

Government of Nepal
Ministry of Physical Infrastructure and Transport
Department of Roads
Bridge Branch

Notice No. 02/BIMP/2079/80

REQUEST FOR EXPRESSION OF INTEREST (REOI)

Date of first publication: 4 December 2022 AD (2079/08/18 BS)

Name of project: Second Bridges Improvement and Maintenance Program (BIMP II)

IDA Credit No.: 6317-NP

Assignment Title: Design of Major Maintenance / Rehabilitation Works of SRN Bridges

Reference No. (as per procurement Plan): NP-DOR-BIMP-II-CS-QCBS-PP-03-2

The Government of Nepal has received financing from the World Bank toward the cost of the *Second Bridges Improvement and Maintenance Program (BIMP II)* and intends to apply part of the proceeds for consulting services. The main objective of the consulting services (the Services) is to design of major maintenance / rehabilitation works of SRN bridges. The specific objectives of assignment are:

- To record existing bridge conditions systematically;
- To assess structural integrity of the bridge for its safe use;
- To evaluate adequacy of the bridge structures in terms of safety to cater the existing traffic movements;
- To provide investigation report of bridges components that needs to be repaired / replaced after assessing and evaluating the bridge;
- To provide design and drawings of the bridge components that need to be repaired / replaced to make the bridge usable;
- To prepare a detailed cost estimate for maintenance / repair / rehabilitation works;
- To prepare interim norms and specification which are not in existing / standard DoR norms and specification including quality assurance plan;
- To suggest / recommend monitoring mechanism to check safety and serviceability of the bridge for the future;
- Capacity development on bridge condition assessment, investigation and design of maintenance activities through transfer of knowledge and innovative approach.

Terms of Reference (ToR) is available in the website of the Department of Roads: <https://dor.gov.np/home/notices>

Anticipated date for commencement of the services is **June 2023** and the tentative duration of the assignment is about **4 months**.

Second Bridges Improvement and Maintenance Program (BIMP II), Bridge Branch, Department of Roads under the Ministry of Physical Infrastructure and Transport now invites eligible International Consulting firms ("Consultants") to indicate their interest in providing the services. Interested Consultants should provide information demonstrating that they have the required qualifications and relevant experience to perform the services. The short-listing criteria are:

- Business objective and years in business (minimum 5 years)
- Organizational capability of the firm for the assignment
- General Experience of the Firm
- Specific Experience relevant to the assignment.

The attention of interested Consultants is drawn to paragraphs 3.14, 3.16, 3.17 of the World Bank's Procurement Regulations for IPF Borrowers, dated July 2016, revised November 2020 ("Procurement Regulations") setting forth the World Bank's policy on conflict of interest.

A consultant will be selected in accordance with the Quality and Cost Based Selection (QCBS) method set out in the Procurement Regulations. It is intended that short-listed consultants will be invited to submit their technical and financial proposal as per the Request for Proposal document to be issued to them.

Consultants may associate with other firms in the form of a joint venture or a sub-consultancy to enhance their qualification. Consultants shall clearly state their association if any whether in the form of joint venture or sub-consultancy in the Expression.

Interested Consultant may obtain further information about the service from the address given below during office hour.

Expression of interest must be delivered in written form to the address below (in person, or by mail, or by e-mail) by **4 January 2023 AD** within office working hour.

Second Bridges Improvement and Maintenance Program (BIMP II), Bridge Branch, Department of Roads, Chakupat, Lalitpur, Nepal, Tel: +977-1-5528771; Email: infobbpcu@gmail.com

TERMS OF REFERENCE (TOR)
FOR
DESIGN OF MAJOR MAINTENANCE / REHABILITATION WORKS OF SRN BRIDGES
UNDER
SECOND BRIDGES IMPROVEMENT AND MAINTENANCE PROGRAM (BIMP II)

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A. INTRODUCTION

Department of Roads (DOR) is an organization responsible for management of Strategic Road Network (SRN) including roads and bridges in Nepal. The SRN consists of approximately 13,000 km of roads and 2,000 bridges. In recent years, these roads and bridges are vulnerable to climatic conditions such as flooding and landslides, aging, lack of appropriate maintenance work on time and frequent road crashes.

Maintenance of bridges is unavoidable and essential needs to enhance reliability and extending useful life of assets at levels of costs that are typically well below bridge replacement. The Second Bridges Improvement and Maintenance Program BIMP-II, which is implemented since Nov14, 2018 with funding support of US\$133mn from the IDA (World Bank). It has also program to maintain approximately 4,500 meters of bridges under major maintenance works.

The ToR is intended for procurement of the consulting services of the firm for survey, design and cost estimation of major maintenance / rehabilitation work of following 5 (Five) SRN bridges.

The basic details of Karnali, Kaligandaki, Trishuli, Bheri and Marsyangdi River bridges such as general features, construction details and history of bridge are summarized in Table below.

Table 1: Summary of Details of Karnali Bridge

General Details	
Name of Bridge/River: Karnali Bridge	Length (m): 500
Road Name: Mahendra Rajmarga (H001)	Road Length (km): 1027.67
Chainage (km): 901+115.001	Division Road Office: Nepalgunj
Latitude: 28.641289	Longitude: 81.283214
Over/under: Over	Design Load: HS 20 - 44
Bridge Width (m): 11.3	Carriageway (m): 7.2
Construction Details	
No. of Spans: 2	Span Length(m): 325, 175
Abutment Type: RCC	Abutment Foundation: RCC Foundation
Pier Type: RCC	Pier Foundation: RCC Foundation
Super Structure: Cable Stayed	Bearings: Steel Bearing
Railings: RCC+Metal Pipe	Movement: Rocking
Road Signs: Name of Bridge, Bridge Span	Running Surface: Bituminous Surface
History	
Designed By: Steinman Boynton Gronquist & Birdsall. Inc. New York. U.S.A.	Year of Completion: 1993
Constructed By: Kawasaki Heavy Industries Ltd. Japan	

Table 2: Summary of Details of Kaligandaki Bridge

General Details	
Name of Bridge/River: Kaligandaki Bridge	Length (m): 93
Road Name: Siddhartha Highway (H010)	Road Length (km): 146.94
Chainage (km): 87+170	Division Road Office: Palpa
Latitude: 27.902617	Longitude: 83.632645
Over/under: Under	Design Load: IRC class A/AA
Bridge Width (m): 7.2	Carriageway (m): 6.7
Construction Details	
No of Spans: 1	Span Length(m): 93.10
Abutment Type: RCC	Abutment Foundation: Open Foundation
Pier Type: N/A	Pier Foundation: N/A
Super Structure: Steel Truss	Bearings: Steel Bearing
Railings: Metal	Movement:
River Training: Yes	Running Surface: Bituminous Surface
Road Signs: Sign Post	Services: Electricity Line

Table 3: Summary Details of Bheri River Bridge

General Details	
Name of Bridge/River: Bheri River Bridge	Length (m): 120
Road Name: Ratna Highway (H012)	Road Length (km): 113.08
Chainage (km): 94+370	Division Road Office: Surkhet
Latitude: 28.517858	Longitude: 81.663122
Over/under: Over	Design Load: China loading CH-80
Bridge Width (m): 10.95	Carriageway (m): 7.75
Construction Details	
No of Spans: 1	Span Length(m): 120
Abutment Type: RCC	Abutment Foundation: N/A
Pier Type: N/A	Pier Foundation: N/A
Super Structure: Steel Truss	Bearings: Steel Bearing

Railings: RCC+Metal Pipe	Movement: Free at one end & fixed on other end
River Training: No	Running Surface: Concrete Surface
Road Signs: Bridge Span	Services: N/A
History The bridge was constructed with Government financing.	

Table 4: Summary details of Trishuli River (Mugling)

General Details	
Name of Bridge/River: Trisuli River (Mugling)	Length (m): 150.9
Road Name: Prithvi Highway(H004)	Road Length (km): 173.43
Chainage (km): 83+290.001	Division Road Office: Damauli
Latitude: 27.854024	Longitude: 84.557121
Over/under: Over	Design Load: China loading CH-80
Bridge Width(m): 8	Carriageway(m): 6.2
Construction Details	
No of Spans: 3	Span Length(m): 13.05, 124.8, 13.05
Abutment Type: RCC	Abutment Foundation: Gabion Box
Pier Type: RCC	Pier Foundation: Gabion Box
Super Structure: Suspension	Bearings: Steel Bearing
Railings: Metal	Movement: Free at one end & fixed at other end
River Training: No	Running Surface: Steel
Road Signs: Diversion	Services: Electricity Line
History The bridge was constructed with support from Government of China.	

Table 5: Summary details of Marsyangdi River Bridge

General Details	
Name of Bridge/River: Marsyangdi River	Length (m): 125
Road Name: Anbukhaireni - Gorkha(F035)	Road Length (km): 24.69
Chainage (km): 0+800	Division Road Office: Damauli
Latitude: 27.905899	Longitude: 84.543214

Over/under: Over	Design Load:
Bridge Width(m): 8	Carriageway(m): 6
Construction Details	
No of Spans: 1	Span Length(m): 125.00
Abutment Type: RCC	Abutment Foundation: RCC Foundation
Super Structure: Steel Truss	Bearings: Steel Bearing
Railings: RCC+Metal Pipe	Movement: Simply supported
Road Signs: Name of Bridge	Running Surface: Steel
History	
The bridge was constructed with support from Government of China.	

B. OBJECTIVES

The objectives of the consulting firm shall be:

- to record existing bridge conditions systematically;
- to assess structural integrity of the bridge for its safe use;
- to evaluate adequacy of the bridge structures in terms of safety to cater the existing traffic movements;
- to provide investigation report of bridges components that needs to be repaired / replaced after assessing and evaluating the bridge;
- to provide design and drawings of the bridge components that need to be repaired / replaced to make the bridge usable;
- to prepare a detailed cost estimate for maintenance / repair / rehabilitation works;
- to prepare Interim norms and specification which are not in existing / standard DOR norms and specification including quality assurance plan;
- to suggest / recommend monitoring mechanism to check safety and serviceability of the bridge for the future;
- Capacity development on bridge condition assessment, investigation and design of maintenance activities through transfer of knowledge and innovative approach.

C. SCOPE OF WORKS

The scope of services shall primarily include the following and shall be completed under four phases/stages with following reporting upon completion of each phase/stage;

- Inception Report
- Rapid Inspection Report
- Principal/Specific Inspection Report and
- Detailed Design of Major Maintenance / Rehabilitation Work Report.

Various submissions made by the consultant shall be reviewed by Department. However, the consultant must proof-check all the designs before submission to Department. Consultant must take full responsibility for the correctness of the designs and certify the same in writing. The consultant shall

make power point presentations to Department to explain the submissions made by them. Any under prepared, incomplete/inadequate or part submittal shall be deemed as shortfall in the services and may attract a penalty.

The main tasks of the consultancy services under these Terms of Reference (TOR) shall be, but not limited to, as follows:

- Task-1: Inception Report consisting of methodology / approach of maintenance design
- Task-2: Rapid Inspection Report including possible defects and proposed methodology of maintenance design
- Task-3: Principal / Specific Inspection Report including analysis and evaluation of bridge assessment, testing and maintenance design philosophy
- Task-4: Maintenance Design and Analysis comprising the Cost Estimate, Interim Norms and technical specification including QAP and construction methodology of Maintenance program
- Task-5: Economic Assessment of Bridge Maintenance
- Task-6: Transfer of Knowledge and Innovative Approach and Update DoR Manuals

Task Descriptions:

C.1 Task-1: Inception Report consisting of methodology / approach of maintenance design

Overall understanding of the ToR, and the content shall be discussed with the Department before proceeding to the field. The report shall contain information on the general approach (particularly details of Methodology) including such detailed information as the Consultant deems relevant, together with a bar chart that would indicate the Consultant's estimate of the duration (separately in the office and in the field), and the probable timing of the assignment of each professional staff member to be used, and the consultant's estimate of the total man-months required to complete the work and services.

C.2 Task-2: Rapid Inspection Report including possible defects and proposed methodology of maintenance design

A quick bridge assessment for damages or obvious faults are done by consultant. This report encouraged to be vigilant and report anything needing primary attention in that bridges. This report reveals a possible defect or hazard and possible action needed. This report should provide the clear framework of methodology to be adopted for detail assessment, design of major maintenance or rehabilitation work of bridge.

C.3. Task-3: Principal / Specific Inspection Report including analysis and evaluation of bridge assessment, testing and maintenance design philosophy

C.3.1 Bridges Principal Inspection and Recording:

- a) Using the Inspection Manual "Guidelines for Inspection and Maintenance of Bridges Vol-1, Vol-2" and Bridge Condition Assessment Method and Templates practiced in the post-earthquake bridge maintenance works of approximately 400 no of bridges in F/Y 2015/16 as a guide, complete the appropriate inspection report forms. The condition, extent and urgency are noted in the form. Use separate inspection forms based on specific bridge other than that suggested in the Manual, if the consultant feels necessary.
- b) Carry out detailed measurement of all damages to be repaired to possible accuracy in approved quantity sheet format for preparation of bill of quantities.
- c) Take photographs and /or video graphic images of damages requiring repair works.
- d) With the results of condition assessment and evaluation, prepare list of work activities under major maintenance, rehabilitation and replacement for each of the bridges.
- e) The Consultants are free to use alternate means for accessibility while conducting condition

assessment apart from conventional tools -ladder/binocular/etc. such as Drone and use Bridge Inspection Vehicle as per site requirement, with prior approval from the Department.

- f) Deliver analyzed reports of Principal/Special inspection for preparation of the design and drawings of the Maintenance or Rehabilitation Works.

C.3.2 Analysis and Testing of Bridge Component / Structures

Conduct all relevant testing including non-destructive test and semi-destructive test of the bridge component i.e. pylon, cable, suspenders, anchorage, stiffening truss and deck, abutment, bearing, expansion joint and foundation as required by condition of the bridge structure.

- a) Carry out suspension bridge cables inspection and relevant test for determining strength of wires such as tensile tests, fractographic examination of suspect wires, examination of fracture surface for Pre-existing cracks, zinc coating, chemical analysis, corrosion analysis, wire properties, estimation of cable strength, assessment of cable vibration and damping, etc.
- b) Carryout bridge deck vibration assessment and deflection check
- c) Carryout pylon/tower strength test
- d) Conduct strength test of anchorage and suspenders
- e) Carryout condition assessment of bridge deck, bearing, expansion joint, abutment and other structure of bridges

C.3.3 Bridge Condition Assessment and Evaluation

The existing conditions of the bridge shall be assessed in detail to identify any defects / damages in the bridge. The bridge condition shall be evaluated to check its serviceability and safety conditions for the existing and expected traffic volume in its estimated service life.

C.3.4 Preparation of General Arrangement Drawing (GAD) and methodology (philosophy) of maintenance design of bridge

On the basis of assessment and evaluation, proper GAD of the existing bridge shall be prepared and all the relevant features such as bank conditions, slope conditions and any other features that has relevance in undertaking maintenance and safety at/of the bridge. If available GAD prepared during the design and construction of the bridge shall be used as base map. If it is not available, then it shall be prepared by noting down existing features of the bridge and ground conditions. Prepared GAD of the bridge is to be submitted to the Employer for its consent. Before taking up the detailed maintenance design of the various component of the structure a concept report containing the methodology (philosophy) of the design is prepared in coordination and consultation with the Employer.

C.4 Task-4: Maintenance Design and Analysis comprising the Cost Estimate, Interim Norms and technical specification including QAP and construction methodology of Maintenance program

C.4.1 Maintenance Design and Analysis

After finalization of GAD and methodology (philosophy) of the maintenance design and design of various parts shall be carried out as per the guidelines / parameters contained in the relevant IRC Codes / Best International Codes and practices.

Analysis of the bridge shall be done on the basis of latest acceptable computer aided methods/ software. Maintenance design of various components shall be in conformity with various latest IRC Codes, guidelines and best international practices. The input data, design parameters, assumptions made in the design and final analysis results for each component of the structure shall be clearly spelt out with proper reference of relevant codes, where required, and shall be indicated in the design report for better appreciation of the design.

C.4.2 Design of river training works

Based on the site requirements, the consultant shall design the river training works like Guide Bunds, Aprons, Launching Apron, Slope Protection, curtain wall, toe wall etc. as per the relevant IRC Codes / Indian Standard Codes / Best International Codes.

C.4.3 Preparation of working drawings of each component of the bridge, approach slab, river training works, and other allied works required, if any, based on the designs made as per above

The consultant shall prepare working drawings of each component of the bridge based on the design and approach slab, river training works, and other allied works required, if any, based on the designs made as per above.

C.4.4 Preparation of 'Interim Norms' or technical specifications of all the works involved in maintenance / rehabilitation of the bridge project in totality including quality assurance plan for the same

The consultant shall prepare 'Interim Norms' which are not in the existing or standard DOR Norms. Moreover, technical specifications of all the works involved in maintenance of the bridge and allied components based on the Standard Specifications for Road and Bridges Works (latest revision) published by DOR, relevant specification and best international practices. The same shall be reviewed by the Employer and after incorporating the comments of the Employer, the Interim Norms and specifications shall be finalized by the Consultant.

The Consultant shall also prepare quality assurance plan for the maintenance bridge project (bridge specific) keeping in consideration of the DOR Standards and best international standards. The same shall be reviewed by the Employer and after incorporating the comments of the Employer, the Interim Norms and specifications shall be finalized by the Consultant.

C.4.5 Preparation of Cost Estimate including details of measurements, Bill of Quantities and analysis of rates

- a) On the basis of the design and drawings, prepare engineering cost estimates of the construction works with sufficient and acceptable accuracy based on the standard, approved norms and market rates based on recent bid price in similar working condition, separately;
- b) If provisional norms and specification are to be used in cost estimation, which are not in existing DOR Norms, propose such norms and specifications as 'Interim'
- c) Field verification of each design shall be carried out with detailed justification of measures adopted/considered in each design by the Department at the bridge sites and if any rectification/correction suggested, the Consultant shall improve accordingly;

C.4.6 Proof Checking of Maintenance Design / Reports etc., submitted by the design consultant

BB, DOR may perform the proof checking of the Maintenance Designs/ reports submitted by the consultant. Consultant shall be responsible for giving proper support for the proof checking of the designs / reports. Any discrepancies / modifications required by the Department shall be made by the consultant to the satisfaction of the Department.

C.4.7 Miscellaneous

If not covered by aforesaid, the Consultants shall perform other studies, explorations, tests surveys, calculations, analysis, etc. required to produce full and complete set of working drawings, specifications, bills of quantities, requirement of materials and complete cost estimates for the bridge/s including related works based upon which construction activities can be started to complete without further study and/or reference to them.

C.5 Task-5: Economic Assessment of Bridge Maintenance

The consultant shall perform the economic assessment to ensure whether the maintenance plan under consider for bridge maintenance is worth investment at all. Determine the cost and benefits of a maintenance program and then evaluate the soundness of maintenance program in economic terms by rate of return methods and discounting cash flow methods. Economic assessment report must be submitted by consultant in final report.

C.6 Task-6: Transfer of Knowledge and Innovative Approach and Update DoR Manuals

The Consultant shall consider the technology transfer as an important aspect in carrying out the assignment. The Consultant shall support/assist DoR, BB, DROs to build their capacity as a part of the on the job training and propose the specific training/methods for the Capacity enhancement in the maintenance sector of DoR. The consultant will provide the on-the-job exercise and practices on field survey, data collection, data analysis, Condition Assessment of Bridges, workshop on advanced maintenance design. Field survey, data collection, data analysis, design of maintenance intervention of Bridges will be carried out together with Division / Sector staffs. Moreover, innovative approaches of maintenance assessment, design, implementation and monitoring shall be proposed by consultant based on the past experiences and modern technique and innovation. And in order to incorporate experience gained during survey, design and cost estimation of these five special bridges, the consultant shall identify the gaps in existing DoR Manual (Guidelines for Inspection and Maintenance of Bridges Vol-1, Vol-2) and update to acceptable standard to the Employer.

D. Reporting Requirement and Time Schedule

The consulting services shall be implemented over 4 (months) from the commencement date.

The consultant shall submit the reports in specified manner and as enumerated in Table-6: Time Frame for Reports and Submissions.

The consultant shall also submit:

1. Inception Report in five (5) hard copies and a soft copy;
2. Rapid Inspection Report in five (5) hard copies and a soft copy;
3. Field Report along with Conceptual Design in five (5) hard copies and a soft copy;
4. Draft Report comprising Economic assessment, details on capacity building with transfer of knowledge and innovative approach with update on DoR manual in five (5) hard copies and a soft copy;
5. Final Report comprising Economic assessment, details on capacity building with transfer of knowledge and innovative approach with update on DoR manual in seven (7) numbers of hard copies and a soft copy

Table-6: Time frame for Reports and Submissions

S.No.	Preparatory Outputs	Submission Deadline (no. of weeks after the commencement date)
1.	Inception Report consisting of methodology / approach of maintenance design	2
2.	Rapid Inspection Report including possible defects and proposed methodology of maintenance design	6
3.	Principal / Specific Inspection Report including analysis and evaluation of bridge assessment, testing and maintenance design philosophy	12
4.	Draft Report comprising Economic assessment, details on capacity building with transfer of knowledge and innovative approach with update on DoR manual	14
5.	Final Report comprising Economic assessment, details on capacity building with transfer of knowledge and innovative approach with update on DoR manual	16

Details to consider in reports are described and mentioned in scope of works of the assignment.

E. Team Composition and Qualification Requirement for Key Staffs

Consulting firms having experience in the design, experience in the design of major maintenance or rehabilitation works of complex bridges as cable stayed bridges, suspension bridges and steel bridges are encouraged to participate. The firms having experience in inspection, analysis, testing and evaluation of existing highway major bridges (length $\geq$ 100 m) will have added benefit.

Tentative person month detail required for the assessment is provided under table below and the qualification requirement for evaluation of key staff is set out in **Annex 1**:

Position	Quantity	Total Person Months	Remarks
1) Expert with International Experience			
Team Leader/ Bridge Engineer	1	4	Key Personnel
2) National Experts			
Deputy Team Leader/ Structural Engineer	1	4	Key Personnel
Geo-Technical Engineer	1	3	Key Personnel
Hydrologist	1	3	Key Personnel
3) Support Staff	2	8	

Note:

- a) *The above Key Staff composition and estimated total staff man-month is client's estimate. The consultant is advised to assess their own requirement and propose their own staff composition and staff input requirement for efficient performance of their job as per the Terms of Reference. If the proposed consultant's team is found inadequate or not sufficient during the performance of the services, then additional staff shall be provided by the Consultant at their own cost*
- b) *The Key Staff composition and estimated total Key Staff man month for design of maintenance/rehabilitation bridge study has been estimated for design of maintenance/rehabilitation bridge study of five major SRN bridges.*
- c) *A Technical Proposal shall be considered unsuitable and shall be rejected for further evaluation if it does not respond to important aspect of ToR.*

F. Documentation Format

All documents shall be prepared on original stable reproducible materials and have title blocks, reference numbers and of the format agreed by the Government. All records whether preliminary or final shall be signed at least a partner of the consulting firm bear the professional engineer's seal or equivalent of the partner concerned.

G. DoR to Have Complete Access to all Information

DOR shall have complete access to all information including any software used by the Consultant and DOR shall have the rights to distribute this within the Department or modify it accordingly.

H. Information to be provided by the Client

The Government shall provide the Consultant following documents and services subject to availability:

- a) Bridge Maintenance Manual Volume I and II (Repair Works)
- b) Norms and Specifications for road and bridges

I. Liaison with other Agencies

In case the Consultant requires the cooperation of other Government, Departments and Agencies, the DOR shall provide liaison and shall assist the Consultant to gather information required for the completion of the assignments.

The Consultant is required to maintain close liaison with the Bridge Branch/Department in particular survey methods and tools for evaluation and inspection should be agreed upon with the Bridge Branch.

Annex 1: Preferred Qualification Requirements of key staff

Key Personnel Qualification Requirement

The working team for field and office works should necessarily consist of the following Key Personnel with qualification and experiences as indicated in the following table. These key professionals shall be:

A. International Key Staff

I. Team Leader / Bridge Engineer (Experience of the last 20 years will only be considered)

A. Education Qualification	
Minimum	Master's degree in Bridge / Structure Engineering
B. Experience	
B1. General Experience	
Minimum	15 years
Preferable	20 years
B2. Specific Experience in new bridge design or design of maintenance works and /or construction of bridge works	
Minimum	10 years
Preferable	15 years
B3. Specific Experience (In the capacity as a Team Leader in proposed field of Expertise works)	
Minimum	5 years
Preferable	10 years
C. Experience in the Proposed Field of Expertise	
C1. Shall have international experience of having completed at least design in major bridge maintenance in five motorable bridges.	
C2. Shall have experience of preparing bridge condition assessments/management plans in at least five bridge related projects funded by World Bank or other donor agencies	
D. Language	
Communicate fluently in English Language	

B. National Key Staff

I. Deputy Team Leader /Structural Engineer (Experience of the last 15 years will only be considered)

A. Education Qualification	
Minimum	Master's degree in Bridge / Structure Engineering
B. Experience	
B1. General Experience	
Minimum	10 years
Preferable	15 years
B2. Specific Experience in new bridge design or design of maintenance works and /or construction of bridge works	
Minimum	8 years
Preferable	12 years
B3. Specific Experience (In the capacity as a Deputy Team Leader/ Structural Engineer of projects related to bridge works)	
Minimum	5 years
Preferable	10 years
C. Experience in the Proposed Field of Expertise	
C1. Experience in 6 number of bridge construction or maintenance as Structural Engineer	
C2. Experience with Donor funded Projects	
D. Language	
Communicate fluently in English Language	

II. Geo-Technical Engineer (Experience of the last 15 years will only be considered)

A. Education Qualification	
Minimum	Master's degree in Geo-Technical Engineering
B. Experience	
B1. General Experience	
Minimum	10 years
Preferable	15 years
B2. Specific Experience (In the capacity as a Geo-Technical in road/bridge works)	
Minimum	8 years
Preferable	12 years
C. Experience in the Proposed Field of Expertise	
C1. Experience in 4 number of road/bridge design or construction as a Geo-Technical Engineer.	
C2. Experience with Donor funded Projects	
D. Language	
Communicate fluently in English Language	

III. Hydrologist (Experience of the last 15 years will only be considered)

A. Education Qualification	
Minimum	Master's degree in Hydrology / Water resource engineering
B. Experience	
B1. General Experience	
Minimum	10 years
Preferable	15 years
B2. Specific Experience in bridge works	
Minimum	8 years
Preferable	12 years
B3. Specific Experience (In the capacity as a Biodiversity Specialist/Road Ecologist)	
Minimum	4 years
Preferable	10 years
C. Experience in the Proposed Field of Expertise	
C1. Experience in 5 number of bridge construction or maintenance as Hydrologist.	
C2. Experience in wide geographic regions	
D. Language	
Communicate fluently in English Language	