



Government of Nepal
Department of Roads

Planning and Design Branch

**Highway Management Information System-Information and Communication Technology (HMIS-ICT) Unit
Road Sector Development Project (RSDP)**

(Extended Phase)

Consulting Service for Road Inventory Survey of Strategic Road Network (SRN) of Nepal
Contract Identification Number: RSDPAF/DOR/HMIS/CONS/01 and RSDPAF/DOR/HMIS/CONS/02
Notice No. RSDPAF/DOR/HMIS/ICT/05/073/74

REQUEST FOR EXPRESSION OF INTEREST (REOI)

Date of first publication: 14th February, 2017

Country: NEPAL

Name of project: Road Sector Development Project Additional Financing (RSDPAF)

Credit No.: 4832-NP

Assignment Title: Consulting Service for Road Inventory Survey of Strategic Road Network of Nepal

Reference No.(as in Procurement Plan) : RSDPAF/DOR/HMIS/CONS/01 and RSDPAF/DOR/HMIS/CONS/02

The Government of Nepal has applied for financing from the World Bank towards the cost of the Road Sector Development Project, Extended Phase and intends to apply part of the proceeds for Consulting Services for Road Inventory Survey of Strategic Road Network (SRN) of Nepal. The consulting services for proposed project (Phase II) includes two (2) packages for carrying out GIS based Road Inventory Survey and preparation of Inventory of Strategic Road Networks of roads under DoR.

Package Identification No.	Description of Works	Length (Km)	Duration of Services (Months)
RSDPAF/DOR/HMIS/CONS/01	GIS based Road inventory Survey of Strategic Road Networks in Eastern and Central Development Region	Black Top:3220 Gravel/Earthen:2761 Total:5981	12
RSDPAF/DOR/HMIS/CONS/02	GIS based Road inventory Survey of Strategic Road Networks in Western, Mid-Western and Far Western Development Region	Black Top:3148 Gravel/Earthen:3363 Total:6511	12

The scopes of consulting services are to prepare Road Inventory of Roads for preparation of the Asset Register and Inventory Management.

Anticipated date for commencement of the services is July 2017 and the tentative duration of the assignment is about 12 months.

The Consultant shall provide expert service for the scope of works described above. The Consulting team is expected to comprise of Experts as Team Leader (Highway/Transportation Engineer), Highway Engineer, Civil Engineer, GPS Technician/Engineer, GIS/Auto CAD Technician.

HMIS-ICT Unit, Planning and Design Branch, Department of Roads under the Ministry of Physical Infrastructure and Transport now invites eligible Consulting firms to indicate their interest in providing the above 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:

- Corporate Capacity of the firm (Corporate/PAN/VAT registration Year of standing min. 5 year).
- General Experience of the Consulting firm.
- Qualifications in the field of the assignment/ Specific Experience of the Consulting firm.
- Technical and managerial organization of the firm
- General qualifications and number of key staff

The attention of interested Consultants is drawn to paragraph 1.9 of the World Bank's Guidelines: Selection and Employment of Consultants under IBRD Loans and IDA Credits & Grants by World Bank Borrowers, dated January 2011 ('Consultant Guidelines') 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 Consultant Guidelines, dated January 2011, revised in July 2014. It is intended that short-listed consultants will be invited to submit their technical and financial proposal as per the Request for Proposal (RFP) document to be issued to them.

Consultant proposing to associate with each other to enhance their qualification shall clearly state in the Expression of Interest, their form of association, a joint venture or a sub consultancy in the Expression. The Consultants' association, not stated clearly, shall be considered to be in the form of sub consultancy.

Interested Consultant may obtain further information about the service from the address given below during office hour or may visit Department of Roads (DoR) Website <http://www.dor.gov.np>.

Expression of interest must be delivered in written form to the address below by 28th February, 2017 Office Hour.

HMIS-ICT Unit,
Planning and Design Branch,
Department of Roads, Babar Mahal, Kathmandu, Nepal

Tel: +977-01425814
Email: hmis@dor.gov.np
Website: <http://www.dor.gov.np>



Workers queue for documentation process in

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Policymakers are also drafting modalities to ensure that each migrant is covered without bureaucratic hassles. MoLE officials said that proof of the insurance coverage should be submitted together with other documents that are required to obtain work approval.

Last month, Dr Guna Raj Lohani, executive director of the Social Health Security Development Committee, had told the Post that the planned policy would help migrants' families to get more affordable health care. As per the plan, each migrant household could get insurance cover worth up to Rs50,000 by purchasing an annual package of Rs2,500 for a family of five. Families having more than five members will have to pay an additional Rs 425 per head.

**OF SUB-PROJECTS UNDER THE
H PROGRAMME IN NEPAL**

ted by the Government of Denmark, at commercialization and development market linkages in the Eastern Development Fund (UCF) through which private sector Contract awarding to some 170 grant plementation of the sub-projects will be

Nepali firm, licensed from a national or it will implement the audits of each and . The contracted firm shall bear the full nd quality of the audits, but may use sub-vidual sub-projects.

Expression of Interest (EOI), describing assignment, a discussion of the ToRs scope, their envisaged approach, fee mation and detailed ToRs are available

ary 2017

POST REPORT

KATHMANDU, FEB 13

The parents of first and second grade students at Shuvatara School, of Sanepa, have taken a serious exception to the decision of the school to discontinue its primary wing over alleged complaints of noise and traffic congestion from the neighbours.

On January 27, the school management had issued a notice to the parents, announcing its decision to shut down its primary wing starting new academic year 2017/18.

The concerned parents on Monday submitted a memorandum at the Lalitpur District Education Office, requesting the latter to intervene to stop the school from closing down its primary wing.

Sushil Rimal, a parent of a second grader, said they have been trying to find a solution to the problem through talks but the school management was unwilling to engage.

"We visited the education office as our last resort. We are worried because finding a decent school for our wards, who will start their second and third grades next year, is next to impossible since most schools only take in new students for first and fourth grades," Rimal said.

As an agreeable solution, the parents have suggested "phase-out closure" starting first grade from next year. The school administration, however, does not seem to be willing to discuss the alternative.

"The school management is not ready to meet us halfway to find a solution without affecting our children's education," Rimal said, adding that the school has recommended 23 schools that are apparently willing to admit new students for second and third grades.

The school management could not be contacted for a comment.

EXPRESSION OF INTEREST (EOI)- DETAILS

ROAD INVENTORY SURVEY (PHASE II)

Background

Management of the assets of roads is one of the vital tasks for all countries. DoR intends to prepare Assets Register of all of its assets by conducting Road Inventory Survey. Conventional method of management of the inventory data is paper based which is inefficient, time-consuming, and non-consistent and hardly sustainable. With the recent advancements of computers, and image processing, new technologies have been employed in the practice of Inventory Data Management. Considering this DoR has prepared GIS based Road Inventory Software for management of the road assets. The assignment for the preparation of Road Inventory is divided into two phases. Phase I assignment is undergoing and comprises of the following

- Development of software/manuals for Road Inventory survey and management
- Road Inventory Survey of Asian Highway AH-42
- Support to the Consultant of Phase II (Proposed Assignment) on use of the software and
- Assist HMIS-ICT Unit to monitor/supervise Phase II Assignment.

The proposed assignment i.e. Phase II includes Road Inventory Survey and Preparation of Road Inventory of Strategic Road Network (SRN) all over the country. The software “Road Inventory Management” prepared during Phase I assignment shall be used in carrying out inventory works for this second phase of the project.

The Consulting Firm(s) are required to complete the forms prescribed below. In case of a J/V these forms has to be completed individually for each partner, in a sequential manner.

1. Name of Consulting firm/Joint Venture:-
 - a) Name of firm:
 - b) Address:
 - c) Phone Number:
 - d) Authorized person:
 - e) Mobile Number:
 - f) Active E-mail ID:
2. Identification number for which EoI applied:-
3. Name of Job for which EoI applied:-
4. Lead Consultant (In case of Joint Venture):-
 - g) Name of firm:
 - h) Address:
 - i) Phone Number:
 - j) Authorized person:
 - k) Mobile Number:
 - l) Active E-mail ID:

Form-1: General Experience of Firm

General Experience of the Firm in Civil Engineering Works during the last 10 years (February 2007 to January 2017)

SN	Name of Assignment	Date of Completion	Value of Service in NRs

Form-2: Specific Experience of Firm

(February 2007 to January 2017)

Specific Experience in "Inventory Survey of Roads

SN	Name of Assignment	Date of Completion	Length of Roads

Specific Experience in "Detailed Engineering Survey and Design" or "Preparation of DPR" or "Construction Survey, Design and Supervision" of a Road

SN	Name of Assignment	Date of Completion	Length of Roads

Specific Experience in Supervision of Road Construction/ Maintenance/ Rehabilitation/Reconstruction of Road.

SN	Name of Assignment	Date of Completion	Length of Roads

Note

- The attached experience certificate shall clearly indicate the description of service, service amount (in/excluding VAT), date of completion, and length of project road.

Form-3: Equipment & Logistics

Equipment	Quantity	Condition
Vehicles (4 Wheeler)		
DGPS with windows (8 or higher) or android based field controller.		
Computer		
Printer		
Photocopy Machine		

FORM-4:**Organizational Chart of Firm**

The consulting firm shall provide the organizational structure of the firm.

Manpower	Number
Manpower	

FORM-5: Adherence to code of Ethics and Anti-Corruption Policy

Provide the firms' commitment on Code of Ethics and Anti-Corruption policy and their mechanism to monitor the adherence to these policies. Upon failing to do so, the firm shall be disqualified for the evaluation.

Government of Nepal

Ministry of Physical Infrastructure and Transport

Department of Roads

**Highway Management Information System - Information and Communication Technology
(HMIS-ICT) Unit**

**EOI Evaluation Criteria for Road Inventory Survey and Preparation of Road
Inventory of Strategic Road Network of Eastern & Central (Package 1)**

The Consultants shall submit following documents in expressions :

1. Corporate Registration
2. Tax Clearance of FY 073/74 / Pan Certificate
3. VAT/ PAN Registration
4. Year of Standing min. 5 year (At least lead firm in case of JV)
5. JV Agreement in case of Firms in JV
6. Adherence to code of Ethics and Anti-Corruption Policy

Note:

- *Consulting Firms can form a Joint Venture (JV) to enhance their capacity. The EOI of Short List must clearly mention the name of the leading firm with financial liabilities.*
- *Maximum no of JV Firms : Three*
- *The same firm shall not be allowed to submit EoI individually and in JV.*

Details of Qualifying Criteria

Criteria	Marks out of 100	Minimum Marks to be obtained
A) General Experience of Firm	20	
B) Specific Experience of the Firm	65	
C) Equipments and Logistics	11	
D) Organizational Structure	4	
Total	100	60

A) General Experience of Firm /JV

During the last 10 years (February 2007 to January 2017)

General Civil Engineering Experience	Maximum: 15Marks
Completion of Civil Engineering related Service within 10 years (Service Cost more than NRs. 30 million excluding VAT for each project) 4.0 points for each job up to 5 jobs	20

B) Specific Experience

During the last 10 years (February 2007 to January 2017)

Specific Experience	Maximum: 60
Completion of Inventory Survey of Roads of at least 15 km length (Maximum number of projects considered for evaluation is 2) 5 marks for each job (Maximum 2 jobs)	10
Completion of work of "Detailed Engineering Survey and Design" or "Preparation of DPR" or "Construction Survey ,Design and Supervision" of a Road (Road Length each more than 50 KM per project) (Maximum number of projects considered for evaluation is 5) 6.0 points for each job (Maximum 5 jobs)	30
Experience in Supervision of Road Construction/Maintenance/ Rehabilitation/ Reconstruction of Road (Road length each more than 50 km per project) (Maximum number of projects considered for evaluation is 5) 5 marks for each job (Maximum 5 jobs)	25

C) Equipments and Logistics

Equipment	Points (for each)	Maximum Points
DGPS with windows(8 or higher) or android based field controller	2	4
Vehicle (4 Wheeler)	1.5	3

Computer	0.2	2
Printer	0.2	1
Photocopy	0.2	1

D) Organizational Structure

Manpower	Points (for each)	<i>Maximum Points</i>
Manpower	0.1	4

Government of Nepal
Ministry of Physical Infrastructure and Transport
Department of Roads
Highway Management Information System - Information and Communication Technology (HMIS-ICT) Unit
ToR for
Road Inventory Survey and Preparation of Road Inventory of Strategic Road Network of Eastern and Central Region (Package 1)

1. BACKGROUND

Management of the assets of roads is one of the vital tasks for all countries. DoR intends to prepare assets register of all of its assets by conducting road inventory survey. Conventional method of management of the inventory data is paper based which is inefficient, time-consuming, and non-consistent and hardly sustainable. As the recent advancements of computers, and image processing, new technologies have been employed in the practice of inventory data management. Considering this, DOR has prepared software for management of the road assets. The assignment for the preparation of road inventory is divided into two phases. Phase I assignment is undergoing and comprises of the following

- Development of Tablet Application (RISS) and Web Based software for road inventory survey and data management
- Road inventory survey by tablet application RISS application, web based software and DGPS of Asian Highway AH42
- Support to the Consultant of Phase 2(Proposed Assignment) on use of the Inventory Management System Software and
- Assist DoR to monitor/supervise Phase 2 Assignment.

The proposed assignment i.e. Phase 2 includes road inventory survey and preparation of Road Inventory of strategic Roads all over the country.

HMIS-ICT Unit intends to hire consultant for carrying out road inventory survey of the road as follows:

Package No	Name of Roads	Length (km)	Duration of Service (Month)
RSDPAF/DOR/HMIS/CONS/01	GIS based Road inventory Survey of Strategic Road Networks in Eastern and Central Development Region	Black Top:3220 Gravel/Earthen:2761 Total:5981	12

2. OBJECTIVE

The objective of the proposed assignment is to carry out Inventory Survey and prepare Road Inventory of Strategic Road Network (SRN) using Inventory Management Software prepared in Phase I.

3. SCOPE OF SERVICES

The scopes of proposed services are to prepare Road Inventory of Roads for preparation of the Asset Register and Inventory Management. The following point shall be incorporated during preparation of the road inventory survey:

- Locate road centerline using Differential Global Positioning System (DGPS) with Recording Interval not greater than 1 second and driving at speed not more than 30 km/hr. GPS with external antenna need to be deployed. Clean the centerline data using GIS software and with reference to Google earth imagery where available and update the links based on the HMIS-ICT defined links codes. The coordinates of start and end node of each link need to be captured and uploaded into the system.
- Each road link is to be divided into a number of segments (with maximum 4-5 km. length each wherever applicable) through the establishment of Location Referencing Points (LRP). LRP may be a temple, bridge, culvert, fueling station, kilo meter post or junction or other suitable location. LRPs must be defined by both chainage and GPS co-ordinates. LRPs should be identified to an accuracy of ± 1 m or better.
- Digital image and coordinate of each node and LRP is to be provided.
- The GPS data should also contain the GPS elevation values for each location.
- Prepare pavement inventory and history from the available information with the Division Road Offices and the various Project Offices and uploading to the system. This shall include the recent pavement re-sealing, rehabilitation/reconstruction with details of the pavement structure used. Where pavement details are not available a sampling need to be done with a core drill at 3 locations per link per surface type. The GPS location (latitude/longitude/GPS elevations) of such sampling should also be taken.
- Prepare inventory of side drain type, sections, conditions, photographs, start and end locations (chainage and GPS positions) using standard formats and uploading to the system.
- Prepare inventory of retaining walls with type, height, conditions, photographs, start and end locations (chainage and GPS positions) using computer and uploading to the system.
- Prepare inventory of Cross Drainage Structure (except Bridges) along with type, spans, length, conditions, photographs, mid locations (chainage and GPS positions) using standard formats using computer and uploading to the system.
- Prepare inventory of the road formation width, pavement widths, and surface type, shoulders width, shoulder height and their types along with its start and end positions for variation in parameters.
- Prepare Inventory and position of road junctions, overhead bridges, median separators, pass - byes, bus shelters, water logging areas, open irrigation crossings, topography of the area, road barriers, etc.
- Prepare inventory of the road furniture like barriers, road signs, road marking, and road humps etc. using standard formats.
- Prepare inventory of the land use type along with its start and end positions as well as topography.
- Prepare inventory of the road geometry both horizontal alignment ($^{\circ}$ /km, radius of curve) and vertical alignment (m/km, %).

- Classify terrain through which roads pass based on Nepal Road Standard and curvature plus total rise fall of each road link. If there is drastic change on terrain class within a link, classify terrain for given segment too.
- Locate heavy rainfall/ landslide area in consultation with concerned road offices.
- Field Data taken from the tablet (compatible to RISS Tablet software of DOR) shall be real-time on-spot synchronized with geo data taken from DGPS/total station using Bluetooth/Wi-Fi/USB file transfer or 'Allow mock location' support of the devices.
- Report collected data to the client.

Survey Procedure

All the inventory works shall be done using standard formats using professional Differential Global Positioning System (DGPS) equipment (with windows (8 or higher)) (use of total station where DGPS cannot be used) with differential correction from reference stations. Reference stations shall be established at appropriate distances based on GPS equipment types within its ranges.

- I. The data capture shall be done using tablet computers using RISS tablet software of DOR where data format shall be pre-loaded and the captured data shall be real-time on-spot synchronized with geo data taken from DGPS/total station verified and uploaded to the inventory system progressively.
- II. All distances shall be measured using a distance measuring device with an accuracy of 0.1% or better.
- III. All survey equipment used for data collection should be fully functional at normal speed under the arduous conditions to be encountered on the paved and unpaved road networks.
- IV. The consultant shall take approval from DoR, HMIS-ICT unit before using the equipment.

4. Consultant's Qualification and Experience

a. Firm's General Experience

General Experience of the Firm in Civil Engineering Works during the last 10 years (February 2007 to January 2017) with Contract Amount more than Rs. 30 million excluding VAT for each project.

b. Specific Experience

Specific Experience of the Firm in following during the last 10 years (February 2007 to January 2017).

- i. Specific Experience in "Inventory Survey of Roads (Atleast 15 km)
- ii. Specific Experience in "Detailed Engineering Survey and Design" or "Preparation of DPR" or "Construction Survey, Design and Supervision" of a Road (Road Length each more than 50 Km per project)
- iii. Specific Experience in Supervision of Road Construction/ Maintenance/ Rehabilitation/Reconstruction of Road length more than 50km.

5. FACILITIES PROVIDED BY THE CLIENT

The client will assist in the facilitation and co-ordination with other Government Ministries, Departments and Agencies as required for carrying out the assignment as necessary. The client will give assistance to the Consultant to gain access to all information required for the proper conduct and completion of the assignment.

HMIS-ICT will provide Highway Inventory Management Software (RISS) and training to operate it through the first phase consultant.

6. CONSULTANTS OBLIGATION

All necessary equipment such as survey equipment, vehicles and working space, staff and other logistics required for successful completion of the assignment will be the responsibility of the Consultant and all such costs need to be included in the Consultant's financial proposal.

7. SCHEDULE OF ASSIGNMENT

The consultant shall complete the assignment within 12 months from the date of signing of agreement. In order to complete the assignment in time frame mentioned above, the Consultant shall divide the team in different groups consisting of Highway Engineer, Civil Engineer and other staff under the overall guidance of Team Leader.

8. REPORTING OBLIGATION

The Consultant will report to HMIS-ICT unit of DoR. The following documents/Reports shall be provided by the Consultant. The consultant shall submit all the reports electronically in addition to the

S.N.	Activities	Reports & time of submission
1.	Inception Report	5 copies at end of 15 days from date of agreement.
2.	Draft Inventory Report	5 copies at end of 10 th month from date of agreement
3.	Final Inventory Report	10 copies at the end of 11 th month from date of agreement including 2 soft copies
4.	Progress Report	5 copies at the end of each month

hard copies as mentioned above.

9. Tentative STAFFING REQUIREMENT

STAFFING INPUTS

The total minimum estimated key staff input is **104 person-months** as detailed below in the table for key personnel. It is expected that the Consultants will propose their required person-months to carry

out the task as per the Terms of Reference. The Consultant should include in their proposal the cost of all facilities and services required by them for the execution of their services including vehicles, miscellaneous transportation, offices, equipment and accommodation etc. The breakdown of estimated staff input is given below.

S.N	Key Personnel	Inputs for road inventory survey (Phase 2)
1	Team Leader/ Senior Highway Engineer	12 PM
2	Highway Engineer -1	14 PM
3	Highway Engineer -2	
4	Highway Engineer -3	
5	Highway Engineer -4	
6	Field Engineer (Civil Engineer) -1	32 PM
7	Field Engineer (Civil Engineer)-2	
8	Field Engineer (Civil Engineer)-3	
9	Field Engineer (Civil Engineer)-4	
10	GPS Technician/Engineer -1	32 PM
11	GPS Technician/Engineer -2	
12	GPS Technician/Engineer -3	
13	GPS Technician/Engineer -4	
14	GIS / Auto CAD Technician- 1	14 PM
15	GIS / Auto CAD Technician- 2	
16	GIS / Auto CAD Technician- 3	
17	GIS / Auto CAD Technician- 4	
	Total	104 PM

QUALIFICATION AND RESPONSIBILITIES OF CONSULTANT'S KEY PERSONNEL

The qualification of Consultant's key personnel will include, but not necessarily be limited to the following:

Professional Key Personnel	General Experience	Specific Experience	Education required	Specific Experience Required
Team Leader/Senior Highway Engineer	Min:10 Preferable:15	Min:7 Preferable:10	M.Sc. in Civil Engineering	Experiences in Team Leadership, Road Inventory Survey, Detailed Survey and Design, Construction Supervision of Road
Highway Engineer-4 nos	Min:7 Preferable:10	Min:5 Preferable:7	M.Sc. in Civil Engineering	Experiences in Road Inventory Survey, Detailed Survey and Design, Construction Supervision of Road
Field Engineer (Civil Engineer)-4 nos	Min:7	Min:5	Bachelor in Civil Engineering	Experiences in Road Inventory Survey, Detailed Survey and Design, Construction Supervision of Road

Professional Key Personnel	General Experience	Specific Experience	Education required	Specific Experience Required
GPS Technician/Engineer -4 nos	Min:7	Min:5	Bachelor in Civil Engineering or equivalent to related field	Experience in Road Survey Works using professional GPS
GIS/AutoCAD technician-4 nos	Min:7	Min:5	Bachelor in Civil Engineering or equivalent to related field	Experience in Road Inventory and Mapping Works

10. RESPONSIBILITES OF TEAM MEMBERS

Position	Responsibilities
Team Leader/Senior Highway Engineer	- Execute the services with full responsibility for obtaining the best output. - Guide, supervise and co-ordinate the input and activities of other experts and staff of the Consultant's Team - Guide field team for Inventory Works. - Guide, supervise and co-ordinate the preparation of other reports to be submitted by the consultant. - Prepare and submit all required reports.
Highway Engineer (4 nos.)	- Review inventory requirements, formats and system in RISS and assist Team Leader to prepare recommendation for update and/or addition of formats and any other component of RISS. - Assist team leader to prepare field inventory manual for the inventory works. - Guide GPS Engineers and field survey team to carry out inventory works in efficient manner. - Assist Team Leader to prepare various reports.
Field Engineer (Civil Engineer)	- Study the data collection formats. - Conduct field survey works. - Enter field based data in the system and check data consistencies. - Provide support and training to other field Engineers, GPS Engineer and Jr. GIS Engineer as needed. - Assist Team Leader in preparation of various reports.
GPS Technician/ Engineer	- Study the data collection requirements. - Operate and collect data using DGPS as required in the ToR. - Prepare manual for DGPS operation including training to the field Engineers on the DGPS operations. - Establish DGPS control stations and conduct DGPS observation, process and provide precise co-ordinates. - Assist Team Leader in preparation of various reports.

Position	Responsibilities
GIS/Auto CAD Technician	• Work in close coordination with Sr. GIS Expert.
	• Study the data collection requirements.
	• Process field based DGPS data.
	• Prepare appropriate base maps for the display of the road inventory works.
	• Prepare GIS map using Geo-Server with necessary style files and zoom levels.
	• Assist Team Leader in Preparation of various reports.

11. MODE OF PAYMENT

The Consultant will be paid as mentioned below:

- i. 1st Payment: Mobilization advance payment upto 20% shall be paid against submission of Advance Bank Guarantee in prescribed format.
- ii. 2nd Payment: 10% of contract amount shall be paid after submission of Inception Report.
- iii. 3rd Payment: 30% shall be paid after completion of Road Inventory Survey
- iv. 4th Payment: 30% shall be paid after submission of Draft Inventory Report.
- v. 5th Payment: 30% will be paid after submission of the Final Inventory Report which shall incorporate all necessary comments and suggestion.

12. Recovery of Mobilization Advance

It shall be repaid 50% from the 4th Payment and remaining 50% shall be recovered from 5th Payment prior to completion of 90% of contract time whichever is earlier.

13. Co-Ordination with Inventory Management System Developer/ Consultant

The Consultants shall co-ordinate and share the information acquired during Road Inventory Survey at all stage with Software Developer/ Consultant. The consultants shall make all effort from its side to acquire support from the Software Developer/ Consultant to accomplish the task as per ToR.

14. Consultant's Selection Method

The consultant shall be selected following Quality and Cost Based Selection (QCBS) method set forth in the Guidelines: Selection and Employment of Consultants under IBRD Loans and IDA Credits & Grants by World Bank Borrowers, January 2011, revised July 2014.

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

Highway Management Information System - Information and Communication Technology (HMIS-ICT) Unit

ToR for

Road Inventory Survey and Preparation of Road Inventory of Strategic Road Network of Western, Mid-western & far-Western Region (Package 2)

1. BACKGROUND

Management of the assets of roads is one of the vital tasks for all countries. DoR intends to prepare assets register of all of its assets by conducting road inventory survey. Conventional method of management of the inventory data is paper based which is inefficient, time-consuming, and non-consistent and hardly sustainable. As the recent advancements of computers, and image processing, new technologies have been employed in the practice of inventory data management. Considering this, DOR has prepared software for management of the road assets. The assignment for the preparation of road inventory is divided into two phases. Phase I assignment is undergoing and comprises of the following

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- Support to the Consultant of Phase 2(Proposed Assignment) on use of the Inventory Management System Software and
- Assist DoR to monitor/supervise Phase 2 Assignment.

The proposed assignment i.e. Phase 2 includes road inventory survey and preparation of Road Inventory of strategic Roads all over the country.

HMIS-ICT Unit intends to hire consultant for carrying out road inventory survey of the road as follows:

Package No	Name of Roads	Length (km)	Duration of Service (Month)
RSDPAF/DOR/HMIS/CONS/02	GIS based Road inventory Survey of Strategic Road Networks in Western, Mid-western & Far-Western Development Region	Black Top:3148 Gravel/Earthen:3363 Total:6511	12

2. OBJECTIVE

The objective of the proposed assignment is to carry out Inventory Survey and prepare Road Inventory of Strategic Road Network (SRN) using Inventory Management Software prepared in Phase I.

3. SCOPE OF SERVICES

The scopes of proposed services are to prepare Road Inventory of Roads for preparation of the Asset Register and Inventory Management. The following point shall be incorporated during preparation of the road inventory survey:

- Locate road centerline using Differential Global Positioning System (DGPS) with Recording Interval not greater than 1 second and driving at speed not more than 30 km/hr. GPS with external antenna need to be deployed. Clean the centerline data using GIS software and with reference to Google earth imagery where available and update the links based on the HMIS-ICT defined links codes. The coordinates of start and end node of each link need to be captured and uploaded into the system.
- Each road link is to be divided into a number of segments (with maximum 4-5 km. length each wherever applicable) through the establishment of Location Referencing Points (LRP). LRP may be a temple, bridge, culvert, fueling station, kilo meter post or junction or other suitable location. LRPs must be defined by both chainage and GPS co-ordinates. LRPs should be identified to an accuracy of ± 1 m or better.
- Digital image and coordinate of each node and LRP is to be provided.
- The GPS data should also contain the GPS elevation values for each location.
- Prepare pavement inventory and history from the available information with the Division Road Offices and the various Project Offices and uploading to the system. This shall include the recent pavement re-sealing, rehabilitation/reconstruction with details of the pavement structure used. Where pavement details are not available a sampling need to be done with a core drill at 3 locations per link per surface type. The GPS location (latitude/longitude/GPS elevations) of such sampling should also be taken.
- Prepare inventory of side drain type, sections, conditions, photographs, start and end locations (chainage and GPS positions) using standard formats and uploading to the system.
- Prepare inventory of retaining walls with type, height, conditions, photographs, start and end locations (chainage and GPS positions) using computer and uploading to the system.
- Prepare inventory of Cross Drainage Structure (except Bridges) along with type, spans, length, conditions, photographs, mid locations (chainage and GPS positions) using standard formats using computer and uploading to the system.
- Prepare inventory of the road formation width, pavement widths, and surface type, shoulders width, shoulder height and their types along with its start and end positions for variation in parameters.
- Prepare Inventory and position of road junctions, overhead bridges, median separators, pass - byes, bus shelters, water logging areas, open irrigation crossings, topography of the area, road barriers, etc.
- Prepare inventory of the road furniture like barriers, road signs, road marking, and road humps etc. using standard formats.
- Prepare inventory of the land use type along with its start and end positions as well as topography.
- Prepare inventory of the road geometry both horizontal alignment ($^{\circ}$ /km, radius of curve) and vertical alignment (m/km, %).

- Classify terrain through which roads pass based on Nepal Road Standard and curvature plus total rise fall of each road link. If there is drastic change on terrain class within a link, classify terrain for given segment too.
- Locate heavy rainfall/ landslide area in consultation with concerned road offices.
- Field Data taken from the tablet (compatible to RISS Tablet software of DOR) shall be real-time on-spot synchronized with geo data taken from DGPS/total station using Bluetooth/Wi-Fi/USB file transfer or 'Allow mock location' support of the devices.
- Report collected data to the client.

Survey Procedure

All the inventory works shall be done using standard formats using professional Differential Global Positioning System (DGPS) equipment (with windows (8 or higher)) (use of total station where DGPS cannot be used) with differential correction from reference stations. Reference stations shall be established at appropriate distances based on GPS equipment types within its ranges.

- I. The data capture shall be done using tablet computers using RISS tablet software of DOR where data format shall be pre-loaded and the captured data shall be real-time on-spot synchronized with geo data taken from DGPS/total station verified and uploaded to the inventory system progressively.
- II. All distances shall be measured using a distance measuring device with an accuracy of 0.1% or better.
- III. All survey equipment used for data collection should be fully functional at normal speed under the arduous conditions to be encountered on the paved and unpaved road networks.
- IV. The consultant shall take approval from DoR, HMIS-ICT unit before using the equipment.

4. Consultant's Qualification and Experience

a. Firm's General Experience

General Experience of the Firm in Civil Engineering Works during the last 10years (February 2007 to January 2017) with Contract Amount more than Rs. 30 million excluding VAT for each project.

b. Specific Experience

Specific Experience of the Firm in following during the last 10 years (February 2007 to January 2017).

- i. Specific Experience in "Inventory Survey of Roads (Atleast 15 km)
- ii. Specific Experience in "Detailed Engineering Survey and Design" or "Preparation of DPR" or "Construction Survey, Design and Supervision" of a Road (Road Length each more than 50 Km per project)
- iii. Specific Experience in Supervision of Road Construction/ Maintenance/ Rehabilitation/Reconstruction of Road length more than 50km.

5. FACILITIES PROVIDED BY THE CLIENT

The client will assist in the facilitation and co-ordination with other Government Ministries, Departments and Agencies as required for carrying out the assignment as necessary. The client will give assistance to the Consultant to gain access to all information required for the proper conduct and completion of the assignment.

HMIS-ICT will provide Highway Inventory Management Software (RISS) and training to operate it through the first phase consultant.

6. CONSULTANTS OBLIGATION

All necessary equipment such as survey equipment, vehicles and working space, staff and other logistics required for successful completion of the assignment will be the responsibility of the Consultant and all such costs needs to be included in the Consultant's financial proposal.

7. SCHEDULE OF ASSIGNMENT

The consultant shall complete the assignment within 12 months from the date of signing of agreement. In order to the complete the assignment in time frame mentioned above, the Consultant shall divide the team in different group consisting of Highway Engineer, Civil Engineer and other staff under the overall guidance of Team Leader.

8. REPORTING OBLIGATION

The Consultant will report to HMIS-ICT unit of DoR. The following documents/Repots shall be provided by the Consultant .The consultant shall submit all the reports electronically in addition to the

S.N.	Activities	Reports & time of submission
1.	Inception Report	5 copies at end of 15 days from date of agreement.
2.	Draft Inventory Report	5 copies at end of 10 th month from date of agreement
3.	Final Inventory Report	10 copies at the end of 11 th month from date of agreement including 2 soft copies
4.	Progress Report	5 copies at the end of each month

hard copies as mentioned above.

9. Tentative STAFFING REQUIREMENT

STAFFING INPUTS

The total minimum estimated key staff inputs is **112 person-months** as detailed below in the table for key personnel. It is expected that the Consultants will propose their required person-months to carry out the task as per the Terms of Reference. The Consultant should include in their proposal the cost of all facilities and services required by them for the execution of their services including vehicles, miscellaneous transportation, offices, equipment and accommodation etc. The breakdown of estimated staff input is given below.

S.N	Key Personnel	Inputs for road inventory survey (Phase 2)
1	Team Leader/ Senior Highway Engineer	12 PM
2	Highway Engineer -1	15PM
3	Highway Engineer -2	
4	Highway Engineer -3	
5	Highway Engineer -4	
6	Field Engineer (Civil Engineer) -1	35 PM
7	Field Engineer (Civil Engineer)-2	
8	Field Engineer (Civil Engineer)-3	
9	Field Engineer (Civil Engineer)-4	
10	GPS Technician/Engineer -1	35 PM
11	GPS Technician/Engineer -2	
12	GPS Technician/Engineer -3	
13	GPS Technician/Engineer -4	
14	GIS / Auto CAD Technician- 1	15 PM
15	GIS / Auto CAD Technician- 2	
16	GIS / Auto CAD Technician- 3	
17	GIS / Auto CAD Technician- 4	
	Total	112PM

QUALIFICATION AND RESPONSIBILITIES OF CONSULTANT'S KEY PERSONNEL

The qualification of Consultant's key personnel will include, but not necessarily be limited to the following:

Professional Key Personnel	General Experience	Specific Experience	Education required	Specific Experience Required
Team Leader/ Senior Highway Engineer	Min:10 Preferable:15	Min:7 Preferable:10	M.Sc. in Civil Engineering	Experiences in Team Leadership, Road Inventory Survey, Detailed Survey and Design, Construction Supervision of Road
Highway Engineer-4 nos	Min:7 Preferable:10	Min:5 Preferable:7	M.Sc. in Civil Engineering	Experiences in Road Inventory Survey, Detailed Survey and Design, Construction Supervision of Road

Professional Key Personnel	General Experience	Specific Experience	Education required	Specific Experience Required
Field Engineer (Civil Engineer)-4 nos	Min:7	Min:5	Bachelor in Civil Engineering	Experiences in Road Inventory Survey, Detailed Survey and Design, Construction Supervision of Road
GPS Technician/Engineer -4 nos	Min:7	Min:5	Bachelor in Civil Engineering or equivalent to related field	Experience in Road Survey Works using professional GPS
GIS / Auto CAD Technician-4 nos	Min:7	Min:5	Bachelor in Civil Engineering or equivalent to related field	Experience in Road Inventory and Mapping Works

10. RESPONSIBILITIES OF TEAM MEMBERS

Position	Responsibilities
Team Leader/ Senior Highway Engineer	- Execute the services with full responsibility for obtaining the best output. - Guide, supervise and co-ordinate the input and activities of other experts and staff of the Consultant's Team - Guide field team for Inventory Works. - Guide, supervise and co-ordinate the preparation of other reports to be submitted by the consultant. - Prepare and submit all required reports.
Highway Engineer (4 nos.)	- Review inventory requirements, formats and system in RISS and assist Team Leader to prepare recommendation for update and/or addition of formats and any other component of RISS. - Assist team leader to prepare field inventory manual for the inventory works. - Guide GPS Engineers and field survey team to carry out inventory works in efficient manner. - Assist Team Leader to prepare various reports.
Field Engineer (Civil Engineer)	- Study the data collection formats. - Conduct field survey works. - Enter field based data in the system and check data consistencies. - Provide support and training to other field Engineers, GPS Engineer and Jr. GIS Engineer as needed. - Assist Team Leader in preparation of various reports.
GPS Technician/Engineer	- Study the data collection requirements. - Operate and collect data using DGPS as required in the ToR. - Prepare manual for DGPS operation including training to the field Engineers on the DGPS operations.

Position	Responsibilities
GIS / Auto CAD Technician	- Establish DGPS control stations and conduct DGPS observation, process and provide precise co-ordinates. - Assist Team Leader in preparation of various reports.
	Work in close coordination with Sr. GIS Expert.
	Study the data collection requirements.
	Process field based DGPS data.
	Prepare appropriate base maps for the display of the road inventory works.
	Prepare GIS map using Geo-Server with necessary style files and zoom levels.
	Assist Team Leader in Preparation of various reports.

11. MODE OF PAYMENT

The Consultant will be paid as mentioned below:

- i. 1st Payment: Mobilization advance payment upto 20% shall be paid against submission of Advance Bank Guarantee in prescribed format.
- ii. 2nd Payment: 10% of contract amount shall be paid after submission of Inception Report.
- iii. 3rd Payment: 30% shall be paid after completion of Road Inventory Survey
- iv. 4th Payment: 30% shall be paid after submission of Draft Inventory Report.
- v. 5th Payment: 30% will be paid after submission of the Final Inventory Report which shall incorporate all necessary comments and suggestion.

12. Recovery of Mobilization Advance

It shall be repaid 50% from the 4th Payment and remaining 50% shall be recovered from 5th Payment prior to completion of 90% of contract time whichever is earlier

13. Co-Ordination with Inventory Management System Developer/ Consultant

The Consultants shall co-ordinate and share the information acquired during Road Inventory Survey at all stage with Software Developer/ Consultant. The consultants shall make all effect from its side to acquire support from the Software Developer/ Consultant to accomplish the task as per ToR.

14. Consultant's Selection Method

The consultant shall be selected following Quality and Cost Based Selection (QCBS) method set forth in the Guidelines: Selection and Employment of Consultants under IBRD Loans and IDA Credits & Grants by World Bank Borrowers, January 2011, revised July 2014.

