Government of Nepal
Ministry of Physical Infrastructure and Transport
Department of Roads
Maintenance Branch
Strategic Road Connectivity & Trade Improvement Project (SRCTIP)
Notice No. SRCTIP/MB/01/2079-80

Contract Identification Number: SRCTIP-DOR-RAMS-CS-QCBS-29

REQUEST FOR EXPRESSION OF INTEREST (REOI)

Country : Nepal
Name of project: Strategic Road Connectivity & Trade improvement project (SRCTIP)
Credit No.: 6673-NP
Assignment Title**:** Project Management Consultant for Road Asset Management System (RAMS) Development
Reference No.: SRCTIP-DOR-RAMS-CS-QCBS-29
The Government of Nepal has received financing from the World Bank toward the cost of Strategic Road Connectivity & Trade improvement project (SRCTIP) and intends to apply part of the proceeds for consulting services.

The consulting services ("the Services") include **Project Management Consultant for the Establishment of a modern web-based Road Asset Management System within the DOR**. The services include review of the existing system and develop a plan for the new modern system with procurement and establishment of the system. Terms of Reference is available in the website of the Department of Roads: www.dor.gov.np/home/notices. Anticipated date for commencement of the services is February 2023 and the duration of the assignment is about 60 months.

The Department of Roads, Maintenance Branch (MB) now invites **eligible** 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:

- Core business and years in business (minimum 5 years)
- General experience of the Consulting firm in any civil engineering projects
- Relevant experience of the Consulting Firm with similarity in nature, size, complexity (establishment of Road Asset Management System)
- Technical, Managerial, financial and organizational capability of the firm for the assignment

The attention of interested Consultants is drawn to Section III, paragraphs 3.14, 3.16 and 3.17 of the World Bank's "Procurement Regulations for IPF Borrowers" November 2020 (“Procurement Regulations”) setting forth the World Bank's policy on conflict of interest.

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

A consultant will be selected in accordance with the Quality & Cost Based Selection (QCBS) method set out in the World Bank’s "Procurement Regulations for IPF Borrowers "November 2020.

Further information can be obtained at the address below during office hours or at DoR's website **htpps://dor.gov.np/home/notices.**
Expression of interest must be delivered in written form during office hours to the address below by **16th August 2022.**

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TERMS OF REFERENCE

Project Management Consultant for Road Asset Management System

1. INTRODUCTION AND BACKGROUND

Government of Nepal with financial support from the World Bank has launched a project with objective to improve efficiency and safety of selected transport infrastructure, improve efficiency of cross-border trade, and strengthen capacity for strategic road network management. The outcome of this Strategic Road Connectivity and Trade Improvement Project (SRCTIP) will be measured through (a) reduction in travel time, vehicle operating costs and annual fatalities related to road crashes on the roads being improved or upgraded; (b) reduction in the time taken for goods transit at a major border crossing point; (c) reduction in time taken for sanitary and phytosanitary clearances in export of selected agricultural commodities; (d) increase in the percentage of Core Road Network (CRN) in "good" condition.

As per the recent mandate, Department of Roads (DOR) under the Federal government would be administering 80 roads of about 15,000 km in highway category while the 7 provincial governments and 753 municipalities would be responsible for the rest of the roads. The Highway Management Information System (HMIS) unit under Planning Branch) within DOR has a Geographical Information System (GIS)based inventory with 25 parameters for the roads under its jurisdiction. The proposed Road Asset Management System (RAMS) shall be applicable to these roads at the moment but, in view of the possible hierarchy upgradation of other roads to highway category in the future, should be scalable to include all other roads. Funded by Roads Board Nepal (RBN), HMIS has been collecting of International Roughness Index (IRI), Surface Distress Index (SDI) and Annual Average Daily Traffic(AADT) on yearly basis. Based on the data, simple empirical method developed about 25 years back is still being used to prepare the Annual Road Maintenance Plan (ARMP) for all Division Roads Offices (DROs).

For the roads under DOR, maintenance is carried out by 33 Division Roads Offices (DRO) and monitored by 4 Federal Roads Supervision and Monitoring Offices (FRSMO). The Maintenance Branch of the department facilitates the process through policy-level support and overall monitoring.

DOR engineering staffs are familiar to some extent on using cloud-based database. The Bridge Management System (BMS) for managing bridge inventory and an app-based Bridge Site Monitoring System (BSMS) are in use already for some years.

Under SRCTIP, the department is desirous to establish a web-based RAMS to provide real-time data on road features as well as on maintenance history, surface condition, traffic volume, active landslides and through integration with other systems, cross-drainage structures and road crashes as well as their analysis to make the best possible decisions for road maintenance, safety, and management. This TOR outlines the requirements to develop and execute such a system in addition to strengthening the HMIS unit within DOR in collecting, analyzing, storing and maintaining the database.

2. OBJECTIVES

The objective of this assignment is to engage a Project Management Consultant (the Consultant) to support the achievement of the following:

i. To develop and establish a robust web and GIS based RAMS[1] for the roads being administered by the Federal Government. The system should be capable of incorporating in the future roads being administered by Provincial Governments and the Local Governments in Nepal in order to facilitate reduction of total transportation costs and support the DOR Strategy[2] through better planning.

ii. To prepare groundwork to depart from the present empirical method (cost/km) to a universal method (eg: HDM-4, HERS-ST, dTIMS-CT, etc) for engineering and economic viability of the investments in road projects.

iii. To enhance the capacity of HMIS Unit at DOR in collecting, analyzing, storing and maintaining the database as well as integrating the system with other relevant systems in Nepal.

iv. The RAMS is to enable for the calculation of the road accessibility model to verify the status of achievement against Sustainable Development Goals(SDG) 11.2.3 on the population within 30 minutes from paved roads[3] and to form a rational basis to expand the road network.

3. SCOPE OF WORKS

The scopes of services of this consultancy are in two Parts as follows:

Part I – Defining the Way Forward

Part I of the assignment is about reviewing what is currently occurring (within the broader RAMS space, and defining the future vision for each of the following:

Task 1. Review and update the road present referencing system with nodes, links and sections balancing both the increasing need for details to plan and manage road maintenance as well as the computational resources required.

Task 2. Review the present empirical prioritizing criteria to identify road links for preparing annual maintenance plans and Periodic Maintenance and document the proposed HDM-4 set-up (treatments, intervention levels etc.) that is to be implemented.

Task 3. Review existing data collection (inventory and condition) methods for roads and bridges and make recommendations for improvement as deemed appropriate for good RAM implementation, including any additional data collection equipment.

[1] Within this TOR, RAMS refers to the computer system for managing the data etc., while RAM refers to the overall processes, practices, policies, systems (including RAMS).

[2] The DOR Strategy, MRCU, Department of Roads, Nepal, 1995.

[3] Needs Assessment, Costing and Financing Strategy for SDG, National Planning Commission, Nepal, 2018.

Task 4. Review the present data storage arrangement and access to it as well as the storage facility provided by NITC (National Information Technology Center) and other government data centers in order to identify the most appropriate cloud facility for HMIS.

Task 5. Identification of strategically located permanent traffic count stations (including a mix of high-speed weigh-in-motion and vehicle count sites) to supplement the existing 160 to cover the network and provide a robust level of confidence as to the traffic trends occurring across the network. Additionally, the Consultant should define a program (likely over a 1-3 year cycle) of shorter term (likely 1 week) traffic counting surveys that should be undertaken to expand the coverage of the permanent count stations.

Task 6. Develop a Road Asset Management Framework and strategy for Nepal with defined roles and clearly delineated responsibilities for HMIS Unit at DOR as well as the FRSMO, Division Roads Offices (DRO) and road project offices on collection, authentication, analysis, storage options, retrieval, sharing and presentation of data as well as collection frequency and mode to align with the DOR Strategy.The framework also needs to define the function and extent of accountability of Department of Local Infrastructures (DOLI), RBN, relevant offices under provincial and local governments should they wish to be included in the framework.

Task 7. Define the overall functional requirements for the RAMS, including what modules are to be implemented immediately, and what additional modules DOR may wish to consider at some future stage. The upgraded system is expected to have the following minimum functionality:

a. Road Register which will have details of the road network, road hierarchy, pavement type by chainages, traffic, location of cross-drainage and major retaining structures, last resurfaced year, maintenance notes, etc;

b. The register should also include available further details on bridges and other structures, landslides, etc as data subsets.

c. Have a mobile app (Android and Apple) for the real-time viewing of data, recording of condition, updating of inventory and reporting faults etc. The app should be capable of logging faults or conducting condition inspections for subsequent uploading in the event that data connectivity is not present across the entire road network.

d. Pavement details, traffic data, Surface Distress index (SDI) with detailed data and calculation.

e. Video processing module with encoding with chainages from Global Positioning ystem(GPS) recordings. Preparation of presentable maps in online web mapping system and system for exporting to common GIS formats (shape files, geo-package etc).

f. The Main App shall be web-enabled running from DOR server so that the users always get the latest version. This should enable for the uploading, querying and reporting of data from any computer without the need for installing additional software.

g. Be fully compatible with HDM-4 data requirements, including the automatic production of the necessary HDM-4 input files and the importation of HDM-4 output files (work

programs, budgets etc.).

h. Integrate climate vulnerability mapping and related investment decision making tools into the RAMS system.

i. Enable the loading of a range of GIS shape files and associated data such as population data, location of public institutions (hospitals, schools etc.), and use these in the preparation of queries and reports from within the GIS interface.

j. Able to calculate the road accessibility model to verify the status of achievement against SDG 11.2.3 on the population within 30 minutes from paved roads, and to display with the GIS interface those locations of populations not meeting the SDG standard.

k. Capability to generate DRO and FRSMO-wise summary for the Annual Road Asset Maintenance Plan (ARMP) to be submitted to the RBN.

l. Determination of RBN allocation for each division and packaging of maintenance contracts.

m. Be fully documented with online help and guidance manuals.

Come with at least a 5 year maintenance and support license as well as extension of the license thereafter preferably in local currency.

Task 8. The Consultant will need to advise on the strengths and weaknesses (including initial and ongoing costs, ease of maintenance/updates, options for hosting, database administration (backups) etc.) of developing an inhouse RAMS, versus procurement of a modular Commercial Off The Shelf (COTS) RAMS. If developing in house, then the RAMS should use Postgre SQL or similar enterprise grade open-source database system which would include a GIS extension. The Consultant is to design an information management architecture suitable for the IT infrastructure and other resources available with the Employer.

Task 9. The Consultant will prepare the TOR, functional & technical specifications etc. for the new RAMS, which may be used in either the procurement of a COTS system or the inhouse production of RAMS – depending on the results of the above process.

Task 10. Support DOR by identification of the goods and services to be procured as well as draft the convincing rationale, specification and TOR for the procurement of:

a. Road Condition Survey using vehicle mounted data acquisition system.

b. Pavement condition survey including collection of CBR, structural strength, roughness and distress of the road pavement.

c. Road roughness recording equipment based on bump-integrator or accelerometer-based technology and the accessories.

d. Falling Weight Deflectometer (FWD) or Benkelman Beam tests to determine pavement life.

e. Drone survey equipment with LIDAR capability to identify active landslide, river toe-cutting, road encroachment and wildlife corridors, etc.

f. Axle-load survey covering the network to review the loading scenario.

g. Internet connectivity at all offices for the purposes of RAMS.

h. License for HDM-4.

i. Traffic counting system.

j. All necessary computer hardware and software to support the RAMS.

Each of the above items should be appropriately costed.

Task 11. During and as well as at end of Part I, the Consultant is to run consultative meetings/workshops with representatives from MoPIT, HMIS, DOR, FRSMO, DRO,DOTM, RBN, the World Bank, Nepal Police and other related stakeholders to present, explain, and discuss all the above outputs and obtain agreement/acceptance of the way forward.

Task 12. A detailed work plan for Part II is to be prepared at the end of Part I, showing all key milestones, the timing of the Consultants inputs (in country or remote) etc. It is expected that the workplan will show that the initial implementation of all the Part II changes would occur within a 12 month period, and the subsequent 36 months would be about embedding those changes and systems within DOR.

Part II – Implementing Changes

Part II of the assignment is about implementing the agreed findings from Part I and requires the Consultant to either develop a number of TORs for the procurement of external providers (and to Manage those Projects or to directly undertake the activities - as agreed to by the client. Specifically, these tasks include but are not limited to:

Task 1. Make changes to the current road referencing system as per the agreed referencing system, and develop a full GIS model of the road network showing all updated nodes, links, names etc. The GIS model should be compatible with well-established industry standards.

Task 2. Support DOR in the procurement of the new/upgraded RAMS, including all necessary training. In addition, where a COTS AMIS is procured, the AMIS supplier should provide fulltime onsite support for an initial period of 6months to enable for detailed system training, customization of reports or similar system support.

Task 3. Stepwise calibration of HDM-4 using the data sets available[4] to (i) get a list of road links for maintenance intervention; (ii) get a revised list of road links with priority considering the budget available.

Task 4. Deliver training to 30 engineers as nominated by DOR for each stage of HDM-4 calibration.

Task 5. Conduct 2-day a training workshop, including field demonstration, at each of

[4] DOR have at least 5 years of data in their current system which can used for calibration of HDM-4.

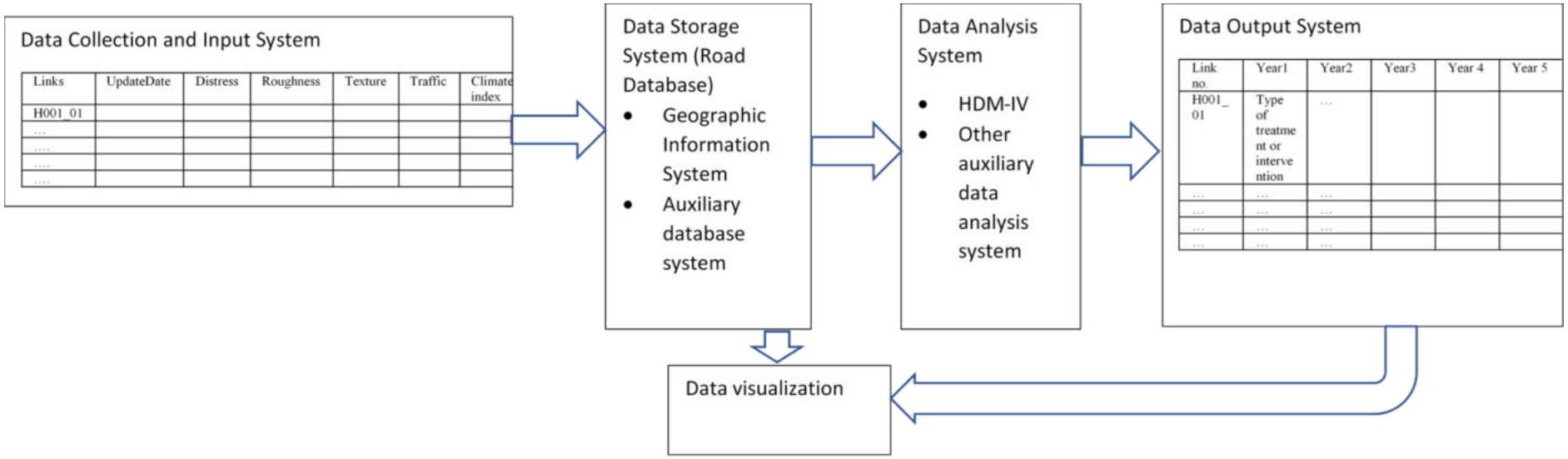
the 4 FRSMO to be participated by engineering staff from DOR offices, local consulting firms and provincial governments as nominated by the corresponding FRSMO on data collection, uploading data in the system, data retrieval and preparation of ARMP. This may be added into the above tasks.

Task 6. Provide intensive support services after developing and establishing the RAMS to institutionalize the RAMS as an integral responsibility of HMIS Unit within DOR.

Task 7. Recommend and support institutional enhancements of DOR and other relevant agencies on road asset management.

The Consultant will actively support DOR in the preparation of all annual works plans, production of asset management plans, budget allocation and similar processes until the end of the assignment. This is expected to be a full time role for a period of 2 years, followed by a period of part time support as DOR capabilities and capacity develop.

The input and output and overall goal of the system should be as shown in the following schematic diagram:



4. FIRM'S QUALIFICATION/ EXPERIENCE REQUIREMENT

Firm must have sufficient qualification and experience to carry out the assignment. As a minimum, the consultant (firm) must have (i) 5 years of standing in consulting services in the road transport sector; and (ii) Having experience of Road Asset Management.

5. DURATION OF SERVICES

The services are to be rendered over a 5-years period in 2 Parts as follows. The Part II shall be commenced after completion of the assignments under Part I within first year.

- Part I (12 months): Tasks 1-8 - Conducting all reviews and defining the way forward. This is an intense period of work and is expected to require fulltime commitment of a number of the Consultants team members.

  Tasks 9-12: Preparing all TORs, bidding documents, Part II workplan etc. This period may permit some team members to be part-time on the project.

- Part II (12-60 months): Procurement/upgrade of all systems, equipment etc. as necessary to enable the full achievement of the objectives of the assignment.

  Support of all aspects of the service for the purposes of strengthening RAM across DOR, including production of the ARMP.

6. THE CONSULTANT'S TEAM AND INPUTS

The proposed services under this Terms of Reference shall be carried out by a team with adequate qualifications and experience in developing and managing RAMS with indicative inputs as follows:

Key Professionals (Inputs in person-month *)	Part I	Part II	Total
Team Leader/ Roads Asset Management Specialist (International)	10	4	14
Maintenance Management Specialist (International)	10	4	14
Deputy Team Leader/ Maintenance Management Expert	12	48	60
Road Condition Survey Engineer	6	6	12
System Engineer	6	6**	12
Total key Staff Inputs	**44**	**68**	**112**

*Notes:

1. The above list of key professionals and estimated person month is for reference only. The Consultant is responsible to review the required services and may propose own requirements for the key professionals and other support staff (eg: Programmers, GIS operators, traffic enumerators, Office Manager, IT Technicians, etc.) required to complete the proposed services in a satisfactory manner.
2. **The inputs of the System Engineer will be heavily dependent on whether the decision is made to purchase a COTS based RAMS or develop an in house solution. The Consultant is to ensure the System Engineer is available to support/implement either approach.
3. The Financial proposal should also include cost for organization of training sessions, consultations, and workshops on RAMS and ARMP in Nepal. Training on HDM-4 and other systems shall be included in the Financial Proposal.

7. QUALIFICATIONS OF KEY PERSONNEL

The broad qualifications of the Key personnel shall be as follows:

Team Leader/ Roads Asset Management Specialist

(An international expert providing full time/ intermittent basis)

- Education: Master's Degree in Civil/ Highway Engineering,
- Training: Certified training on GIS and HDM-IV

Experience: Over 15 years of general experience in road design/ construction/ maintenance with at least 5 years specifically in development of Road Maintenance Plans for the National/Central Road Network as well as 5 years in development and implementation support on Road Asset Management System; Training of Engineering staff; Completion of at least 2 similar assignments in a different countries.

Maintenance Management Specialist (International)

(An international expert providing full time/ intermittent basis)

- Education: Master's Degree in Civil/ Highway Engineering,
- Trainings: Certified training GIS and HDM-4;
- Experience: Over 15 years of general experience in road design/ construction/ maintenance with at least 5 years specifically in development of HDM4 based Road Maintenance Plans. Extensive experience on calibration of HDM4 to suit local condition; Completion of at least 2 similar assignments in different countries.

Deputy Team Leader/ Maintenance Management Expert

(A national expert providing full-time support)

- Education: Master's Degree in Civil/ Highway Engineering, preferably relevant master's degree; Certified training on GIS and HDM-4;
- Experience: Over 15 years of general experience in road design/ construction/ maintenance with at least 5 years specifically in development of Annual Road Maintenance Plans, preferably using the HDM-4

Road Condition Survey Engineer

(A national expert providing intermittent on-site support)

- Education: minimum Bachelor's degree in Civil Engineering. Preferred Master's degree in highway and or relevant field.
- Experience: Minimum 10 years of general experience in road design/ construction/ maintenance; at least 3 years of specific experience in conducting Road Inventory and Road Condition Surveys, Professional GPS operation, online GIS database and and preparation of ARMP.

System Engineer

(A national expert providing full-time/ intermittent support)

- Education: Bachelor's degree in Computer Science, Computer Engineering, or Information Technology. Preferably master's degree in computer science and related field.
- Experience: Over 5 years of experience in setting up the server system in Linux/ Windows with PostgreSQL/ PostGIS, Geo-server, web hosting, web services. Completion and maintenance of at least 2 projects with application at national or state levels for managing road/ infrastructure system along with online GIS mapping using PostgreSQL/ PostGIS, web services for android applications etc.

8. REPORTING REQUIREMENTS

The Consultant is required to submit the following reports in 5 hard copies and a soft copy:

Report	Timeline
a. Inception Report (with detailed work schedule, timing of major deliverables, expert deployment schedule, inputs expected from the Employer and its timing, Quality Assurance plan, Risk management plan)	within 1 month of contract commencement
b. Progress Report	within 1st week of each successive calendar month Trimester reports within 1st week of successive month of trimester Annual Status report to be presented by 1st month of each consecutive year detailing the major achievements, and key work plan for the coming year.
c. Part I: Tasks 1-6. Each task to have its own standalone report.	Within 4 months of contract commencement
d. Part I Task 7: Functional requirements of RAMS	Within 6 months of contract commencement
e. Part I Task 8: Inhouse vs COTS approach	Within 6 months of contract commencement
f. Part I Tasks 9 & 10: TORS and specification requirements for bidding for procurement of all necessary components	Within 12 months of contract commencement

g. Part I Task 12: Detailed work plan for Part II	Within 12 months of contract commencement
h. Final Report on Part I (may be presented as a series of final reports covering each of the tasks as per the above, with the Final Report being an Executive Summary style report referencing the individual reports)	Within 1 month after completion of Part I
i. All outputs for Part II. A report/technical note on each deliverable is to be provided as appropriate for the task.	To be delivered as per the agreed Detailed Workplan prepared by the Consultant under Part I task 12
j. Report on Part II (implementation and upgrade of all systems, equipment etc)	within 18 months of the contract commencement for Part II
k. Training Reports	within 2 weeks of each of the trainings or workshops.
l. Final Completion Report	Draft submitted 2 months before completion of contract services, Final submitted within 2 weeks of receipt of feedback.

9. OBLIGATIONS

The Employer's obligations

The Employer shall provide the following:

a. All previous GIS and other data on road alignment, procured GIS map layers, record on road asset, their maintenance history
b. Access to the BMS and other systems owned by the Employer.
c. Timely nomination of trainee and workshop participants.
d. Server space for the data collected.
e. Web-hosting of the RAMS portal.

The Consultant's obligations

In order to achieve the objective by covering the Scope of Services stated above, the consultant is required to fulfill the following additional obligations:

a. Mobilization of their staff, with accommodation, transport and other logistics required to execute the services.

b. Bring, operate and maintain computer hardware/ software, other equipment for use during the contract period. The Consultant shall take back all such equipment as soon as their function is over.

c. Proper use of equipment, software license, data and asset provided by the Employer. These shall be used only for project purpose and handed back in good condition.

d. Prepare training curricula, develop training material/ handouts and conduct trainings. Soft copy of the training material shall be provided to the Employer.

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