protection works.
- ☐ Hydraulic adequacy of drainage arrangements for approaches and adjoining structures.
- ☐ Details of debris, sedimentation or other site-specific hydraulic considerations, where relevant.
- ☐ Photographs/site observations and relevant historical flood information.
- ☐ All input data, assumptions, methodology and software/model files used for hydrological/hydraulic analysis, wherever applicable.

D. Coordination of Geotechnical, Hydrological and Structural Design

- ☐ Foundation design is consistent with the geotechnical parameters and recommendations.
- ☐ Founding level is adequate with respect to calculated scour level and geotechnical requirements.
- ☐ Hydraulic opening is consistent with the approved hydrological/hydraulic assessment.

- ☐ Pier, abutment and foundation locations are consistent with the hydraulic model and waterway requirements.
- ☐ Scour protection and river training works are consistent with the hydraulic and geotechnical assessments.
- ☐ HFL, design flood level, roadway/bridge levels and freeboard are mutually consistent.
- ☐ Hydraulic forces considered in the structural design are consistent with the hydrological/hydraulic assessment.
- ☐ Any changes in foundation arrangement, waterway, span arrangement or structure configuration have been duly incorporated in the corresponding geotechnical, hydraulic and structural calculations.
- ☐ Any discrepancy between the Geotechnical Investigation Report, Hydrological/Hydraulic Report, design calculations and drawings has been identified and resolved before submission for proof checking.

E. Structural Analysis and Design

- ☐ Structural analysis model and model description.
- ☐ Input files/model files in the native software format, wherever feasible.
- ☐ Output files/results of structural analysis.
- ☐ Model geometry, member properties, material properties and boundary conditions.
- ☐ Details of supports, bearings, hinges, releases and connection assumptions.
- ☐ Load cases and load combinations.
- ☐ Moving-load analysis and critical load effects for bridges.
- ☐ Seismic analysis, including modal analysis/response spectrum analysis, wherever applicable.
- ☐ P-Delta/geometric non-linearity analysis, where applicable.
- ☐ Construction-stage analysis, including temporary and erection conditions, where applicable.
- ☐ Independent checks of critical reactions, forces, moments, deflections and stresses.
- ☐ Serviceability checks, including deflection, crack width and vibration, wherever applicable.
- ☐ Ultimate limit-state checks.
- ☐ Fatigue assessment for applicable bridge components.
- ☐ Stability and buckling checks for applicable members.
- ☐ Robustness and structural integrity checks, wherever applicable.

F. Substructure and Foundation

- ☐ Design calculations for foundations.
- ☐ Design of pile foundations, including pile capacity and settlement, where applicable.
- ☐ Pile group analysis and lateral capacity, where applicable.
- ☐ Pile integrity/load test results, where available/applicable.
- ☐ Design of pile caps/open foundations/well foundations, as applicable.
- ☐ Pier and abutment design calculations.
- ☐ Retaining wall and return wall design, where applicable.
- ☐ Bearing and foundation-level checks.
- ☐ Scour and protection arrangements for waterway structures.
- ☐ Seismic and lateral load checks on foundations, where applicable.

G. Superstructure

- ☐ Complete design calculations for the superstructure system.
- ☐ Girder/box girder/slab design calculations, as applicable.
- ☐ Flexural, shear, torsion and combined-action checks.
- ☐ Prestressing calculations, where applicable.
- ☐ Prestress losses and tendon profile calculations.
- ☐ Anchorage zone and end-block design, where applicable.
- ☐ Construction-stage and erection-stage checks.
- ☐ Diaphragm/cross-girder design.
- ☐ Bearing reactions and bearing design requirements.
- ☐ Expansion joint requirements and movement calculations.
- ☐ Deck slab and wearing course details.
- ☐ Drainage arrangements.
- ☐ Parapets/crash barriers and their connection details.
- ☐ Fatigue and serviceability checks, where applicable.

H. Special Bridges/Structures

For cable-stayed, extradosed, segmental, balanced cantilever, steel, composite, integral/semi-integral or other special structures:

- ☐ Complete structural concept and design methodology.
- ☐ Detailed construction sequence and stage-wise analysis.
- ☐ Erection/launching/segment placement analysis, as applicable.
- ☐ Temporary works and temporary support arrangements.
- ☐ Cable/tendon design and stressing sequence, where applicable.
- ☐ Time-dependent analysis, including creep, shrinkage and relaxation, where applicable.
- ☐ Global and local stability checks.
- ☐ Wind and aerodynamic assessment, where applicable.
- ☐ Seismic analysis and relevant special checks.
- ☐ Independent verification of critical design parameters.

I. Structural and Detailed Drawings

The following drawings shall be submitted in the latest approved/released-for-proof-checking revision:

- ☐ General Arrangement (GA) drawings.
- ☐ Plan, elevation and sectional drawings.
- ☐ Foundation drawings.
- ☐ Pile layout and reinforcement drawings.
- ☐ Pier and abutment reinforcement drawings.
- ☐ Superstructure reinforcement drawings.
- ☐ Prestressing/tendon layout and stressing details, where applicable.
- ☐ Girder/box girder/segment drawings, as applicable.
- ☐ Bearing layout and details.
- ☐ Expansion joint details.
- ☐ Deck slab and wearing course details.

- ☐ Diaphragm/cross-girder details.
- ☐ Reinforcement detailing at critical zones.
- ☐ Construction joints and detailing.
- ☐ Drainage and deck drainage details.
- ☐ Crash barrier/parapet details.
- ☐ Approach slab and transition details.
- ☐ Seismic restraint/stoppers/shear keys, where applicable.
- ☐ Details of connections, splices, anchorages and embedded items.
- ☐ Temporary works/erection drawings, where applicable.
- ☐ Bar Bending Schedule (BBS), wherever applicable.
- ☐ Relevant standard drawings and reference drawings.

J. Drawings-Design Consistency Check

- ☐ All dimensions in drawings are consistent with design calculations.
- ☐ Member sizes and geometry are consistent with the analysis model.
- ☐ Reinforcement shown in drawings corresponds with design calculations.
- ☐ Prestressing details correspond with approved design calculations.
- ☐ Bearing type, capacity and locations correspond with design requirements.
- ☐ Expansion joint type and movement capacity are consistent with calculations.
- ☐ Foundation dimensions and reinforcement correspond with foundation design.
- ☐ Levels, gradients, cross-falls and drainage arrangements are coordinated.
- ☐ Construction joints and sequence are consistent with the design assumptions.
- ☐ No discrepancies exist between GA drawings, detailed drawings and design calculations.

K. Software and Digital Design Data

- ☐ Name and version of software used for structural analysis/design.
- ☐ Description of modelling methodology and assumptions.
- ☐ Native analysis model/input files.
- ☐ Relevant output files and design reports.
- ☐ Design spreadsheets used for critical calculations.
- ☐ Software design modules/settings adopted, where relevant.
- ☐ Details of any user-defined functions, macros or scripts used.
- ☐ Electronic drawings in editable/native format, wherever required.
- ☐ PDF set of all drawings and design documents for record.

L. Independent Design Review/Quality Control

- ☐ Internal design check certificate by the Designer.
- ☐ Independent design check, wherever required under the Contract.
- ☐ Compliance statement against applicable Codes, Specifications and NHAI requirements.
- ☐ List of assumptions requiring confirmation during construction.
- ☐ List of critical design elements requiring special attention during construction.
- ☐ Details of previous comments/observations on the design, if any, and their compliance.
- ☐ Revision history of design calculations and drawings.
- ☐ Certificate that the submitted drawings and calculations represent the same design revision.

M. Submission and Certification by Contractor/Designer

The Contractor/Concessionaire/Designer shall submit a **Design Submission Index** along with the complete package and certify that:

- ☐ The submission is complete and contains all documents required for proof checking.
- ☐ The design calculations and drawings correspond to the same revision.
- ☐ All design inputs and assumptions have been identified.
- ☐ The design has been checked internally by the authorised Design Consultant/Designer.
- ☐ All applicable Codes, Standards, NHAI specifications and Contract requirements have been considered.
- ☐ All relevant structural analysis models and electronic files have been submitted.
- ☐ No material information relevant to the structural design has been omitted.

Certificate by Contractor/Concessionaire/Designer

"It is certified that the design calculations, drawings, analysis models and supporting documents submitted for proof checking are complete, internally checked and correspond to the same design revision. The submission has been prepared in accordance with the applicable Codes, Standards, NHAI Specifications, Contract provisions and approved design criteria."

Name & Designation of Authorised Signatory: _____
Name of Design Consultant: _____
Project: _____
Structure/Package: _____
Revision No.: _____
Date: _____

Note

The above checklist is indicative and shall be supplemented by any additional documents, calculations, drawings, analysis or supporting information specifically required by the empanelled IIT/Technical Institution considering the type, complexity and special features of the structure. Submission of the checklist shall **not limit the responsibility of the Contractor/Concessionaire/Designer for completeness, correctness, safety and adequacy of the design.**

Annexure II

CHECKLIST FOR PROOF CHECKING OF MAJOR BRIDGE STRUCTURES

A. General Information

1. Project Name and Location
2. Bridge Type and Configuration
3. Design Life Considered (100 Years / As Specified)
4. Applicable Codes, Standards and IRC Specifications
5. Design Basis Report (DBR) Reviewed
6. Latest Drawings and Revisions Reviewed
7. Independent Verification of Design Inputs Completed

B. Survey and Investigation Data

Topographic Survey

1. Survey Datum Verified
2. Alignment and Coordinates Verified
3. Existing Structures and Utilities Considered

Geotechnical Investigation

1. Borehole Locations and Depths Adequate
2. Soil/Rock Parameters Verified
3. Groundwater Level Considered
4. Liquefaction Assessment (where applicable)
5. Foundation Recommendations Reviewed

C. Hydraulic and Hydrological Studies

Hydrology

1. Catchment Area Verified
2. Rainfall Data Source Verified
3. Design Return Period Adopted as per IRC/MoRTH
4. Peak Flood Discharge Calculation Verified
5. Climate Change / Future Hydrological Trends Considered (where applicable)

Hydraulic Parameters

1.HFL (Highest Flood Level) Verified
2. LWL (Low Water Level) Verified
3. Design Water Level Verified
4. Afflux Calculation Checked
5. Waterway Adequacy Verified
6. Velocity Distribution Assessed
7. Flow Direction Confirmed
8. River Training Works Reviewed
9. Backwater Effect Assessed (if applicable)
10. Tidal Effects considered (if applicable)

Scour Assessment

1. Normal Scour Depth Verified
2. Design Scour Depth Verified
3. Local Scour Around Piers Assessed
4. Maximum Scour Level Adopted Correctly
5. Foundation Level Below Design Scour Verified

Freeboard and Navigation

1. Vertical Clearance Verified
2. Navigation Clearance Verified (if applicable)
3. Freeboard Requirement Satisfied

D. Structural Design Review

Loading

1. Dead Load Verified
2. Superimposed Dead Load Verified
3. Live Load Class Verified
4. Impact Factor Verified
5. Braking and Longitudinal Forces Checked
6. Centrifugal Force Considered (if applicable)
7. Wind Load Verified
8. Temperature Effects Considered
9. Shrinkage and Creep Considered
10. Seismic Load Verified
11. Construction Stage Loads Considered
12. Fatigue Assessment Conducted (where applicable)

Superstructure

1. Structural System Adequacy Verified
2. Span Arrangement Verified
3. Deck Slab Design Checked
4. Main Girder Design Checked
5. Cross-Girders/Diaphragms Checked
6. Prestressing Design Verified
7. Bearing Reactions Verified
8. Serviceability Criteria Checked
9. Ultimate Limit State Checked

Substructure

1. Pier Design Verified
2. Abutment Design Verified
3. Wing Wall / Return Wall Design Verified
4. Seismic Restraint System Checked
5. Expansion Joint Arrangement Reviewed

Foundations

1. Pile Capacity Verified
2. Well Foundation Design Verified (if applicable)
3. Settlement Assessment Reviewed
4. Lateral Load Capacity Checked
5. Uplift Stability Checked
6. Scour Effects Included

E. Seismic Design

1. Seismic Zone Considered Correctly
2. Site Classification Verified
3. Response Reduction Factors Verified
4. Seismic Forces Computed Correctly
5. Bearings and Seismic Arrestors Reviewed
6. Ductility Requirements Satisfied

F. Bearings and Expansion Joints

1. Bearing Type Selection Reviewed
2. Bearing Capacity Verified
3. Rotation and Translation Requirements Checked
4. Expansion Joint Movement Capacity Verified

G. Durability and Service Life

1. Design Life Requirement Verified
2. Exposure Conditions Identified
3. Concrete Grade Adequate
4. Reinforcement Cover Adequate
5. Corrosion Protection Measures Reviewed
6. Drainage Arrangement Verified
7. Waterproofing Details Reviewed

H. Constructability Review

1. Construction Methodology Reviewed
2. Temporary Works Considered
3. Launching/Erection Analysis Verified
4. Construction Stage Stability Verified
5. Accessibility for Inspection and Maintenance Considered

I. Drawings Review

1. General Arrangement Drawing Reviewed
2. Reinforcement Drawings Checked
3. Prestressing Drawings Checked
4. Bearing Details Checked
5. Foundation Drawings Checked
6. Bar Bending Schedules Reviewed
7. Drawing Consistency with Calculations Verified



J. Independent Checks and Compliance

1. Independent Structural Analysis Performed
2. Critical Member Design Independently Verified
3. Compliance with IRC/MoRTH Requirements Confirmed
4. Design Assumptions Documented
5. Non-Conformities Identified and Closed

K. Proof Checker Certification

1. Design Found Safe and Adequate
2. Design Found Safe Subject to Comments
3. Design Requires Revision and Resubmission

Proof Checking Entity:

Name:

Qualification:

Organization:

Signature:

Date:

Annexure III

Table 1: Specialized Domain Expertise - Structural/Major Bridge Design

A. Structural/Major Bridge Design	Institute 1	Institute 2
Broad Categories		
1. Specialization Based on Function / Purpose of Structure		
1. Highway bridges, expressway structures		
2. Road Over Bridges (ROBs) / Road Under Bridges (RUBs)		
3. Flyovers, interchanges, grade separators		
4. Pedestrian bridges / Foot Over Bridges (FOBs)		
5. Viaducts, elevated corridors		
6. Reinforced soil (RS)/ Reinforced earth (RE) wall		
2. Form / Type of Superstructure		
1. RCC / PSC girder bridges (T-beam, I-girder, slab bridges, etc.)		
2. Box girder bridges (single cell / multi-cell)		
3. Arch bridges (open / closed spandrel)		
4. Cable-stayed bridges		
5. Suspension bridges		
6. Extra-dosed bridges		
3. Construction Technology / Methodology		
1. Cast-in-situ construction		
2. Precast and pre-stressed segmental construction		
3. Balanced cantilever construction		
4. Incremental Launching Method (ILM)		
5. Span-by-span construction		
6. Advanced construction techniques and mechanization		

4. Structural System / Support Conditions		
1. Simply supported systems		
2. Continuous and multi-span systems		
3. Cantilever and rigid frame structures		
4. Integral and semi-integral bridges		
5. Seismic-resistant configurations		
5. Material Specialization		
1. Reinforced Cement Concrete (RCC)		
2. Pre-stressed Concrete (PSC)		
3. Structural steel bridges		
4. Composite structures (steel-concrete)		
5. Advanced/high-performance materials (HPC, UHPC, FRP, etc.)		
6. TOR Steel/ FRP rebars/ Stainless Steel		
6. Geometric Configuration / Alignment		
1. Straight bridges		
2. Skew bridges		
3. Curved bridges		
4. Complex geometries and interchanges		
7. Type of Foundations		
1. Open / shallow / raft foundations		
2. Pile foundations		
3. Well foundations		
4. Special foundations for difficult conditions (deep/marine, floating well foundation) etc.)		

8. Additional Capabilities (if any)		
1. Experience in proof-checking / third-party design review		
2. Use of advanced analysis tools (FEM, 3D modelling, seismic analysis, etc.)		
3. Familiarity with IRC, IS codes and international standards		

Table 2: Specialized Domain Expertise - Hydrological and Hydraulics studies

	A. Hydrological and Hydraulics Study		
	BROAD CATEGORIES		
1	**Hydrological Studies and Analysis**		
a.	Rainfall analysis and intensity-duration-frequency (IDF) curves		
b.	Flood estimation methods (empirical, statistical, unit hydrograph, etc.)		
c.	Design discharge and peak flood estimation		
d.	Watershed delineation and catchment area analysis		
e.	Climate change impact assessment on hydrology		
2	**Hydraulic Analysis**		
a.	River hydraulics and open channel flow analysis		
b.	Waterway adequacy and afflux studies		
c.	Scour depth estimation and river behaviour analysis		
d.	Sediment transport and river morphology		
3	**River Training Works**		
a.	Design of guide bunds, Launching Aprons		
b.	River Bank Protection, Embankment protections, Spur		
4	**Drainage Design and Flood Management**		
a.	Highway drainage design (cross-drainage works)		
b.	Urban drainage and storm water management		
c.	Floodplain mapping and zoning		
d.	Flood mitigation and protection measures		
4	**Data Collection and Modelling Tools**		
a.	Use of hydrological and hydraulic modelling software (HEC-HMS, HEC-RAS, MIKE, etc.)		
b.	GIS and remote sensing applications in hydrology		
c.	Handling and analysis of hydro meteorological data		
d.	Physical modelling of major river structures		

5	**Standards and Guidelines**		
a.	Familiarity with IRC, IS codes, CWC guidelines, and international practices		
b.	Experience in preparation/review of hydrology reports as per national standards		
6	**Experience and Institutional Capacity**		
a.	Experience in proof-checking / third-party review of hydrology reports		
b.	Notable projects handled related to highways, bridges, or river engineering		
c.	Availability of expert faculty and dedicated teams		