GOVERNMENT OF MEGHALAYA OFFICE OF THE CHIEF ENGINEER (NH), P. W. D. (ROADS) LOWER LACHUMIERE: MEGHALAYA, SHILLONG.

Email:cenhwbmitp@gmail.com

REQUEST FOR EXPRESSIONS OF INTEREST

(Consulting Services – Quality and Cost Based Selection (QCBS)

INDIA: MEGHALAYA INTEGRATED TRANSPORT PROJECT (MITP). Project ID: P-168097

Assignment Title: Consultancy Services for Assessment of Climate Change Risk and Vulnerability of Roads and Preparation of Climate Resilient Green Growth Strategy for Meghalaya Integrated Transport Project (MITP) funded by the World Bank.

Reference No: IN- PWD-CRGGT&VA-CS-QCBS-2

Government of Meghalaya has received a loan from the World Bank (IBRD) under its Meghalaya Integrated Transport Project (MITP) and intends to apply part of the proceeds for consulting services.

The Meghalaya Infrastructure Development and Financing Corporation (MIDFC) through Meghalaya Public Works Department (Roads), wish to engage a consultant for the preparation of Assessment of Climate Change Risk and Vulnerability of Roads and Preparation of Climate Resilient Green Growth Strategy for the state of Meghalaya.

The Meghalaya Public Works Department (Roads), Government of Meghalaya 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 defined in the Eligibility Criteria in the Term of reference (TOR).

The TOR for the activity is also enclosed.

The employer intends to engage the services of a consultant for the aforementioned works.

The attention of interested Consultants is drawn to paragraph 3.17 of the World Bank's *Procurement Regulations for IPF Borrowers, July 2016- Revised November 2017 and August 2018* as amended from time to time *[under IBRD Loans and IDA Credits & Grants] by the World Bank Borrowers*, setting forth the World Bank's policy on conflict of interest.

Consultants may associate with other firms in the form of a joint venture or a sub consultancy.

A Consultant will be selected in accordance with the Quality and Cost Based Selection (QCBS) method set out in the Consultant Guidelines of the World Bank.

Further information can be obtained at the address below during office hours i.e., 11:00 am to 03:00 pm.

Expression of interest comprising letter of motivation and detailed CV must be received at the address below no later than 12^{th} April, 2024 at 16:00 hours local time. No extension will be granted after the last date. No EOI will be accepted after the date and time specified above. The Department will not be responsible for any delay of the EOI sent by registered post/speed post/courier etc.

3 A.M. Kharmawphlang

A.M. Kharmawphlang Chief Engineer(NH), PWD (Roads), Meghalaya Shillong. Lower Lachumiere, Shillong-793001, Meghalaya. E-mail: cenhwbmitp@gmail.com

TERMS OF REFERENCE

MEGHALAYA INTEGRATED TRANSPORT PROJECT (MITP)

Assessment of Climate Change Risk and Vulnerability of Roads and Preparation of Climate Resilient Green Growth Strategy

Introduction

Meghalaya is a relatively small hilly state situated in the country's North-East region with 70 per cent covered with forests and trees. The state is the wettest region of India and has a high vulnerability to earthquakes, landslides, floods, cyclones, and, storm surges.

Meghalaya is strategically located as a connecting node for the BBIN(Bangladesh, Bhutan, India (via Meghalaya), and Nepal) corridor and therefore a development priority for the Government of India (GOI). The state suffers from tenuous communication, poor market access, and low industrialization due to its poor transport infrastructure, challenging hilly terrain and climatic conditions. The growth potentials therefore remain unexplored.

Roads are the backbone of Meghalaya's development. Yet, about half of the state's road network is in poor or failed condition due to inadequate drainage, and extreme climatic events such as heavy rainfall and flash floods. About 500 semi-permanent timber bridges are in dilapidated condition. About half of the 5,362 habitations lack resilient transport connectivity. Adding to the ailing road network are the changing land-use patterns - from lush green forests and tree covers to barren hills, leading to soil liquefaction, subsidence, slope failures, landslides, and rock falls in mountainous regions. Some parts of Meghalaya are also prone to floods/flash floods which are known to wash away bridges and stretches of roads.

The state government of Meghalaya has received a loan from the World Bank (IBRD) under its Meghalaya Integrated Transport Project (MITP) for the up-gradation of the transport infrastructure in the State to build resilient connectivity. Thinking ahead, the State PWD wishes to overcome the climate change challenges by developing and institutionalizing Climate Resilient Green Growth Strategy including planning and design concepts that internalize current and future climate scenarios, adopting nature-based solutions (NbS), and applying measures to improve resource efficiency and carbon-footprint of roads and bridges.

Objective

The main objectives of the proposed analytical work are to prepare a Climate Resilient Green Growth Strategy for Meghalaya's Road network (only state roads)based on climate risk assessment of 200 – 300km of road network (including bridges). The strategy should include:

- a) Guidelines on the use of climate data for the current and future climate scenarios;
- b) Guidelines on the assessment of climate change risks and design needs while applying landscape approach;
- c) Recommendation on the application of new local design standards and engineering solutions including NbS for the construction and maintenance of all-weather resilient roads and bridges;

d) Recommendation on institutional strengthening for mainstreaming climate considerations and resilient approaches.

Methodology and Scope of Work

A) Climate Change Risk Assessment

As per IPCC AR5,¹ Climate Risk is a function of hazard, and vulnerability, wherein vulnerability is again a function of sensitivity and adaptive capacity of a given physical asset. Here risk is defined as adverse consequence (in terms of magnitude, scale, distribution, reversibility, etc.). The analytical study should try to follow the same approach as far as possible. Some data limitation is anticipated.

i. Mapping of climate-induced multi-hazards of road network on GIS platform–Based on initial-desk-based analysis, identify and map on the GIS platform the multi-hazards to the roads and bridges network of the State based on existing climate information (current and future scenarios) and past archival data on extreme/ disaster events/ repair & rehabilitation work.

Climate-related hazards refer to the potential hazard risks that may arise from climate change. Climate change may cause – (a) longer-term gradual shifts (slow and onset) of in weather norms such as changes in precipitation pattern, average temperatures, rising sea levels etc. (i.e., leading to chronic physical risks); (b) extreme climate change-related weather events (or extreme weather events) such as floods, heat waves, landslides, storms and wildfires (i.e., causing acute physical risks); and (c) indirect effects of climate change such as loss of ecosystem services (e.g., degradation of soil quality, changes in the watershed etc.). While mapping consultant must consider all direct and indirect causes and applying based on current and project climate scenarios.

The consultant must clarify how projected climate scenario(s) have been applied and justify the choice of emission scenario(s). GIS maps of the state road network are available with State PWD, the same should be considered as a base for creating further layers.

ii. **Identifying root-cause analysis and resilience measures based on field study**– Based on the multi-hazard mapping of the State Road network, the consultant in discussion with the State PWD team, should identify 200 – 300 km road stretches in total for identification of root-cause(s) and possible design/ rehabilitation measures to mitigate the physical risk(s) through field visit.

Asthe physical risk to any climate-induced hazard is a component of variables including the likelihood of exposure, the sensitivity of the asset (i.e., asset condition) and adaptive capacity (preventive maintenance, etc.), the consultant may identify several issues, including the institutional capacity to design and maintain resilient assets.

The road stretches totalling200-300 km must be selected to cover all hazards identified in the first task as well as cover all types of geography in the State. It should cover some of the Urban roads, Tourism roads, Roads connecting to agricultural hubs/ important markets, industrial corridors, critical infrastructures such as hospitals, educational institutions, etc. The stretches should be selected in consultation with PWD.

¹ IPCC – Intergovernmental Panel on Climate Change Assessment Report 5

Later based on synthesized findings from field investigation and understanding the consultant should identify potential adaptation/ resilient options (in terms of design/ choice of material/ construction process and use of technology) as a response to the assessed vulnerabilities and those that are techno-economically feasible and appropriate in the context of Meghalaya. Where possible Consultant should identify nature-based solutions or bio-engineering measures and define standards/ design specifications for the same.

B) Climate Resilience and Green Growth Strategy

(i) Developing Climate Resilience and Green Growth Strategy

Based on the above analysis of hazard, exposure, and vulnerability, the Consultant should present a risk matrix (high, medium and low) of the road assets of the State indicating vulnerable hotspots, root cause (s) and other internal/ external factors influencing the conditions. The risk matrix should enable the State to understand how each region/ area/ landscape of different from the others and therefore requires different approach(es) in terms of planning, designing, implementation and maintenance. This should be developed on the GIS platform.

Synthesizing the risks identified, the Consultant should then draw a Climate Resilient and Green Growth Strategy for Meghalaya's Roads and Bridges Sector. The strategy should (i) outline a general climate change adaptation policy framework required to provide a foundation for climate change adaptation and enhance the overall resilience of the sector; (ii) require institutional strengthening to carry out adaptation works (training needs); (iii) design, planning and maintenance process and technological measures; (iv) financial innovation for any additional financing if required.

The strategy should be followed by a roadmap for implementation, such that it enables PWD to (a) prioritize actions; (b) implement the recommendation and achieve resilience of assets.

(ii) Developing Application Guidelines

For institutionalization of climate risk assessment of roads/ bridges/ other assets, the Consultant should develop a guideline for PWD covering the following aspects:

- a) process of assessing the physical risk of road assets to climate change;
- b) type and format of data needed for risk assessment including study of floods, hydrological data of the catchment areas, assessment of rainfall data, alternate design analyses, landslide and related geotechnical/geo-morphological analyses.
- c) methods for mapping, preferably GIS-based ones, of infrastructure assets in vulnerable areas, and inventory of critical assets that are susceptible to climate change impacts;
- d) methods for monitoring asset conditions in conjunction with environmental conditions (e.g., temperature, precipitation, geology, wind to determine if climate change affects performance;
- e) methodology for prioritization of risk areas and assets and identification of high-risk areas and highly vulnerable assets as carried out Task A;
- f) Methodology to apply different Climate Resilient Design Standards/Specifications for different climate risks and hazards;
- g) Methodology for the development of a work program of priority climate resilience measures for vulnerable roads and other assets in at-risk areas.

DELIVERABLES, TIMELINES AND PAYMENT SCHEDULE

It will be a lump-sum contract for 12 (Twelve) months. Payments will be linked with the acceptance of deliverables.

SI.	Deliverables	The due date for	Payment Schedule
No.		submission from the start	
		date of contract signing	
		(Days)	
1	An inception report that	Within 15 days of the	Acceptance of this
	summarizes the methodology,	commencement of the	for 10% of the
	approach and timelines		contract amount
2	Mapping of climate-induced	Within two(2) months of the	Acceptance of this
	multi-hazards of road network	commencement of the	report would account
	on GIS platform	assignment.	for 10% of the
			contract amount;
3	Climate Risk Assessment (i.e.	Within six (2) months of the	Acceptance of this
	completion of Task A)	commencement of the	report would account
		assignment.	for 25% of the
			contract amount;
4	Climate Resilience Green	Within eight(8) months of	Acceptance of this
	Growth Strategy and Roadmap	the commencement of the	report would account
	for Implementation	assignment.	for 25% of the
5	Application Quidelines	Within ton (10) months of	contract amount;
5	Application Guidelines	the common common of the	Acceptance of this
			for 20% of the
			contract amount
6	Final reportscover all that is	Within twelve(12) months of	Acceptance of this
-	included in TASK A. &B	the commencement of the	report would account
	,	assignment	for 10% of the
			contract amount.

Eligibility Criteria:

	Eligibility Criteria	Supporting Documents to be submitted	
1.	A bidder (single entity/ leading entity) should have a minimum annual turnover of INR 50 Crores in the last three financial years and a positive net worth.	Certificate from a registered Chartered Accountant (CA) certifying the turnover of the company as required for Para 2(a)	
2.	The bidder must have completed at least two projects for providing Advisory/Consultancy services for vulnerability and risk assessment of road infrastructure, projects.	Copy of the work order, and completion certificate (self- certified) to be given on the company's letterhead by its authorized signatory with details of consultancy project cost.	

3.	 The bidder must have experience in the following works: Detailed road engineering design and technical specifications; International experience on road designing projects; Solid knowledge of the institutional and policy process required in the implementation of climate change adaptation measures; Excellent ability to consult with key decision-makers and other stakeholders in the road sector; and 	Copy of the work order, and completion certificate (self- certified) to be given on the company's letterhead by its authorized signatory with details of consultancy project cost.
	Knowledge of and fluency in the local languages will be an added advantage.	
4.	The bidder should not have been blacklisted by any State / Central Government / PSUs in India as on the bid submission date for corrupt, fraudulent or any other unethical business practices or for any other reason.	Self-certificate to be given on the company's letterhead by its authorized signatory.

Manpower requirements and eligibility criteria of Key Personnel/Specialists

It is expected that the firm or team of consultants will include, but not limited to, persons with the following roles:

Key Staff	Qualifications	Experience	Time Inputs
Team Leader (1)	The candidate must have a Master's in Roads and Highways engineering/ Transport/ Hydrology/ or equivalent	The candidate must have at least 20 years of work experience with at least 5 years of experience in leading projects on climate/ hydro-meteorological risk assessment of roads/ highways/ bridges/ transport projects/ assets and recommending design measures including nature-based solutions for avoiding/ minimizing physical risks. The candidate should have completed at least 2 projects for providing consultancy services for vulnerability and risk assessment of road infrastructure. The candidate must have experience working in the Himalayan/ Northeastern States of India.	10
Deputy Team Leader (1)	The candidate must be a postgraduate in Roads and	The candidate must have at least 15 years of work experience in Road Engineering projects including climate/ hydro- meteorological risk assessment of roads/ highways/ bridges/ transport projects/ assets	12

Road/ Civil Engineer (2)	engineering/ Transport/ Hydrology/ or equivalent Bachelor's degree in civil engineering, with post-graduate qualification in roads-related discipline.	 and recommending design measures including nature-based solutions for avoiding/ minimizing physical risks. The candidate must have worked for the Himalayan/ Northeastern States of India. 10 years or more experience in the field of roads and bridge engineering, with specific experience in modelling landslides, flooding, scouring, pavement design, etc. 	12
GIS Mapping Specialist (1)	Master of Computer Science or Engineering Degree	Minimum of 10 years of GIS experience and experience working with various data formats such as CAD, GPS, etc. Knowledge of environmental resource management, transportation, or geography is strongly preferred.	6
Geo technical engineer (1)	At a minimum a Bachelor's degree in an engineering discipline with Post Graduate in Geotechnical Engineering	At least 10 years of experience in positions requiring proficiency with the analysis of landslide and slip circle failures, and geotechnical and bio-engineering applications for road and bridge protection works. Some CCA and/or DRM-related project experience is preferred. Experience in hill roads and bridges will be an added advantage.	6
Engineering Hydrologist (1)	Bachelor's degree in Hydrology, Physical Geography, Earth Science, Engineering, or Environmental Science required with a strong focus on hydrology. Preferably a master's degree.	At least 10 years' relevant experience in engineering hydrology including 3 years of experience in hydrodynamic analyses and modelling, flood risk assessment with hydrologic modelling software. Some CCA and/or DRM-related project experience is preferred. Some CCA and/or DRM-related project experience is preferred.	6

Additionally, time inputs for Support Staff can be considered. The support staff should have a Degree in Civil Engineering with at least 5 years of experience.