

TERMS OF REFERENCE

for

Feasibility Study and Preparation of SIRTIP Project

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BACKGROUND INFORMATION

The Local Government Engineering Department (LGED) is strategically engaged in the process of development and management of physical infrastructure in rural and urban areas including roads, structures and trade centers, irrigated agriculture, minor drainage and flood control works and production and employment programs for the rural community. Currently, LGED, as a single institution, is managing over USD 2.0 billion each year, which is approximately 10-15% of the country's total annual development budget. Rural transport infrastructure consists of an extensive network of rural roads (37,254 km of Upazila Roads, 41,828 km of Union Roads, and 274,250 km of Village Roads) and 262,651 bridges and culverts with the total length of 318,819 meters. To meet a rapid increase in demand for transportation services (e.g., heavy trucks) from agriculture and manufacturing industries and for passenger services (e.g., buses) between employment generation centers, there is urgent need to strengthen the pavement capacity (both structural and lane width) of existing core upazila roads through the introduction of the revised and improved design standards.

Managing infrastructure assets in a sustainable manner with adequate levels of service to meet the expectations of present and future generations, LGED has adopted an **Asset Management Policy** that lays foundations for systematic and coordinated activities and practices through which the department optimally and sustainably manages its assets in accordance with international asset management standards.

To ensure the sustainability of its rural road assets, LGED has been exploring innovative management approaches, including the use of performance-based maintenance contracts (PBMC). During the implementation of the Additional Financing of the Second Rural Transport Improvement Project (RTIP-II AF), LGED piloted 18 PBMC covering 456 km of paved Upazila roads in 8 districts. Overall, there has been positive experience with the pilot PBMC, and LGED intends to scale up this approach.

Therefore, the Government of Bangladesh (GoB) intends to request the International Development Association to assist in preparing and implementing a prioritized program of Climate Resilient and Integrated Rural Transport Infrastructure after the substantial completion of the Additional Financing of the Second Rural Transport Improvement Project. Now a study needs to be commissioned for preparing a new project with new concept including climate resilient rural transport infrastructure in the project area in the light of GoB/development partners policies and strategies. The project design will take into account the climate and disaster risk factors for the infrastructure and enhance LGED's technical capacity to continue managing and strengthening the adaptation, resilience and sustainability of rural transport infrastructure. The technical design of the proposed project will take into account the new road design standards (Road Design and Pavement Standard of LGED) prepared by Bangladesh University of Engineering and Technology (BUET), financed by the World Bank and approved in December 2020.

These Terms of Reference (ToR) are intended to procure consultant services to verify the completed feasibility study and design the prioritized 1000 km of roads.

The working title of the new project, which will finance part of this Program, is "Sustainable and Integrated Rural Transport Project (SIRTIP)". However, the project name, scope and size (in terms of financing) will be finalized upon completion of the design and study. This Consultancy Services will be procured using the Quality and Cost-Based Selection (QCBS) method and lump sum contract with open international competition.

PROPOSED PROJCT AREA

The proposed project coverage in 5(five) administrative divisions of Bangladesh namely, i) Rangpur division, ii) Rajshahi division, iii) Dhaka division iv) Chattogram division (excluding CHT area) and v) Mymensingh division. The number of districts is 41. Physical coverage may increase or decrease but the scope of work remains the same as 1000 km of roads.



OBJECTIVES OF THE ASSIGNMENT

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The objective is to support LGED in the enhancement of asset management practices and enhancement program and verify the feasibility studies previously conducted for scaling up PBMC contracts in the selected project districts. The updated AMS is expected to explicitly define risk allocation and agreed performance indicators for PBMC. The assignment will assess the feasibility of upgrading the core roads of rural network to the required design standards.

Specifically, the Consultant is expected to support LGED in the preparation of a new rural transport project for increasing resilience of infrastructure to climate change and other risks, reducing the life cycle cost of assets, increasing the level of service to the population, and promoting transport safety, creating employment opportunities, and promoting overall economic growth.

The assignment will verify the feasibility of upgrading selected roads to required design standards. It will also identify missing road links which are needed for establishing connectivity and providing accessibility to different essential services specially to rail and waterways. The engagement will focus on sustainable asset management including analysis and review of current asset management policy, strategy and practices in LGED. The assignment will conduct a detailed feasibility study with technical, safeguards, socio-economic and financial analysis including transport demand and supply analysis. The new project is likely to include innovative approaches, e.g., scaling up PBMC on rural roads in districts other than where PBMCs were piloted.

Table 1: Indicative Program Road Lengths

Consultant Contract #1	Civil works category	Indicative contract type	Indicative percent length of program	Indicative length of program (km)	Percent of program under this ToR	Indicative length included in this ToR (km)
	Road widening	Bill of quantities	10%	500	40%	200
Reconstruction (no widening)	Bill of quantities	15%	750	40%	300	
Preventative maintenance	Bill of quantities	25%	1,250	40%	500	
Routine maintenance*	performance-based maintenance	50%	2,500	40%	1,000	
			5,000		2,000	

*The routine maintenance category is intended for contracts under the performance-based maintenance (PBM) contracting method. It is anticipated for these roads to be in good or fair condition, thus requiring no or minimal remedial work prior to the start of the PBM period.

The road length of civil works packages under this task estimated in Table 1, in the column labeled "Indicative length included in this ToR (km)." This chart is indicative, not exact, intended only to provide interested firms with a general idea of the required work. The actual lengths are expected to deviate within a reasonable range, especially between civil works categories.

Table 2: Indicative Program Lengths by Batches

Consultant Contract #1	Civil works category	Indicative Batch I length	Indicative Batch II Length	Indicative Batch III Length	Indicative length included in this ToR (km)
	Road widening	0	100	100	200
Reconstruction (no widening)	60	120	120	300	
Preventative maintenance	250	250	0	500	

	Routine maintenance*	1,000	0	0	1,000
		1,310	470	220	2,000

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*The routine maintenance category is intended for contracts under the performance-based maintenance (PBM) contracting method. It is anticipated for these roads to be in good or fair condition, thus requiring no or minimal remedial work prior to the start of the PBM period.

Civil works under the proposed project are envisaged to be divided into 3 batches. Table 2 indicates the indicative program length for each batch. This chart is indicative, not exact, intended only to provide interested firms with a general idea of the required work. The actual lengths are expected to deviate within a reasonable range, especially between civil works categories and between batches. The consultant is expected to phase its work in a manner that will enable to pursue procurement of Batch I sites first, followed by Batch II sites, and finally Batch III sites.

SCOPE OF SERVICES

All items within the scope of this consultancy shall consider international best practices and standards, national standard designs, and context sensitive design.

Task 1: Inception Report

Prepare an inception report detailing the items listed below. If there is a conflict between the contract and the inception report, the contract will take precedence.

1. Complete report detailing the consultant's intended means, methods, schedule of milestones and key deliverables, time inputs of key experts, design standards, reference documents to be used, and assumptions for the feasibility study and other items within the scope of work. The report should effectively demonstrate that the consultant possesses a firm grasp on the required scope of work and plans to utilize international best practices and standards in their work; detail the consultant's plan and resources required for each task and subtask; and clarify what resources are needed from other parties (e.g., LGED and the World Bank) and by when.
2. Prepare a quality assurance / quality control (QA/QC) plan that conforms with international best practices. Ensure that all project deliverables conform to accepted design practices and comply with national and international design standards and best practices as appropriate. The QA/QC Plan shall contain procedures that will be used to ensure that a quality product is provided for each deliverable and shall list what documentation will be submitted to verify that the procedures have been followed. Include sample checklists, or similar documentation, this will be used to indicate that an internal quality review has been performed, and that this ToR document, contract modifications, review comments, and any field reports and meeting minutes' action items have been checked against to ensure compliance and incorporation into the deliverables.
3. Prepare a survey plan that summarizes the methodologies and instrumentation proposed to provide the survey extent and accuracies required for effective feasibility planning, detailed design, and construction. It is incumbent upon the consultant to ensure that the survey plan and survey will result in sufficient data to complete all activities associated with this consultancy.
4. Prepare a field investigation plan. This shall include pavement condition surveys proposed, bridge inventory drilling and sampling of existing pavement, proposed geotechnical drilling and soil sample location maps, and a narrative summary. If appropriate, this section of the inception report can be delayed until roads selection is complete.

5. Prepare a complete schedule (Gantt or bar chart) for the feasibility study, detailed design (if confirmed as needed for some sub-projects), bid package preparation, and other items required in the scope of work of this consultancy, clearly depicting the critical path(s) and the float for each task and subtask. Provide a narrative detailing any foreseen schedule risks and the consultant's plan for mitigating any future schedule issues. Maintain this schedule throughout the engagement and prepare monthly schedule reports to be included as part of monthly progress reports.

Task 2. Review of LGED's Contracting Practices and Industry Survey

This task will involve the review of the following critical aspects and development of specific recommendations to enhance LGED's capacity in programming, planning and management of its rural road assets:

- 2.1 **Review of LGED's PBMC pilot.** The Consultant shall review the pilot PBMC experience based on the implementation of 18 PBMCs in RTIP-II. The assessment of this pilot experience shall involve both desk review of any associated documents (e.g., contract documents, reports on pre-bidding conferences, bid evaluation reports, supervision/monitoring progress reports, user satisfaction survey report, etc.), interaction with contractors and supervision/monitoring consultant(s) and field visits to some of the roads where those PBMCs were piloted. The review shall present key features of Bangladesh's PBMC model, compare cost-effectiveness of this type of contracts with traditional routine maintenance contracts, identify key issues and factors contributing to the successful implementation of pilot contracts or, on the opposite, leading to problems in their implementation. Special attention shall be given to the assessment of the risk allocation (e.g., types of risks, contractors' capacity to manage those risks, etc.), definitions of performance indicators and levels of service, and the contractors' compliance with those levels of services in the pilot PBMCs. The review shall suggest practical recommendations how to address issues faced in the pilot PBMCs in future similar contracts, propose specific changes or improvements in any aspect to further improve the effectiveness of PBMC and its attractiveness to the private sector. Findings of these review shall be detailed in a Technical Report. Conduct workshops for PBMC for civil works contractors, LGED staff, and consultants.
- 2.2 **Review of Bangladesh private sector capacity for road projects.** Conduct detailed stakeholder surveys, interviews, bid history, and other means necessary to ascertain and assess: i) civil works financial and technical capacity, especially the number of firms financially and technically capable of completing road and/or bridge construction work for various contract value ranges (<US\$500,000, US\$500,000-US\$2,000,000, US\$2,000,000-\$5,000,000, US\$5,000,000+) number of these firms availability to work in each district and ii) a detailed survey of materials suppliers and plants, to include aggregate, asphalt, cement, concrete, sand, and other materials, and related prices in each districts. Assessment must also include and consider a detailed analysis of LGED bid history for civil works tenders, and also tenders from other relevant agencies (e.g. RHD). Develop GIS heat maps depicting material supply availability and/or cost for various material types.

Task-3: Economic analysis, Surveys, and Preliminary Design of subprojects

Carry out project feasibility study for approximately 1000 km of roads selected by LGED. The consultant is responsible for validating the viability and appropriateness of road sections selected by LGED and any data provided. Work under this task includes, but is not limited to, the following:

- (i) **Economic analyses.** Prepare economic analysis for each road and overall project to verify economic viability of interventions using HDM-4. Carryout computation of EIRR, FIRR, NPV and Sensitivity Analysis for all components selected under the project according to the requirements of The World Bank and GoB; Project level GHG accounting shall also be provided considering the requirements of information and reporting completeness check (IRC) form and international financial institutions guideline for a harmonized approach to GHG accounting.
- (i) **Transect walks (Crokier survey) and baseline surveys.** Conduct on-site transect walk surveys each road in the 1,000 km selected by LGED. Engage technical design and safeguards specialists to physically assess the site in collaboration with LGED staff and local stakeholders, including local leadership, stakeholder groups, residents, landowners, business owners, and other interested or knowledgeable parties. Verify suitability of treatment identified by LGED and recommend changes as needed, field-verify land acquisition needs, assess drainage needs, assess structure conditions, and other information as needed to support the detailed design. Assess and document land acquisition needs, utility conflicts, and other encumbrances, if any. Capture photos and videos for each site as necessary to support future design work and minimize the need to conduct future site visits.
- (ii) **Complete topographic survey:** Topographic survey of the existing road areas with a minimum offset of 20m on either side of the centerline, or more, if necessary, for the design of improvement of road geometrics, road upgrading works, or waterway access works. Ground topographic survey is required, but LiDAR or similar aerial survey may be considered for approval provided that the outputs are sufficient for quality reports, and detailed design, and construction.
- (iii) **Survey and assessment of small bridges and culverts, including hydrologic surveys.** Identify small bridges and culverts on the selected roads and assess for hydraulic adequacy and damage, and design to comply with new design standards, green roads for water concepts, and international best practices. Document locations with missing, damaged, clogged, eroded, or otherwise non-functioning culverts. Conduct bridge and large culvert survey and condition assessments for all structures within the alignment under the project. Condition assessments shall, at a minimum, utilize national best practices for bridge inspection procedures and shall adequately inform decision matrices required under other items in this scope.
- (iv) **Prepare conceptual drawings for all structures.** Prepare conceptual-level drawings for all structures requiring work, including replacement or rehabilitation. Drawings are not required for bridges that only require routine maintenance. Conceptual drawings should be minimal and should convey the proposed bridge type, size (elevation and length), and location (plan view). Detailed surveys and detailed project reports (DPRs) for structures will be required during the detailed design stage.
- (v) **Reporting on climate resilient road design opportunities.** Complete a detailed climate resilience assessment and design plan to support decisions during the subsequent detailed design phase, considering especially risks related to hydrologic and hydraulic uncertainty. Design process practices, such as the need for detailed hydrologic surveys, analysis, and designs, shall also be included. Consider, among other items, adequate road surface elevation, adequate culvert sizing, embankment protection, nature-based solutions including bioengineering, energy dissipation, adequate bridge freeboard, use of resilient and/or recycled construction materials, and slope stabilization measures.
- (vi) **Prepare climate-resilient generic typical sections for all non-widening work.** Prepare

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generic typical sections, including reconstruction (without widening), rehabilitation, periodic ⁶ maintenance and routine maintenance. Typical sections should include options for different site conditions (e.g. rural vs. urban). Typical sections should generally comply with latest LGED design standards from CReLIC, and targeted to appropriate site-specific conditions.

- (vii) **Conduct road safety surveys.** Road safety survey as necessary to inform the detailed design and/or other required items for this project. This subtask shall include, but is not limited to, consideration of minor geometric improvements especially curve widening where possible, a survey of all existing signs, markings, and safety hazards. a survey of all objects within the clear zone, as defined and guided by relevant LGED manuals.
- (viii) **Conduct earthworks and shoulder condition survey.** Assess all shoulders, embankments, and other road features for damage and prepare pre-work survey and post-work earthworks survey and preparation of quantities.
- (ix) **Miscellaneous road asset survey.** Survey of any other road deficiencies not otherwise noted in these ToR, such as shoulder deficiencies, slope failures, guardrail deficiencies, etc.
- (x) **Support development of procurement strategy.** The consultant will perform the following tasks include, but not limited to, the following under procurement and contract management:
 - i) prepare Borrowers Project Implementation Plan (BPIP), Project Procurement Strategy for Development (PPSD), Procurement Plan, and other relevant documents as required by the authority for the proposed project after completion of Task 5.
- (xi) Organize and present stakeholder consultation meetings as appropriate.
- (xii) Prepare preliminary cost and economic/financial analysis
- (xiii) Provide any data collected or used within the scope of this contract and any input as requested to support LGED and the World Bank's preparation of the Development Project Proposal (DPP) and Project Appraisal Document (PAD) documents;

Task-4: Verification of Environmental and Social Impact Assessment :

Consultant will review the drafted ESMF following World Bank ESF policy(A copy of the ESF policy guidelines and standards may be found at: <http://documents.worldbank.org/curated/en/383011492423734099/pdf/114278- WP-REVISED-PUBLIC-Environmental-and-Social-Framework.pdf>). If further modifications are required, the consultant will perform the jobs.

Task 5: Survey & Site Investigations, Technical Design, Preparation of BoQ, Preparation of Bid Documents

Survey and site investigation tasks required for this consultancy are included below. Carry out survey and investigation, engineering design, BoQ preparation, land acquisition plan preparation, bid document preparation, and other items as indicated below or as necessary to achieve task objectives. It is the responsibility of the consultant to (1) complete items on this list in time to inform relevant deliverables, and (2) complete additional items not on this list that are required to complete other deliverables. Given substantial differences in levels of effort required between work categories, this section is divided into subsections for work category groupings. The consultant is responsible for phasing its work to achieve the required deliverable deadlines for each batch of civil works packages.

- (i) **Complete hydrologic surveys and analysis.** For all waterways, new structures (bridges and large culverts), structure replacement, and structure rehabilitation, conduct adequate upstream and downstream ground and channel elevation (e.g. 200 m upstream and downstream) and contour/hydrologic mapping as necessary to inform detailed hydraulic modeling and analysis

of all bridges spanning waterways.

- (ii) **Complete baseline survey to support construction activities.** Baseline survey and monumentation works for efficient and accurate control of vertical and horizontal alignment during construction.
- (iii) **Pavement condition survey and coring investigations.** Complete manual pavement survey and assessment for each road, documenting visible pavement distresses including longitudinal cracks, transverse cracks, alligator cracking, rutting, potholes, and others. Also make observations about the condition of roadside assets including shoulders, ditches, and slopes. Document chainages and offsets for each location or as necessary to support final design. Complete pavement coring and investigations along the wheel path at least every 1 km, or more if necessary to inform design. Determine strength of existing pavement and otherwise evaluate the physical properties of existing pavement for proposed pavement design. Propose pavement patch types and locations and also finalize pavement typical sections based on pavement condition survey for all project roads, qualitative assessments, and other internationally accepted pavement condition rating criteria.
- (iv) **Conduct geotechnical investigations and laboratory testing.** Adequate Geological/Geotechnical investigations and laboratory testing works required for design involving pavement that will be retained in place, bridge locations, slope-stabilization works, and other relevant items based on hazard maps. At a minimum, borings are required at 1) all new or replacement bridge substructure units (e.g., all abutments, piers, and bents, 2) all proposed retaining wall locations at appropriate intervals, and 3) all other locations as required for quality design.
- (v) **Prepare detailed project reports (DPRs) and drawings.** Prepare separate DPR reports for each road, in a clear, concise, and consistent format that illustrates all survey results, design decisions, and design decision rationale. Boring logs, traffic count sheets, and other raw data should be included as appendices. DPRs and drawings should include at a minimum:
 - a. Executive summary.
 - b. Basic site information, such as length, location map, existing carriageway/shoulder widths, proposed work, etc.
 - c. Survey data.
 - d. Analysis to support design decisions.
 - e. Design and design decision rationale.
 - f. Typical sections, depicting existing and proposed conditions. Also include pavement and shoulder design insets and typical section type chainage chart.
 - g. Plan and profile sheets, depicting the existing conditions, proposed conditions, right of way, obstacles, and other relevant information.
 - h. Prepare interval cross sections at maximum 50m intervals, or more frequently as needed to inform detailed design.
 - i. Detail sheets for common road elements, junction types, signs, markings, retaining structures, small culverts, and other relevant items.
 - j. Conduct design-stage road safety audit. Conduct road safety audits for all sites accordingly to LGED road safety audit manual. The road safety audits will also include a review of crash history, and incorporate road safety improvements in design where appropriate and cost effective.
 - k. Prepare complete bill of quantities (BoQ) with supporting quantity calculations.
 - l. Prepare engineer's estimate (EE) with supporting unit price calculations using LGED estimation software.
 - m. Prepare the Bid documents for each package as described in next sub task-5(vi)
- (vi) **Prepare bid documents, and support procurement.** Prepare bid documents for each

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package. The format will be provided by LGED and will be either the latest World Bank⁸ standard procurement document (SPD) format or a different LGED-prescribed format. Customize the bid documents for special situations when required. Include standard specifications and prepare project-specific specifications when needed. Bid documents shall be suitable for the establishment and management of PBMC contracts, including prequalification documents. In addition to the pavement, the civil works contractor would be responsible for the maintenance of all road and roadside assets within the performance period in the proposed PBMC contracts. The contract documentation should follow the Sample Bidding Document published by the World Bank for the PBMC Contracts. The Sample Bidding Document can be modified by the Consultant, with the agreement of the LGED (under the World Bank) to incorporate the agreed contract strategy. The Documentation should be acceptable to the LGED. The Consultant should also define the proposed quality framework for ensuring compliance of the works, including the penalty regime that will prevail in the event of any non-compliance by the Contractor in PBMC.

- (vii) Complete any other related activities to meet the objectives of the assignment.

DATA, LOCAL SERVICES AND FACILITIES TO BE PROVIDED BY THE CLIENT

Study Reports, Traffic and Technical Data:

All recently completed relevant studies related to the project will be made available to the consultant; Design manuals, design standards of roads and structures, markets and ghats, standard specifications as reference materials, road traffic data, equipment data, IDA procurement regulations, LGED's item rate bid history, Unit Rate Analysis and Unit Rates etc.; Maps of the country and its road network, including existing road inventory data of Rural Road network; Cost data on recent constructions. The client will provide all available data and reports for the design of the proposed project.

INSTITUTIONAL ARRANGEMENTS

LGED Headquarter (HQ) and/or the project management unit (PMU) will coordinate and monitor activities of consultants at head quarter level. LGED will provide necessary counterpart staff who will coordinate and monitor consultant's day to day activities and support to the consultants during field works. The consultant needs to present the draft report in presence of all stakeholders and accommodate acceptable comments. The consultant will also liaise and coordinate with LGED Planning Unit, Design Unit, Maintenance Unit, other relevant LGED units, and Bank staff as necessary during preparation of the project.

DURATION OF SERVICES:

All items in the scope of the work are to be completed by 8 (Eight) months after contract signing, with interim milestones as required elsewhere in this document.



PROFESSIONAL STAFFING INPUT REQUIRED

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To achieve the objectives of consultant services under these Terms of Reference and in accordance with the scope of works as stated, the requirement of following professional and staff with anticipated person months has been estimated in the table below.

It is the responsibility of the consultant to consider and propose sufficient quantities of key, non-key, and support personnel to ensure completion of all work by all allowable interim and final durations/completion dates for this consultancy.

While some anticipated responsibilities are also included below for some key staff positions, these lists are not all-inclusive and it is the responsibility of the consultant to effectively manage its team to ensure that all items required in the scope for each task are completed.

All consultants shall have excellent verbal and writing communication skills with people at all levels including fluent in English;

Sl. No.	Position	Staff Month	Qualifications & Experience
1.	Team Leader / Rural Infrastructure Management Specialist(International)	8	<ul style="list-style-type: none">• Minimum bachelor's degree in civil engineering. Masters in Transportation Engineering or equivalent is preferred. At least 25 years of professional experience with 15 years of relevant experience in planning, design, construction and maintenance of rural infrastructures projects. Preferred experience in rural infrastructure projects (such as roads, bridges & culverts, different protective works against natural calamities due to climate change), with knowledge management capabilities especially for climate resilience.• At least 10 (ten) years of relevant overseas working experience with at least 5 years of experience as a team leader or 10 years of experience as deputy team leader• Proven leadership and project management capability, personnel management and interpersonal skills, work skills in multi-disciplinary and multi-cultural team environments, excellent report preparation skills.• International expert or experience working on projects in multiple countries is preferred.
2	Deputy Team Leader/ Road Design Engineer	8	<ul style="list-style-type: none">• Minimum bachelor's degree in Civil Engineering. Masters in Transportation Engineering or relevant post-graduate degree is preferred. At least 20 years of professional experience with 15 years of relevant experience in planning, design, construction and maintenance of rural infrastructures projects. Preferred experience in rural infrastructure projects (such as roads, bridges & culverts, different protective works against natural calamities due to climate change). with knowledge management capabilities especially for climate resilience.• At least 5 years' experience of designing large projects involving funds from different sources (preferably ADB, World Bank, JICA, KfW, IFAD or other similar financiers).• Proven leadership and project management capability, personnel management and interpersonal skills, work skills in multi-disciplinary and multi-cultural team environments, excellent report preparation skills with computer literacy.

Sl. No.	Position	Staff Month	Qualifications & Experience
3	PBMC Specialist (International)	3	<ul style="list-style-type: none"> • Minimum bachelor's degree in Civil Engineering. Diploma/Certification in Asset Management is preferred. • 20 years' experience including minimum 15 years' experience as expert/specialist in road maintenance and preferably 10 years' international experience in design, contract formulation, and implementation of Performance based Maintenance Contract. • Fully conversant with design, estimation, bid document preparation and management of PBMC Contract. Also, experienced in selection of road and define the service level for PBMC contract.
4	Transport Economist	4	<ul style="list-style-type: none"> • Minimum bachelor degree in Civil Engineering/Master's degree in Economics or similar subjects with 15 years of professional experience and 10 years relevant experience in economic analysis & calculating BCR, NPV, FIRR, EIRR and GHG. • Experience of economic appraisal preparation in infrastructure projects. • Knowledge on transport economics and development of sustainable asset management strategy will be required.
5	Hydrologist and Hydraulic Engineer	8	<ul style="list-style-type: none"> • Minimum bachelor degree in civil engineering, preferred post-graduate degree in Water Resources Engineering or Ecology in Aquatic Environments or Physical Geography. Experience on hydrology especially surface water hydrology will be an added advantage. • At least 15 years of professional experience with 10 (ten) years relevant working experience with a focus on climate change adaptation (CCA). • At least 5 (five) years relevant experience in in analysis and design for climate resilience. Experience in the Ganges Delta area and other areas in Bangladesh is an advantage. • Proven climate change expertise, minimum 5 years of experience designing innovative climate resilient infrastructure in low lying areas prone to flooding, preferably authored articles in internationally prestigious academic journals for the same.
6	Senior Road Safety Engineer	8	<ul style="list-style-type: none"> • Minimum Bachelor degree in Civil Engineering. a postgraduate degree in Transportation/Traffic engineering is preferred. • Authorship of at least three scholarly articles on the subject of road safety improvements in internationally prestigious journals. • 15 years of professional experience with a minimum 10 years of experience conducting road safety audits and implementing countermeasures. • Preferred experience in road safety and traffic engineering in developing countries, especially Bangladesh.
7	Sr. Environmental Specialist	8	<p>Bachelor's degree in civil/ environmental engineering/ Master's degree in environmental science, geography or relevant subjects having 20 years of professional experience with 15 years of experience in relevant field. Knowledge on World Bank's safeguards policies and ESF and its standards will be required. Ability to conduct environmental assessment and preparation of environmental impact management framework for the project in compliance with the related country laws and World Bank guidelines will be required.</p>
8	Sr. Social Development	8	<p>Master's degree in Sociology/Social Science or equivalent having 20 years of experience and 15 years of relevant experience in the related field with experience on donor funded projects. Experience on World Bank safeguards policies and the new ESF, community consultations, and preparation of social</p>

Sl. No.	Position	Staff Month	Qualifications & Experience 11
	Specialist		inclusion, indigenous peoples, gender empowerment, labor rights, resettlement, and land acquisition. Ability to conduct social assessment and develop social impact management framework for the project in compliance with the related country laws and World Bank guidelines will be required.

In addition, it is anticipated that some non-key staff input will be required. LGED envisages that these positions will include, but not be limited to, the following:

- (i) Road/Pavement Design Engineer-4 nos.
- (ii) Jr. Safeguard Specialist-4 nos.
- (iii) Junior Road Safety Engineer-4 nos.
- (iv) CAD Operator- 6 Nos.

All consultants shall have excellent verbal and writing communication skills with people at all levels including fluent in English;

Note: Only the Key Expert positions listed above will be scored in the technical evaluation.

However, individual staff must be proposed by the consultant from for all the experts and Non-Key experts/other experts) listed below are required to meet the minimum qualification requirements specified for each position in this TOR. If any proposed staff does not meet the specified minimum qualification requirements, and if the proposing firm still ends up achieving the overall highest combined technical and financial score, then the firm will be required during contract negotiations and prior to Contract signing to replace the unqualified individual with another individual who fully meets the minimum qualification requirements for that position as specified in the TOR. CV must be in the format of Tech-6 and must be signed by the experts.

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REPORTING REQUIREMENTS AND PAYMENT SCHEDULE

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The consultant shall prepare the reports as described below. The contents of the report will include all relevant data, information, analysis and recommendations, but not limited to the contents mentioned in the following table. The reports will be provided in soft and hard copies.

SN	Reports, Documents and Deliverables	Percentage of contract price to be paid	Quantity	Deadline for submission
1	Inception Report: The report includes, but not limited to, a detailed methodology and approach for the study, break up of activities, a time frame, work plan, milestones, manning schedule and a list of outputs of the study (as described in Task-1);	10%	10 copies	Within 21 days of commencement
2	Review of LGED's Contracting Practices and Industry Survey as specified in Task-2;	5%	10 copies	Within 2 months of commencement
3	Report on Economic analysis, Surveys, and Preliminary Design of subprojects as described in Task-3	10%	10 copies	Within 3 months of commencement
4	Report on Task-4 (Verified and Updated report) Environmental and Social Commitment Plan (ESCP), Environmental and Social Impact Assessment (ESIA), Environmental and Social Management Framework (ESMF), Resettlement Policy Framework (RPF), Land Acquisition Support Plan (LASP), Stakeholder Engagement Plan (SEP), Labor Management Procedure (LMP), and Small Ethnic Community Development Framework (SECDF) for the project and Environmental and Social Management Plan (ESMP), Resettlement Plan(s), and Small Ethnic Community Development Plan (SECDP) for the works packages for which detailed engineering design will be finalized before project appraisal by the World Bank. The deliveries should also touch upon Workers Occupational Health and Safety Plan, Community Health and Safety Plan, Traffic Management and Road Safety Plan, and Waste and Debris Management Plan for construction management.	5%	10 copies	Within 3 months of commencement
5	(a)Submission of detailed project reports (DPRs) and drawings as described in Task-5. Bath-1:300 Km of roads.	15%	3 sets for each road	Within 5 months of commencement
	(b)Submission of detailed project reports (DPRs) and drawings as described in Task-5. Bath-2:300 Km of roads.	15%	3 sets for each road	Within 6 months of commencement
	(c)Submission of detailed project reports (DPRs) and drawings as described in Task-5. Bath-3:400 Km of roads.	20%	3 sets for each road	Within 7 months of commencement
6	Final Report: The final report will incorporate in the views, ideas, comments received from the client, donor, compilation of all interim reports and others concerned on the draft final report include necessary maps, charts, graphs, recommendations.	20%	20 copies	15 days before completion

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Make available all deliverables in PDF format as well as the source files (e.g. WORD, GIS shape files, 3D CADD files, Excel files, etc.), and distribute to LGED, WB, and other partners as required via File Transfer Protocol (FTP) or other method using hyperlinks.

Prior to starting work on each report, the consultant shall submit a table of contents and rough content outline for LGED approval.

SUPPORT SERVICES AND COST ITEMS

The consultant will arrange necessary office accommodation on rental basis, consumables, furniture, fixtures, computers, photocopiers, vehicles on rental basis & their operating cost, and other necessary accessories, communications facilities, survey & investigation, travelling expenses, international travel, per diem allowances, supplies & stationery, printing, survey & investigation, data collection, holding workshops, etc. The relevant costs are to be included in the costs of the services as reimbursable in the financial proposal. Any cost item not specified in the Consultant's financial offer shall be deemed to have been covered in other cost items for which a price has been quoted.

Taylor