

## TERMS OF REFERENCE

### Consultancy Services for Procurement of Bioengineering Solutions Manual for the State of Himachal Pradesh under Himachal Pradesh State Roads Transformation Program (HPSRTP)

#### A. Project Background

The Government of Himachal Pradesh through the Govt. of India has received a loan from the World Bank (USD 82 Million) for the implementation of the Himachal Pradesh State Roads Transformation Project (HPSRTP). HPSRTP has envisaged to strengthen the transport, logistics and Road Safety institution and also to improve priority Major District Roads/other Districts Roads (State Road Network) to stimulate horticultural and overall economic growth of Himachal Pradesh State.

The Lead Implementing Agency Himachal Pradesh Roads and Infrastructure Development Corporation (HPRIDCL) represented by the Director (Project)-cum-Chief Engineer has already awarded consultancy services for conducting a detailed feasibility study of about 2,000 Km of State Core Road Network, mainly Major District Roads. The Consultancy firm shall prepare a Detailed Project Report (DPR) for upgradation works of 650 km of core roads which include detailed engineering design, social, environmental and road safety safeguards measures and maintenance of 1,350 km of MDRs through contracting and Project Management Consultant (PMC) to assist in the implementation of the Project.

Up-gradation of 650 Km Road length will be carried out in 3 Tranches i.e., Tranche-I=90 Km, Tranche-II=270 Km, and Tranche-III=290 Km. The Tranche-I of HPSRTP-II is to be implemented in three components namely Institutional Strengthening/Transformation Agenda, Upgradation of Priority Roads, and Development of "Safe Corridor Initiative."

#### B. Objective

The project envisages up-gradation and maintenance of state roads, some of which may lead to adverse environmental impacts and risks due to proneness to erosion, slope instability, geo-hazards, etc.

It is the HPRIDCL's initiative to introduce and evolve economical/affordable, environment-friendly and ecologically sustainable measures of landslide disaster management, Soil erosion reduction and prevention. Bioengineering will be used as one tool toward attaining sustainable asset management, reducing overall road maintenance costs, and improving the overall environment. Bioengineering techniques as preventive measures for these interventions will be introduced under the project to achieve these objectives. The key elements which will be covered are as follows:

- Preparation of Bioengineering Solutions Manual to guide mainstreaming of Bioengineering measures in the regular PWD's works. The manual will integrate road design standards for stretches that require Bio-engineering solutions to stabilize erosion-prone slopes/landslides, and debris disposal sites along the RoW boundaries;
- Bio-engineering suitability checklist covering land, slope, soil, and hydro-geology parameters for guiding decision making process to stabilize erosion prone slopes;
- Documenting best practices from the sector to stabilize erosion-prone slopes/landslides, and debris disposal sites along the RoW boundaries specially from hilly fragile/Himalayan region;
- Creation of pilot trial sites.
- Assessment and design of slope failure treatments (for both natural as well as man-induced failures) for such sites;
- Development of guidelines for minimizing man-induced instabilities;
- Establishing roles of various state agencies (such as the Horticulture Wing of the PWD and Forest Department), including technical institutions along with their capacity building;
- Preparation of Bioengineering Solutions Manual and
- Creation of an institutional framework to ensure inter-agency coordination.

- Creating a monitoring framework that will include quality control and quality assurance measures for ongoing and completed bioengineering works to stabilize erosion-prone slopes/landslides, and debris disposal sites along the RoW boundaries.

In this regard, HPRIDCL needs to hire a Consultancy Services for Procurement of Bioengineering Solutions Manual in its unit to effectively coordinate necessary studies as part of project preparation and implementation.

### **C. Scope of Consultancy Work**

In the preparation, implementation and monitoring stages, Bioengineering Solutions Consultant will undertake the following specific tasks:

- Review Hill Road construction and maintenance design standards and other applicable manuals/documents (National/International) available regarding Bioengineering Measures.
- Review and document national and international best practices to stabilize erosion-prone slopes/landslides, and debris disposal sites along the RoW boundaries specially from fragile hilly/ Himalayan region
- The Consultant shall review/study the approach to Soil Bioengineering piloted by the HPRIDCL as part of the first HPSRTP funded by the World Bank and recommend any change in scope of this TOR and prepare a bioengineering manual that will be mainstreamed in regular business practices of PWD.
- To review and assess the present planning, design, implementation and maintenance process and the capacity of all the stakeholders including HPRIDCL, Consultants, and Contractors in terms of Bioengineering aspects.
- To interact with officials of the forest and horticulture department to understand fully the ground reality and requirements for bioengineering, existing local practices and techniques including identification of suitable species for bioengineering.
- Identify the requirements of Bioengineering Measures/Techniques in the ongoing construction projects/DPR projects of HPRIDCL and prepare a bioengineering solutions manual incorporating methodology/implementation plan of bioengineering measures.
- Preparation of the Bioengineering Solutions Manual so that Bioengineering measures can be mainstreamed in the regular PWD's works.
- Preparation of Plantation scheme in reference to the manuals, specifications and codes.
- Preparation of procedural guidelines for hybrid bioengineering solutions, applying a blend of plantation and civil structures, including geomatic material, gabions, subsurface drainage, interception drains/ditches, grass-covered masonry/concrete check dams for steep side drainage structures, and bamboo reinforced earth.
- Documentation and reporting to apprise World Bank team during mission visits or as and when required.
- The consultant shall also assess changes in vegetation coverage and land use in the high geohazard risk areas along the core road network of 2000 km and determine the potential of new landslide risk occurrence and possible remedial Bioengineering measures to sustainably prevent and protect the landslide risks.
- The consultant shall make recommendations on the needs of relevant staff in HPPWD/HPRIDCL and training and other capacity support in planning, implementation and monitoring of bioengineering solutions to stabilize erosion-prone slopes/landslides, debris disposal sites along the RoW boundaries. The consultant shall prepare a training calendar detailing out modules that will essentially guide the frequency of training and target audiences. Capacity-building activities will also include orientation of the Contractor's designated staff about scopes and proposed methods of the bioengineering solutions in their respective projects.

- The Consultant will provide 3 trainings to HPRIDCL/HPPWD staff and contractors' staff during the consultancy assignment. The venue and material of training are to be finalized in consultation with the client.
- Review/suggest the bioengineering measures/plan that needs to be undertaken on 650km upgradation and 1350Km roads under Periodic Maintenance of road by Long Term performance Base Maintenance Contract to promote ecological sustainability of the region.
- The consultant will coordinate the preparation of Action Plans for time-bound implementation of such activities with field staff and other involved agencies. The discussion will include matters about the use of design, implementation, nursery establishment and management, works calendars and programs; in particular, define the timings of the obligations of the PWD Horticulture Wing in producing materials for site use by the contractors.
- The Consultant will study and submit a comprehensive report on establishing a Geo-Environment-Social Unit (GESU) in HPRIDCL and assist HPRIDCL in establishing the same.

#### **D. Consultant Acceptable Deliverable / Payment Schedule**

The Consultant will be paid as a percentage of the contract value as per the schedule given below based on satisfactory completion and approval of the deliverable items by the client HPRIDCL:

<b>Sr. No.</b>	<b>Item</b>	<b>No. of Copies</b>	<b>Due date (Months from start)</b>	<b>Payment (Percentage of Contract Price)</b>
1.	Inception Report (It should provide a Methodology with work plan including Training Programme Schedule).	5	T+1month	5
2.	Interim Report Covering Preliminary Findings and Data Collection for preparing Bioengineering Solution Manual.	5	T+4 months	10
3.	A comprehensive report including (i) establishing a Geo-Environment-Social Unit (GESU) in HPRIDCL and (ii) needs of relevant staff in HPRIDCL and HPPWD and training and other capacity support in planning, implementation and monitoring of bioengineering solutions.	5	T+5 months	5
4.	Submission of Draft Bioengineering Solutions Manual.	5	T+6 months	30
5.	Completion of 3 training (1 <sup>st</sup> training on T+2 month, 2 <sup>nd</sup> training on T+4 month and 3 <sup>rd</sup> training on T+6 month) Programme.	5	T+7 months	15
6.	Preparation of Action Plan for time-bound implementation of Bioengineering Measures.	5	T+8 months	5
7.	Submission of Final Bioengineering Solutions Manual including demonstration of Bioengineering Solution Report and submission of Stakeholder/Public Consultation minutes of meeting and recordings regarding Bioengineering solutions.	5	T+9 months	30

**(T: Commencement Date of the assignment)**

**Note:** The Consultant will be paid ONLY after submission **and acceptance** of deliverables by the review committee.

#### **E. Duration of Services**

The duration of the consultancy assignment shall be 9 months from the commencement date.

#### **F. Reporting Requirements**

The consultancy firm or the designated Bioengineering Solutions Consultant shall report to the Director (Project)-cum-Chief Engineer, HPRIDCL and shall work closely with inhouse Bioengineering and Horticulture Expert of HPRIDCL, for timely completion the assignment.

#### **G. Review and Acceptance of Deliverables**

- Background material, available data, design reports and records of previous surveys, will be provided to the consultant for reference.
- The Review Committee of HPRIDCL shall review the deliverable reports submitted by the consultant.

#### **H. Selection Process**

Selection of the Consultant will be carried out in accordance with Consultant's Qualification Based Selection (CQS) method set out in the Procurement Regulations for IPF Borrowers" July 2016, Revised November 2017 and August 2018 ("Procurement Regulations").

#### **I. Experience Profile and Qualifications of the Consultant firm**

Preference will be given to consultants having related experience in preparing Bioengineering Management Plans and Supervising & Monitoring the implementation of bioengineering measures/plans in infrastructure projects funded by the World Bank or any other external aided agencies in the hilly area. A designated Team Leader cum Bioengineering Expert will manage all communications and activities with the HPRIDCL and the multi-lateral funding agency, be fluent in oral and written English, and demonstrate the management skills to manage all Subject Matter Expert(s) and deliver tasks on time. The Consultant must have excellent analytical skills and solid experience in researching and drafting reports and translating findings into actionable recommendations.

The team of experts for Bioengineering Solutions Measures should meet the following qualifications and expertise

- **Team Leader cum Bioengineering Expert:** One should possess a Post Graduate in Botany/Forestry/Forest Management/Bio Science/Horticulture from a recognized University and should have a total work experience of 15 years in infrastructure projects as Sr. Environmental Expert/Bio Engineering Expert. Should have at least 10 years of experience in planning and practical application of bioengineering solutions in road projects and maintenance of the same. Should have good knowledge as similar capacity in design/construction of road works in hill and mountainous areas. Experience in preparing Bioengineering Management Plans and Supervising & Monitoring the implementation of bioengineering measures/plans in similar projects funded by the World Bank or any other external aided agencies will be given preference.
- **Ecological Expert:** One Post Graduate in Environmental/Bioscience or equivalent, with a minimum experience of 10 years in infrastructure projects and should possess the similar

position in the World Bank and other MFIs funding projects. Should have at least 5 years of experience to identify the potential impacts of the proposed development/industrial activity on local ecology and have provided inputs as an expert for reports. Should have good knowledge as similar capacity in design/construction of road works in hill and mountainous areas.

- **Geotech Expert:** One Post Graduate in Geo-tech with a minimum experience of 10 years in infrastructure projects and should have experience with the World Bank and other MFIs projects. Should have good knowledge as similar capacity in design/construction of road works in hill and mountainous areas. Thorough knowledge of modern techniques of materials investigations and laboratory testing is essential.
- **Hydrogeologist or Geology Expert:** One Post Graduate in Geology with proven expertise in hydro-geology and a minimum experience of 10 years in infrastructure projects and should have experience with the World Bank and other MFIs projects. Should have good knowledge as similar capacity in design/construction of road works in hill and mountainous areas. Should have experience in local geology and in examining the factors affecting slopes and cause of instability of slope and further integrate the bioengineering solution in slope stabilization measures.

The team of experts shall have the support of junior professionals (Surveyors/Site engineers, CAD Expert etc.) with at least 5-7 years of experience in the relevant discipline along with support services for site work assistance. This is clarified that Support Staff and Non-Key Experts CVs shall not be evaluated. Only Key Expert's CVs shall be evaluated.

#### **J. Expert-Months:**

The proposed total man-months for this assignment are 27 Key expert-months and 09 Non-Key Experts, details of expert-months of Key Experts and Non-Key Experts are given below:

<b>Subject Expert</b>	<b>No. of Experts</b>	<b>Total Expert-months</b>
<b>A) Key Experts</b>		
Team Leader cum Bioengineering Expert	1	
Ecological Expert	1	
Geotech Expert	1	
Geology/Hydro-geology Expert	1	
<b>B) Non-Key Experts</b>		
Site Engineer-1	1	
Site Engineer-2	1	
Other Staff	As required	