

Government of Nepal
Ministry of Physical Planning and Works
Department of Roads
Bridge Project
Babar Mahal, Kathmandu
RSDP(AF) - IDA No. 4832-NP and Grant No. H629-NP
Contract Identification Number: BP/RSDP(AF)/ 2011-12/01
Consulting Services
(National Competitive Bidding)
Notice No. BP 1/2011/12
First Publication Date: July 25, 2011

Expressions of Interest

Department of Roads, Ministry of Physical Planning and Works, Government of Nepal (GON) has received financing from the International Development Association (IDA No. 4832-NP) and a Grant (Grant No. H629-NP), towards the cost of Road Sector Development Project (AF) and intends to apply credit proceeds to make payments under the contract for Consulting Services for Project Preparation which includes Feasibility Study, Environmental Study and Detailed Engineering Survey and Design of Bridges.

The Consulting services for proposed project include Feasibility Study of about 25 bridges, Initial Environmental Examination (IEE) of about 22 bridges, Environmental Impact Assessment (EIA) for about 3 bridges, Detailed Engineering Survey, Soil Exploration, Design and Drawing of about 25 new bridges. Anticipated date of commencement of assignment is October 26, 2011. Further details are available in the draft TOR.

The Department of Roads (DOR) now invites eligible consultants to indicate their interest in providing the services. Interested consultants must provide adequate information with supporting documents or testimonials where applicable, regarding the organization, relevant experience (in the format provided), professional staff and turnover for consecutive five years ending 2010 to indicate that they are qualified to perform the required services. Consultants may associate to enhance their qualifications.

A Consultant will be selected in accordance with the procedures set out in the World Bank's Guidelines: Selection and Employment of Consultants by World Bank Borrowers, May 2004 (revised May 2010).


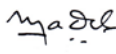
Interested consultants may inspect the draft TOR and obtain further information at the address below during the office hours or at the DOR website: www.dor.gov.np

Expressions of interest must be delivered to the address below by August 8, 2011 within office hours.

Project Manager
Bridge Project
Department of Roads
Babar Mahal, Kathmandu, Nepal
Tel: 977-1-4268580
Fax: 977-1-4268580
E-mail: bridgeprj@dor.gov.np

Relevant Experience Format

[Using the format below, provide information on each assignment for which your firm, and each associate for this assignment, was legally contracted either individually as a corporate entity or as one of the major companies within an association, for carrying out consulting services similar to the ones requested under this assignment.]

Assignment name:	Approx. value of the contract (in NPR):
Location :	Duration of assignment (months):
Name of Client:	Total No. of staff-months of the assignment:
Address:	Approx. value of the services provided by your firm under the contract (in NPR):
Start date (month/year): Completion date (month/year):	No. of professional staff-months provided by associated Consultants:
Name of associated Consultants, if any:	Name of senior professional staff of your firm involved and functions performed (indicate most significant profiles such as Project Director/Coordinator, Team Leader):
Narrative description of Project:	<div style="text-align: center;">  </div> <div style="text-align: right; margin-top: 10px;">  </div>
Description of actual services provided by your staff within the assignment:	

Firm's Name: _____

Terms of Reference

for

Feasibility, Environmental Study, Detailed Engineering Survey, Soil Exploration and Detailed Design of New Bridges

1. Introduction:

Department of Roads is the organization responsible for management of strategic Roads in Nepal. Bridges are the major component of a reliable and efficient road system facilitating movement of goods and passenger throughout the year. The Department's responsibilities with regards to bridges are of two fold. The first one is to carry out feasibility study, selection for implementation, detail design and construction of new bridges, and other one to maintain / preserve already constructed bridges on the strategic road network. Adequate study of the bridge right from the feasibility study to detailed engineering survey and design are pre-requisite for successful construction and sustainable bridge management practices. Department of Roads, Bridge Project intends to utilize services of experienced engineering consulting firms (in the fields of feasibility studies, environmental studies, soil investigation, hydrological studies, bridge design and river training works) to conduct feasibility studies, environmental studies, detailed engineering survey and designs of about 25 numbers of bridges on strategic road net work located at various parts of Nepal. This is a draft version of Terms of Reference and the final version of Terms of Reference shall be provided to the short listed consultants along with Request For Proposal (RFP) documents.

2. Objectives:

2.1 Main Objective:

The main objective of this consultancy service is to carry out Feasibility study of selected bridges and detailed engineering survey and design **25 numbers of safe, reliable, cost effective and environmental friendly bridges including the necessary IEE or EIA study (as applicable)** located in strategic road networks at various parts of Nepal using the appropriate technology.

2.2 Sub-objectives:

The sub-objectives of this consultancy service are as follows:

- a) Conduct feasibility study of 25 selected new bridges.
- b) Detailed engineering and hydrological survey, soil exploration
- c) Detailed engineering design of 25 new bridges
- b) Environmental Studies (IEE/EIA as per Environment Protection Act and Rules) of 25 new bridges.

3. Scope of Works:

To fulfill the above main as well as sub objectives of the proposed services the scope of work for the consultant shall include the followings. The consultant, not limiting to the followings, shall carry out the necessary standard engineering practices to achieve the objectives with professional integrity and acceptable quality.

3.1 Desk study:

On the basis of provided list of selected bridges for feasibility study a desk study should be carried out by the consultant before going to the field. The consultant shall collect the necessary information, maps, socio-economic data, information on the proposed bridge site, relevant reports, aerial photos, satellite imagery, topographical maps, geological maps etc. Only a careful desk study and after preparation and approval of inception report including all the activities and overall planning the consultant shall be able to start the actual field works.

3.2 Feasibility study of new bridges including Environmental Studies

The feasibility study shall be carried out to evaluate the viability of alternative sites and bridge types in terms of technical, economic, environmental, social and resettlement, and recommend for best alternative.

The Consultant's tasks shall include, but not limited to, the following:

- a. Review available reports, data and information from secondary sources;
- b. Study of the available geological maps, land use maps, hazard maps with identification of each hazard spots and description etc.
- c. Carry out field studies to prepare geological, geomorphological, geotechnical and hazard maps including with the assessment of bank protection, if necessary.
- d. Carry out traffic surveys (traffic count and origin-destination survey) and project the traffic volume for at least 20 years.
- e. Study of the availability and transport lead necessary for construction materials such as aggregates, sand, timber, fuel, water, cement, steel etc. and possible access to the quarry sites.
- f. Carry out preliminary cost estimate for alternative bridge sites based on norms and market rates and based on recent bids in similar condition.
- g. Develop the possible alternatives for the bridge construction.
- h. Select the best site based on the topographical, geological, geo-technical, social and environmental aspects and other relevant characteristics of the site as well as the catchment area. The selected site should be clearly indicated in the map and all the characteristic features of the chosen bridge site shall be given, in order to facilitate easy reference while designing the bridge.
- i. Carryout required IEE or EIA (as appropriate) for each bridges following complying with Governmental Acts, Rules and Guidelines;
- j. Identify and develop measures and technical options to minimize land acquisition and resettlement impact.
- k. Carry out discussion with the local users/ communities and make an assessment for acceptance of the planned bridge construction in a specified format acceptable to the client.
- l. Consider traffic safety to all side of users in the design as well as safety during construction and operation.
- m. Calculate the total financial and economic costs for the project's life cycle considering the necessary organization and costs for regular, recurrent, and periodic maintenance,
- n. Identify and calculate the benefits from the project implementation for its life time.
- o. Carry out risks assessment and sensitivity analysis for all the alternatives.
- p. Prepare project implementation plans; and
- q. Prepare required feasibility level design, drawings and reports with a content and format acceptable to the DOR.

3.3 Detailed Engineering Study and Survey:

Based on the outcome of the feasibility study and further discussion and decision of the DOR the list of bridges shall be finalized for detailed engineering survey and design. The detail engineering survey including assessment of geological and hydrological survey, and detail design for the proposed type of bridge structure shall be carried out as per standard engineering practices and not limiting to include the followings:

3.3.1 Topographical Survey

The topographical survey of the area should cover a minimum distance of **500 m** upstream, **200 m** downstream, and **200 m** on either sides of the river banks at the proposed bridge site. The Topographic map should show at least the following features :

- (i) Contours at 1(one) m intervals in hilly area and at 0.50 m in plain area.
- (ii) Flood lines on either sides of the river in the entire area surveyed.
- (iii) Lines with spot levels along which the bed slope of the river is taken
- (iv) Both banks of the river

- (v) Lines along which cross section of the river is taken
- (vi) Show the approach road at least 500 m on either side including a design, if necessary to built new approach road
- (vii) Govt. and/or public establishments
- (viii) Traverse lines, benchmarks reference lines and/or points with respect to which the present topo map is prepared.
- (ix) The angle and direction of skew, if the bridge is proposed to be aligned skew.
- (x) The Names of the nearest identifiable villages/towns etc. in either ends of the bridge.
- (xi) Other information relevant to design, construction and/or maintenance of the bridge.

3.3.2 Hydrological Study

For determination of all design data the consultant shall carry out a detailed hydrometrical survey and hydrological study of the river especially considering the location of proposed bridge site and shall include at least the following:

- (i) Catchment area of the river for the proposed bridge site
- (ii) Length of the river from origin up to bridge site
- (iii) Assessment of possibility of change of catchment area in future
- (iv) Nature, size and quantities of debris carried by the river
- (v) Intensity, duration and distribution of rain fall in the catchment
- (vi) Vegetation, cultivation etc. of the catchment area.
- (vii) Existence of artificial or natural reservoirs, lakes etc. in the catchment area .
- (viii) Existing bridge or any other hydraulic structures across the river in the vicinity of the proposed bridge site with their details as much as possible.
- (ix) General slope of the river from the critical point (origin) of the river up to bridge site and general slope of the catchment in both sides of the river.
- (x) Cross sections covering 200 m. beyond flood lines of the river at proposed bridge site, at about minimum 500m u/s and d/s respectively wherein HFL, LWL,LBL, area of the cross section, wetted perimeter and geological profile with silt factor of each strata (at proposed bridge site only) shall be indicated. (horizontal and vertical scale of the cross section shall be the same.)
- (xi) Bed slope of the river which shall cover 500 m on both upstream and downstream from the bridge axis.
- (xii) Maximum and Design discharge calculated by established formulas with different return periods and the peak discharge observed over a period of 100 years.
- (xiii) Assessment of velocity and depth of flow at the time of survey.
- (xiv) Assessment of scour depth and Maximum Scour depth
- (xv) Linear waterway needed to be provided inconsideration with the possible debris, log etc and also inconsideration with the water transport carriers like boats or water jets, if any.
- (xvi) Assessment for the possibility of shifting of the river flow based on the past flow changes and location of proposed bridge site and its vicinity.
- (xvii) Assessment for the siltation and or similar problem, if any
- (xviii) Other information required for river control, design, construction and maintenance of the bridge.

3.3.3 Seismological Study:

The consultants shall collect and refer to the available data regarding the seismic records of the area. Seismic Forces : According to the Indian Standard Criteria for Earthquake Resistant Design of Structures, IRC: 6 shall be followed.

3.3.4 Subsurface Exploration of the proposed bridge foundation

Sub-surface exploration for the proposed bridge foundation works shall be carried out with following objective:

- (i) examine the sub-soil characteristics of the site as well as design parameters; to determine and or select the foundation type, substructure, and superstructure designss;
- (ii) assess the possibility of the ground hazards such as presence of logs, big boulders or any other difficulties/ hazards that would come across during construction and in the service life of the bridge;
- (iii) assess the impact of bridge in the river banks and help in determining or design of river-training & approach roads.

The sub-surface exploration shall mainly include the followings:

3.3.4.1 Test pits and auguring

Test pits and auger-holes in the riverbed to a depth as mentioned in the [BOQ](#) for determining the mean particle size of riverbed materials in each layer.

3.3.4.2 Bore-holes, field tests and laboratory tests

The properties of the underlying soil are determined by field and laboratory tests of the soil samples obtained from the bore holes drilled to depth as mentioned in the next section and/or the [Bill of Quantities](#). As far as possible, the locations of the boreholes shall be under each proposed abutment and piers. In general, the following tests are conducted for determination of soil properties for each bore hole:

SN	Type of test	Frequency
1	Undisturbed Soil Sampling	at least 2 at each borehole
2	Standard Penetration Test	as required but the interval not less than 1.5 m
3	Grain size analysis	at least 2 at each borehole
4	Hydrometer analysis	at least 2 at each borehole
5	Moisture content	at least 2 at each borehole
6	Bulk and dry density	at least 2 at each borehole
7	Unconfined compression test	at least 2 at each borehole
8	Consolidation test	at least 2 at each borehole
9	Direct shear test	at least 2 at each borehole

If required by the field condition, the Consultant shall conduct other types of tests. Similarly the frequency of the above tests may need to be increased due to field condition.. The cost required for all the field and laboratory tests including bore holes shall be incorporated in the consultant's cost . No separate payment shall be made for the tests that described above.

3.3.4.3 Depth of soil exploration

The depth of soil exploration from ground level shall be as follows:

SN	Type of soil	Governing depth for soil exploration
1	Silty, sandy, clayey soil	3 times the design scour depth, or 1.5 times the least dimension of the foundation footing, or 20 m, whichever is maximum
2	Granular soil (gravels, boulders)	2 times the design scour depth, or 1.5 times the least dimension of the foundation footing, or 16 m, whichever is maximum
3	Rocks (soft or hard)	Not exceeding 8 m.

The above mentioned depths are indicative. The Consultant shall decide the actual required depth of soil investigation according to the field condition and design parameters. But in any case the Consultant shall be paid only up to the depth mentioned in the [Bill of Quantities](#). If rock is found at the beginning or at mid-depth then the drilling works shall not exceed the depth as mentioned in the table above. In such case the payment shall be made only for the actual depth.

For example, if rock is found at a depth of 12 m. and if the maximum required depth is 16 m, then drilling shall continue only for further 4 m., and the payment shall be done for 16 m. If rock is exposed on the surface then drilling shall be done up to a depth of 8 m., and the payment shall be made for 8 m. But if the thickness of rock at the surface is 6 m then the drilling shall continue further to the required maximum depth.

The consultant should have to submit at least 5 min Video Clip of each borehole in good resolution which can identify the depth and location of boreholes.

3.3.4.4 Soil exploration works to be certified

The Consultant is required to submit the soil/rock samples obtained from the drilling works in core boxes and/or a bore-log details certified by the concerned officials from the respective Division/Project Offices that identified by the DOR for particular bridges.

3.4 Analysis of Data and identify/ finalize the Design Parameters.

Based upon all the the above mentioned detail survey, studies, and investigations the consultant shall make the best use of their technical know-how and professional skill to analyze the available information/ dat and identify and or finalize the design parameters for the proposed bridge construction.

If not covered by aforesaid survey / exploration and or studies, the Consultants shall perform the required other studies, explorations, tests surveys, calculations, etc. that required to produce a standard design and produce a complete set of working drawings, specifications, bills of quantities, schedules of required materials, total cost estimates for the bridge/s including related works based upon which construction activities can be started and completed without further delay.

3.5 Detailed design and quantity/cost estimates

Based on the collected information and results of the discussions mentioned above, the consultant/s shall design the bridge following the standard codes of practice, norms and guidelines applicable to Nepal. The consultants shall produce detailed quantity estimate of the bridge and its accessories. They shall collect information on sources of materials and their lead distances and prepare rate schedules and cost estimates based on the standard norms and prevailing district rates. The consultant shall have to design at least 500m of approach road on either side of the river bank connecting existing road and bridge approach.

3.5.1 Use of Standard Design(s)

Depending upon the site condition and other factors the Consultants can use the Standard Design of the part(s) of the bridge, which shall be made available by the DOR. This matter will be discussed and finalized during the discussion on Preliminary Design or at a later stage convenient to both parties. If such Standard Design is used the Consultants shall adjust the design of other parts of the bridge to incorporate the parameters of the Standard Design.

If it is decided to use any Standard Design, the Payments shall be adjusted according to the Conditions of Contract and/or as mentioned in the BOQ.

3.9 Technology Transfer to DoR Staffs

While performing the job of feasibility study, detail survey and design, IEE and or EIA the Consultant is required to transfer the technological know-how to DoR staffs. Appropriate mode, approach and schedule of technology transfer activities needs to be proposed by the consultant and shall be agreed and implemented to transfer knowledge and skills to the DoR staffs.

4.0 Miscellaneous

- Consultant shall recommend to the DOR any changes in the scope of work which may prove necessary or desirable during the course of the works, .
- Consultant shall recommend to the DOR possible cost savings during and on use of state of art technology in the bridge design .
- Consultant shall identify need for the required traffic diversion for the construction period and shall include the necessary safety procedures, design and costs for such traffic diversion . Traffic diversion should be designed for vehicles as well as pedestrians and considering the men at work. Such diversion shall ensure the uninterrupted flow of traffic and minimum inconvenience to the public during the concerned period. Adequate warning signs, flagman and other relevant safety precautionary measures shall be designed to warn motorists well ahead of the intended diversion.
- All Traffic safety devices shall be designed in accordance to prevailing DOR guidelines.
- Consultant shall be fully responsible for mobilization, safety, and insurance of their people/ field workers/ equipment/ vehicles etc. those engaged for carrying out the services in this TOR

5.0 Reports

5.1 Inception Report

Inception Report shall be submitted within 3 (three) weeks time from the date of agreement. Before approving the inception report **the DOR may ask to present the Inception Report to the DOR audience.** The cost of such presentation shall be borne by the Consultants.

5.2 Monthly Progress Report

Monthly Progress Report shall be submitted every month interval of time. The report shall be in the format approved by DOR.

5.4 Draft Report

Draft reports of the study shall be submitted within Eight (8) months from the date of agreement. Draft reports shall be prepared for each bridge sites separately. This report shall in all respect be complete, containing all the required components of the Feasibility study, environmental study, detailed engineering survey, soil exploration, design, drawings and cost estimates.

5.5 Presentation of the Draft Report

The Consultants shall present the draft report to the DOR audience prior to the submission of the final report. The consultant shall present the findings on feasibility, environmental studies, geological/geo-technical studies, hydrological studies and detailed design, drawings etc. to the DoR audiences. They shall review the issues raised during the presentation while finalizing the report and make necessary amendments/corrections if needed. The date and venue of the presentation shall be determined by mutual agreement between the Bridge Project and the consultant/s. The cost of such presentation shall be borne by the consultant/s.

5.6 Final Report

Apart from the presentation, the DOR/Bridge Project will verify the contents against the Terms of Reference and the checklist (if any). The DOR may also discuss upon the technical content of the report and may suggest changes if deemed necessary. Final report shall be submitted within two (2) months after receiving comments and suggestions from Department of Roads. While preparing the Final Report the consultants shall consider the comments/suggestions and make corrections or amendments if required. It does not, however, relieve the consultants from their responsibility over the technical content of the study report. The final report shall be submitted in 5 numbers of hard copies and 5 numbers of soft copies (electronic copies in CD-ROM).

6.0 Deliverables

- **Inception Report in two copies;**
- **Monthly Progress Report in two (2) copies** or such numbers as nominated by the Government of the Progress Reports, Completed forms, Cards and photographs;
- **Draft Report in five (5) copies;**
- **Final Report in 5 numbers of hard copies** and 5 numbers of soft copies (electronic copies in CD-ROM).

7.0 Team Composition

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:

SN	Personnel	Nos*.	Minimum academic qualification	Minimum Experience
1	Team Leader	1	Master's in Civil Engineering	15 years in general, specific experience of bridges in Detailed survey design / IEE/EIA / Feasibility Study for 10 years and have worked as a team leader in above specific fields minimum in 5 projects.
2	Bridge / Structure Engineer	2	Master's in Bridge / Structural Engineering	15 years in general, specific experience of bridges in Detailed survey design for 10 years and have worked as a structure / bridge engineer minimum in 5 projects.
3	Environmentalist / Ecologist	2	Master's in Environmental Engineering / Environmental Science / Ecology	10 years in general, specific experience on Detailed environmental studies (IEE/EIA) for 5 years and have worked as a Environmentalist / Ecologist minimum in 5 projects.
4	Engineering Geologist / Geo-technical Engineer	2	Master's in Engineering Geology / Geo-technical Engineering	10 years in general, specific experience on Detailed geo-technical study for 5 years and have worked as a Geo-technical engineer in minimum 5 bridge projects.
5	Hydrologist	1	Master's in Relevant Field	5 years in general, specific experience in Hydrological Studies for 3 years and have worked as a Hydrologist in minimum 5 bridge projects.
6	Socio-economist	1	Master's Degree in relevant field	10 years in general, specific experience on Socio-economic study for 5 years and have worked as a Socio-economist in minimum 5 projects.

* Note: The number of key personnel shown are indicative, and that the consultants are free to propose the numbers they feel best meets needs of the assignment and their proposed methodology.

8.0 Documentation Format

All documents shall be prepared on original stable reproducible materials and have title blocks, reference numbers and of the format approved 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.

9.0 DoR to Have Complete Access to all Information

DOR shall have complete access to all information used by the Consultant and DOR shall have the rights to distribute this within the department or modify it accordingly. DoR will have the copy right of the report produced under this agreement.

10.0 Implementation Schedule

Within two (2) weeks after the appointment, Consultant has to submit the implementation schedule to include, but not restricted to the following :

- a) Inception reports.
- b) Review and approval of methodology for services
- c) Feasibility study
- d) Environmental Study
- e) Interim Report
- f) Draft Report
- g) Final Report

11. Information to be provided by the Government

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

- The list of 25 Bridges to be studied under this ToR including location map and GPS data (co-ordinates in terms of Latitude and Longitude);
- Any other relevant data/information available in DoR.

12.0 Information to be Obtained by Consultant

Any relevant DOR documentation for the project shall be obtained from DOR offices and reproduced with the permission of DOR at the expense of the consultant itself. The consultant shall obtain information on relevant bridges from the concerned Division Roads Offices, Road Projects or any other agencies.

13.0 Project Engineer

The Government will assign a project engineer/ team of engineers and or specialists under the Bridge Project and or DOR units for close monitoring and liaison during the consulting service period. The Consultant shall cooperate fully with the such team of project engineer/ engineers and or specialists under the Bridge Project and or DOR units.

14.0 Liasion with other Agencies

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

15.0 Government Indemnity

The Consultant shall be fully responsible for any damage to life and property that may arise out of their works and they shall take all necessary safety and insurance cover to indemnify the Government from any compensation that may arise from the consultant's work to accomplish the services described in this TOR.