

goods are not delivered on time. On top of all these issues, the high cost of

unaddressed by the federal and provincial governments.

The government is least bothered to

issues was not enough.



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

Development Cooperation Implementation Division
Accelerating Transport and Trade Connectivity in Eastern South Asia–Nepal Phase 1 Project
Jwagal, Lalitpur

Request for Expression of Interest (REOI)

Notice No.: ACCESS/02/079-80

Date of Publication: 24th September, 2022

It is notified that Accelerating Transport and Trade Connectivity in Eastern South Asia–Nepal Phase 1 Project requested all the eligible consultants to submit expression of interest in providing the following services.

S.N.	Contract Identification No.	Service
1	ACCESS-DOR- BGC-QCBS- 01	Consultancy Services of (i) Detailed Engineering Survey and Design of Upgradation Works for Gorusinghe-Chanauta (19Km) highway section and associated Bridges, (ii) Environment Assessment for Upgradation Works for Gorusinghe-Chanauta (19Km) highway section and associated Bridges and (iii) Construction Supervision of Improvement/Widening of Butwal-Gorusinghe-Chanauta section (69Km) of East – West Highway.

Interested consultants may obtain Terms of Reference (TOR) for the mentioned assignment title and further detail relevant information from <https://dor.gov.np/home/notices>. Expression of Interest must be delivered in written form to the given address (in Person or by email) by 14th October 2022.

Project Director

Government of Nepal
Ministry of Physical Infrastructure and Transport
Department of Roads
Development Cooperation Implementation Division
Accelerating Transport and Trade Connectivity in Eastern South Asia (ACCESS)- Nepal Phase 1
Project

Notice No. : ACCESS/02/079-80

Contract Identification Number: ACCESS-DOR-BGC-QCBS-1

REQUEST FOR EXPRESSION OF INTEREST (REOI)

Consultancy Service for (i)**Detailed Engineering Survey and Design of Upgradation Works for Gorusinghe-Chanauta (19Km) Highway section and associated Bridges**, (ii) **Environment Assessment for Upgradation Works for Gorusinghe-Chanauta (19Km) highway section and associated Bridges** and (iii)**Construction Supervision of Improvement/Widening of Butwal-Gorusinghe-Chanauta section (69Km) of East –West Highway**

Name of project: **Accelerating Transport and Trade Connectivity in Eastern South Asia (ACCESS)- Nepal Phase 1 Project**

Credit No.: 7159-NP

The Government of Nepal has received financing from the World Bank toward the cost of **Accelerating Transport and Trade Connectivity in Eastern South Asia (ACCESS)- Nepal Phase 1 Project** and intends to apply part of the proceeds for consulting services. The Department of Roads intends to widen and Improve Butwal-Gorusinghe-Chanauta (69 Km) and Bridges in four lanes standards with all road safety features, foot over bridges, four lanes with service track and footpath in market areas as well as social and environmental enhancement measures.

The scopes of the consulting services are “(i)**Detailed Engineering Survey and Design of Upgradation Works for Gorusinghe-Chanauta (19Km) highway section and associated Bridges**, (ii) **Environment Assessment for Upgradation Works for Gorusinghe-Chanauta (19Km) highway section and associated Bridges** and (iii)**Construction Supervision of Improvement/Widening of Butwal-Gorusinghe-Chanauta section (69Km) of East –West Highway**”.

Anticipated date for commencement of the services is March 2023 and the tentative duration of the assignment is about 104 months. The detailed Terms of Reference (ToR) for the assignment are available in the website of the Department of Roads: **<https://dor.gov.np/home/notices>**.

The Consultant shall provide expert service for the scope of works described above. The Department of Roads, Development Cooperation Implementation Division 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 shortlisting criteria are:

- core business and years in business,
- Relevant experience of the Consulting Firm with similarity in nature, size, complexity
- Technical and Managerial Capability of the firm
- Experience of firm in the Multilateral Bank financed project

(Note- Consultants shall mention the work experience indicating consulting service amount, duration of the assignment, commencement and completion year. For Road Project, the consultant shall mention detailed features of the road including length and no. of lane.)

The attention of interested Consultants is drawn to paragraphs 3.14 and 3.16 - 3.17 of the World Bank's Procurement Regulations for IPF Borrowers, *fourth edition November 2020* setting forth the World Bank's policy on conflict of interest.

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, *fourth edition November 2020*

Consultants may associate with other firms to enhance their qualifications, but should indicate clearly whether the association is in the form of a joint venture and/or a sub-consultancy. In the case of a joint venture, all the partners in the joint venture shall be jointly and severally liable for the entire contract, if selected. A Consulting Firm is not permitted to form association as Sub - Consultant with more than 2 (Two) Lead Consulting Firms. The Consultants' association, not stated clearly, shall be considered in the form of sub- consultancy.

Interested Consultant may obtain further information about the service at the address below during office hour.

Expression of interest must be delivered in written form to the address below on or before **14th October, 2022** , 15:00 hours local time.

Department of Roads
Development Cooperation Implementation Division
Accelerating Transport and Trade Connectivity in Eastern South Asia (ACCESS)- Nepal Phase 1
Project
Jwagal, Lalitpur
Tel: +977-1-5541686: Fax: +977-1-5542532
Email: dorfcbb@dor.gov.np

TERMS OF REFERENCE (TOR) FOR

1. Detailed Engineering Survey and Design of Upgradation Works for Gorusinghe-Chanauta (19Km) highway section and associated Bridges
2. Environment Assessment for Upgradation Works for Gorusinghe-Chanauta (19Km) highway section and associated Bridges.
3. Construction Supervision of Improvement/Widening of Butwal-Gorusinghe-Chanauta section (69Km) of East –West Highway

Under Accelerating Transport and Trade Connectivity in Eastern South Asia (ACCESS)

1. Background

More than 95 percent of Nepal's trade is via land, and 60 percent of trade is either with India or is routed through India, passing through three cross-border locations and two regional corridors. Trade in goods accounts for 40 percent of Nepal's GDP. Inefficiencies in connectivity and delays have directly impacted the competitiveness of Nepal's exports and economy.

With 95 percent of the land-traded goods passing through the East –West Highway (EWH) and the Kathmandu-Birgunj-Kolkata corridor, the South Asia Subregional Economic Cooperation (SASEC) Operational Plan identified the upgrading of the EWH as a priority project to enhance regional connectivity. ADB and WB are upgrading the eastern side of the EWH, and the WB has committed to support the upgrading of the western part between Butwal and Gaddachauki. The road is part of Asian Highway 2, which connects Nepal to India through Dodhara- Chandani border point on the western border of Nepal. Through link roads, the EWH also connects to India via its main cross-border points in Biratnagar, Birgunj, Bhairahawa and Nepalgunj. More efficient highway corridor development for seamless vehicle movement and congestion reduction is critical to help significantly reduce GHG emissions. Inclusive development as well as regeneration of the particularly dense and unplanned urban areas crossed along the project highway section from Butwal to Chanauta is also needed to provide communities with economic opportunities, safer infrastructure that is inclusive of non-motorized transport.

The engineering detailed design of Butwal-Gorusinghe section is in progress. Most engineering surveys have been completed and the final detailed design is expected by October 2022. Based on the preliminary findings, the review recommended that the upgrading incorporates an expressway design that enhances the free flow of traffic. The consultant will investigate an optimal design solution balancing cost, road safety, resilience, and level of service. The Government of Nepal under **Accelerating Transport and Trade Connectivity in Eastern South Asia (ACCESS) –Nepal Phase 1 Project** intends to hire consulting services for supervision of Butwal-Gorusinghe-Chanauta road section (69Km) as well as to conduct a detailed design of Gorusinghe-Chanauta(19 Km) road improvement works including Environment and Social Study and technical design review of Butwal-Gorusinghe Road section.

Government of Nepal, Ministry of Physical Infrastructure and Transport, Department of Roads, intends to apply portion of the proceeds (IDA Credit No. 7159-NP) to make payment under the contract for Consulting Services.

2. Objectives

The main objective of the consulting services (the Services) are :

Part I(a) – Detailed Design of Upgradation Works for Gorusinghe-Chanauta (19Km) highway section and associated Bridges.

It involves detailed engineering surveys, detailed investigations and detailed design for construction of roads, bridges, animal crossing and level crossing for the upgradation of 19km Gorusinghe-Chanauta section of EWH from existing two-lane to four-lane road standards along with detail design for construction of about 7 nos. of bridges within the section.

Part I(b) – Environment Assessment for Upgradation Works for Gorusinghe-Chanauta

(19Km) highway section and associated Bridges.

It involves social and environmental assessment (IEE) of Gorusinghe-Chanauta Road in accordance with GON's Environment Protection Act (EPA), 2076 and Environment Protection Regulation (EPR), 2077.

Part II Construction Supervision of Improvement/Upgrading of Butwal-Gorusinghe-Chanauta section (69Km) of EWH

It includes verification and updating of Design and Construction Supervision for improvement/widening of Butwal-Gorusinghe-Chanauta section (69Km) of EWH during construction and maintenance period as well as supporting the implementation of the project Resettlement Action Plan (RAP), Environmental and Social Management Plan (ESMP) and Environmental and Social Safeguard aspects.

3. Scope of Services

To fulfill the main objectives as defined above the main scope of services for the consulting services are:

A. Part I(a) – Detailed Design of Upgradation Works for Gorusinghe-Chanauta (19Km) highway section and associated Bridges.

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3.1.1 General Scope of Services

The consultancy services will include but not necessarily be limited to the following:

- a. The Consultant shall refer to relevant documents for the Upgradation of the road for investigation and recommendations for the alignments including bridges and other road related structures in terms of socio-economic factors of the influence area, traffic, topography, geology, climate resilience, environmental and social aspects, soil and other related factors along the alignment with maps, sketches wherever necessary for the detailed engineering survey, investigations and design.
- b. The Consultant shall thoroughly inspect the existing road sections including bridges and structures, including geometric features, and type and condition of drainage structures, River Training Works/Protection works and other major features and shall prepare a report about their condition including all the parameters in the *Standard Condition Assessment Format*. The condition and structural assessment survey shall be carried out under close supervision of senior experts of the Consultant.
- c. The Consultant shall carry out engineering surveys and investigations, including topographic surveys, as required to prepare detailed engineering designs, drawings as appropriate to prepare bills of quantities within reasonable accuracy.
- d. The Consultant shall take into consideration the necessary environmental and social studies

with due consultations with relevant stakeholders and with separate *ESIA Consultant*, during the design processes, and identify sensitive areas and features such as climate vulnerability, wildlife corridors, cultural heritages, natural habitats and/or critical habitats etc. as well as screen for potential direct, indirect and induced impacts, and define required mitigation measures as part of the design including cost.

- e. The Consultant will coordinate, interact, and share information on design and assessment on environment and social aspects with the *Environment Assessment (EA) teams*. Integration of environmental and social findings and recommendations in the technical design, cost estimate and bid documents is very important. For better coordination the Consultant, besides regular meetings and sharing of data / information, shall be needed to organize workshops, consultation/ dialogues with stakeholders, joint working sessions with *EA team*.
- f. The Consultant shall prepare detail design and drawings for the road pavement sections, retaining structures, slope protection measures, drains, cross drainages structures, bridges and intersections, flyovers, noise barrier walls, and all other items necessary for construction of a safe, efficient, resilient and inclusive road; applying sound engineering practices and integrating environmental and social measures in accordance with the ESIA/ESMP prepared separately and the World Bank ESF and Government's related regulations and policies.
- g. The Consultant shall identify sources, quarry sites and borrow areas, undertake field and laboratory testing of the materials to determine their suitability for various components of the work and establish quality and quantity of various construction materials and recommend their use based on techno-economic principles. The Consultant shall prepare mass haul diagram for haulage purposes giving quarry charts indicating the location of suggested/selected borrow areas, quarries and the respective estimated quantities.
- h. The Consultant shall collect details of important physical features along the alignment affecting the proposed project activities and should normally include buildings and structures, monuments, burial grounds, cremation grounds, places of worship, railway lines (existing/planned), stream/ river/ canal, water mains, sewers, crossings, trees, plantations, utility services such as electric and telephone lines and poles, existing/planned optical fiber cables (OFC) etc. within the designated right-of-way of the road.
- i. The Consultant shall conduct hydrographic survey, utility survey, identification of Underground Structures and Other Obstacles Structure. Preconstruction Survey shall be carried out throughout proposed/agreed alignment.
- j. The Consultant shall conduct road safety audit and carry out assessment analysis and incorporate the findings and recommendations into the detailed designs. The Consultant is required to follow the state of art/ technology in managing/improving the road safety in design for road and bridges including other interventions. The Consultant shall also make assessment and make sufficient provisions for managing road safety aspects and traffic management during construction including work-zone safety protocols, that to be included in the bidding documents.
- k. The Consultant shall adopt practical and cost-effective geometric (horizontal, vertical, intersection etc.) designs and pavement structural designs based on projected traffic levels, pavement structure studies, axle-load considerations, considering previous studies, traffic safety, environmental and social impact assessment, biodiversity management plan including relevant input and information.
- l. The Consultant shall prepare detailed designs and drawings for major intersections and

- junctions with safety features based on international best practice.
- m. The Consultant shall prepare drone survey video of current status of road section and bridges including other structures throughout the road so that it could be compared to the status after project implementation.
 - n. The Consultant shall prepare a short, animated video of road, bridges and intersections presenting the details of designs, features, concepts, traffic flow etc. with voice over and music appropriately. The Consultant shall prepare design visualization, still images and videos of proposed roadway and bridges.
 - o. The Consultant shall determine the most cost-effective improvement option for the proposed road section. The Consultant shall prepare a Pavement Preservation Schedule and Instruction Manual adopting the latest technology in pavement management with forecast future maintenance needs that presents the most cost-effective overlay, crack sealing, and other treatments at the right times, to extend the life of the pavement for as long as possible in a cost-effective manner.
 - p. The Consultant shall study the hydrological regime in detail, based on the catchment area, a vulnerability assessment and analysis of rainfall and flood records and future projections, supplemented by engineering field investigations, to establish the adequacy of road embankment levels at bridge approach road embankments, culverts, and side ditches, and design bed and slope protection for the drainage structures and bridges.
 - q. The Consultant shall assess possible use of water from roads for productive use in safe manner plus recharge and the design shall include provisioning of necessary crossing structures like culverts in consultation with local people, especially where roads pass through existing/potential agriculture areas.
 - r. The Consultant shall assess cross-drainage structure requirements and propose new additional structures (bridges, culverts, and causeways as appropriate) or improvements/replacement to structurally unsound structures, if any, considering these structures would also serve as wildlife crossing
 - s. The Consultant shall conduct detailed geotechnical field investigations (also showing possible locations of natural springs / wells / sand boiling), materials laboratory analyses, and prepare geotechnical design recommendations with bore logs as necessary to facilitate the resilient design of bridges and other structures.
 - t. The Consultant shall prepare record of inventory of geologically sensitive areas like slip prone areas, areas subject to landslides, rock fall, erosion, activity etc.
 - u. The Consultant shall prepare detailed plan for slope stabilization of existing as well as potential landslide areas, with detailed engineering for proposed civil engineering structures and bio-engineering measures, prepare costs estimates and include them in bills of quantities. Similarly, the Consultant shall also prepare detailed plans for roadside development activities, including plantation of trees and shrubs in urban and non-urban locations, proposing maintenance for such measures and prepare cost estimates and include them in bills of quantities.
 - v. The Consultant shall prepare and document standard and technical specifications for each work item, considering of relevant specifications and best practices in use in the country and internationally for similar works and relevant environmental and social measures based on the ESIA/ESMP and related plans.
 - w. The Consultant shall prepare detailed engineering designs of road, pavement, bridges and other

- structures, and bills of quantities, and evaluate engineering, environmental and social management costs estimate for civil works with details of foreign and local components input.
- x. The Consultant shall integrate, as appropriate, environmental, and social measures to avoid/minimize/ mitigate and offset adverse impacts into the detailed plans and designs and fully evaluate for cost for mitigation measures/interventions and include in Bill of Quantities and Bidding Documents etc.
 - y. The Consultant shall prepare the construction contract package.
 - z. The Consultant shall prepare and document a practical and resource-based project schedule considering the implementation of works with detailed analysis and graphical representation showing critical construction activities and floats using CPM/PERT which shall justify the project duration. The schedules shall accommodate seasonal climatic effects at the work site and consider typical outputs based on similar earlier road projects.
 - aa. Once the generic bid documents are discussed, agreed and finalized, the Consultant shall prepare and submit the bidding documents for each contract packages in soft copy (original version) and hard copy (5 sets).
 - bb. The Consultant shall conduct capacity development activities through regular interaction activities with the client team for the purpose of discussions and knowledge transfer on latest technologies, applied procedure, methods etc. on road/ bridge/other related structures' design & construction and current international practice on contract administration, contract management, disputes, and its resolution.
 - cc. The Consultant shall develop Project Quality Management Plan, monthly progress reporting and template (in compliance with the Contract Documents) for the Client's application during the Contract Management. A departmental review team within DoR will endorse these documents for implementation.
 - dd. The Consultant shall comply with the applicable Occupational Community Health and Safety (OCHS) Policies and Guidelines [available] or shall refer to suitable best practices and include the applicable provisions in the bidding documents. Furthermore, the Consultant shall ensure that any sub-service providers appointed by the Consultant also adheres to the applicable OCHS Policies, Manual and Guidelines.

3.1.2 Detailed Survey, Investigations, and Design of Upgradation Road and Bridge Works

a. Detailed Design of the Road Section

Detailed Survey, Investigations, and Design of Road shall be based on the recommendations agreed with DOR. The road design should accommodate the future generated traffic volume of at least 20 years considering it as a major highway in Nepal that joins East to West and trade routes linking Indian borders at South and China towards North. The required measures to address the concerns of environmental, social and road safety are to be incorporated in design.

In addition to the General Scope of Services the design shall also cover the Special features as listed below :

- i. The Consultant shall prepare the Detailed Engineering Design for execution of the upgradation of road works which shall include upgradation of road geometry, side drains, drainage structures, retaining and protection structures, slope stabilization and bioengineering works, road pavement works and miscellaneous ancillary works, such as toll facilities, rest areas,

fueling station, pedestrian overpasses/underpasses, road safety features, special structures such as underpasses/overpasses to facilitate wildlife and domestic animal movement, and other relevant design measures for a wildlife friendly road (informed by ESIA and guidelines for wildlife friendly linear infrastructure), etc.

- ii. Design should refer the Nepal Road Standard 2070 (2013), Pavement Guidelines, Bridge Design Standard and other relevant standards of Department of Roads, International Standards and Practices and engineering analysis and judgement.
- iii. All the design works shall be substantiated by design calculations and verified by international best practices especially for design of pavement thickness, retaining walls, cross drains, size and type of drains, capping layers for wet area and poor sub-grade strata.
- iv. As regards road safety, the Consultant should:
 - a) Review present practices followed in the highways on road safety issue and recommend site specific upgradations, where necessary.
 - b) Identify road location stretches requiring Upgradation works for road safety and prepare appropriate and cost-effective designs.
 - c) Identify the requirement of safety measures along the bridges and prepare the appropriate cost- effective designs
 - d) Incorporate road safety measures in the design based on international Research outcomes and Road safety audit or assessment Report. Incorporate the international best practices on road safety treatments with a particular focus on safety treatments for (a) head on crashes, (b) run off the road crashes, considering both the daytime and night traffic.
 - e) Identify the requirement of safety Crash Barriers along the vulnerable sections and other safety measures as necessary including cats eyes and reflective paints at permanent structures.
 - f) Identify the stretches, places and prepare appropriate plans for conducting awareness program for drivers, public, and children on road safety (considering stakeholder feedback through the consultation process).
 - g) Design suitable traffic safety features and road furniture including traffic signals, signs, markings, overhead sign boards, crash barriers, delineators etc. The locations of these features shall be identified and detailed in the reports and shown in the drawings, according to international standards including amendment in DoR standards for road signs, if necessary.
 - h) Identify the requirement of safety measures along the bridges and proper recommendation for the design and Upgradation in existing bridges.
 - i) Evaluate construction-related traffic management and road safety issues and propose a plan to address road safety concerns during the construction/upgrading phase of recommended upgradation works for road segments and bridges.
 - j) Prepare a detailed prioritized activity plan for each road section to address the road safety issues identified/ encountered during the safety audit, which may include structural/design recommendations, awareness raising and educational campaigns, emergency response plans and measures, institutional aspects / institutional strengthening measures to conduct monitoring and enforcement, provide emergency response in case of accidents, etc. (taking into account stakeholder feedback as appropriate through the consultation process).

- k) Prepare a plan for effective post-crash response mechanism development considering both humanitarian and physical aspects.
- v. Design shall consider the intersections at major junctions at areas like Chanauta, Gorusinghe and other locations as necessary to maintain a Level of Service (LOS) B at the design speed of 100 kmph, referring to relevant International Standards and Practices.
- vi. Design shall consider the provision of controlled access lanes at market areas and multiple lanes shall be separated by standard median throughout with greenery plans. Designs should consider the physical treatments for speed reductions in the urban areas of the corridor.
- vii. Design shall consider the provision of separated footpaths, railings and pedestrian crossings (taking into account stakeholder feedback through the road safety consultation process) at market areas considering the concept of “universal access” and equality to all road users.
- viii. Design should consider providing holding lanes, entry lanes and exit lanes at suitable locations as per the suggestions of the stakeholders’ consultation during ESIA study, referring to the relevant International Standards and Practices
- ix. The road alignment should be properly designed harmonizing to the highway standards accordingly.
- x. The Consultant shall design suitable Bus bays/stops, Truck lay byes, weighing stations, parking areas, rest areas, pedestrian crossings, wildlife crossings, noise barrier walls, and other ancillary items and prepare suitable separate designs. Rigid Pavement or any other appropriate pavement should be considered at the bus-bays/ parking lots. The bus stops/stations shall be spacious, with shades, chairs, friendly to differently abled people, accommodating several components like Digital Information boards, Digital maps and information, Restrooms (gender friendly), cabin for Security personnel etc.
- xi. All the design works must follow the requirement and standard acceptable to DoR and should be based on current proven and accepted national and international practices.
- xii. The Consultant shall use the data collected during the hydrological survey and determine the type of the cross-drainage structure and its capacity, roadside drainage, and subsurface drainage. Existing drainage structures should be used wherever possible.
- xiii. The Consultant shall prepare the design drawings with sufficient detail for bidding purpose and for execution of the construction works in appropriate size, scale, and format acceptable to DoR.
- xiv. Prepare appropriate and cost-effective designs, cost estimates, specifications.
- xv. Before finalizing the design drawings, the Consultant's team needs to agree the quality assurance procedures for finalizing design drawings with the DoR and the DoR forms a Departmental Team to finalize the design drawings with proper verification in the field by checking the alignment and verify the survey details and the design drawings with proper verification in the field by checking the alignment.
- xvi. Final design and drawings shall be prepared and submitted only after field verification and approval from DoR. The final design and drawings as well as other documents incorporate site-specific environmental mitigation measures.
- xvii. The Consultant shall furnish the important documents, reports, drawings and other necessary information in the DoR acceptable format in soft copies compatible with DoR’s Management Information System. At a minimum, all deliverables shall be furnished in both the original document format (for example, MS Word, Excel, AutoCAD, etc.), PDF format, and hard copies.

b. Detailed Design of the Bridges along Gorusinghe-Chanauta Road Section

- i. In the same manner as for the road sections, the detailed design of bridges will also require close collaboration with their ES teams along with separately contracted Environmental and Social Assessment Consultant.
- ii. The location of new bridges shall be chosen so as to eliminate the need to close the Mahendra Highway for any length of time, harmonize with the highway geometric standards, and ensuring the safety of the existing bridge.
- iii. The design of bridges should be carried out to enhance the capacity of bridges and other cross drainage structures to match the upgradation works to enhance the road capacity, resilience, and road safety, with consideration for additional widening, if cost effective.
- iv. The existing 7 bridges have varying carriageway widths of 5.6 m to 7m. The table in **Annex 1** lists the various features of bridges on this section.
- v. All bridges along the road section will be considered for new construction works. The design of the new bridges must be compatible with the proposed design relative to the upgradation works of the adjacent road section considering the geometry, geotechnical, road safety and road congestion studies. The Consultant should propose innovative ideas considering national context and the latest technology.
- vi. The design should be climate-resilient, safe, reliable, wildlife-friendly, and cost effective with maximum use of appropriate technology minimizing any environmental and social risks and impacts associated with new bridge construction and/or bridge dismantling. The type, feature and condition of existing bridges should be given due consideration while designing any alternatives. The design shall, at a minimum, consider the following factors:
 - Suitably matching to the upgraded road alignment.
 - Type, size, lane width and span of the proposed bridge.
 - Present condition of each component and general features of the existing bridge.
 - Load carrying capacity of the existing bridges.
 - Theoretical structural analysis of the existing bridges and its make.
 - Topography, locations, environmental sensitive areas such as wildlife corridors and surrounding land uses at bridge site.
 - Nature and structure of the soil underneath
 - Other structures in proximity to each bridge
 - Aesthetics of the surrounding area
 - Availability of space for traffic diversion for traffic management during construction
 - Road safety measures to be introduced after provision of proposed bridge
 - Climate resilience and robustness
 - Constructability and site-specific construction methodology to be adopted for new bridges
 - Time to construct
 - Use of Precast superstructure construction technology, where feasible
 - River training and other protection works required
 - Social and environmental issues and mitigation measures as identified in the ESIA/

- ESMP and related plans such as the biodiversity management plan
 - Road users and pedestrians' expectations
 - Other information as needed
- vii. Alternative design options should be presented, discussed, and the best option to be finalized based on the consultation and discussion with the DoR. The final report should document the process of identification and assessment/ranking of all alternatives considered related to bridges and justifying the proposed best alternative.

3.1.3 Additional Specification: Design Characteristics and Expected Surveys

a. Climate Resilient and Inclusive Design

Given extreme climate and weather uncertainties in Nepal, the Consultant shall consider climate and weather resilience in all aspects of the detailed design, and especially in bridge and drainage design. At a minimum, consider: i) innovative bio-engineering and nature-based solutions where possible, i) scour protection at all substructure units and streambanks adjacent to abutments beyond that which is normally required by standard, iii) river training works, iv) additional freeboard to account for hydrologic and design flow uncertainty due to catchment area conditions and climate change, v) design bridges, culverts, and approaches to withstand overtopping, vi) ensuring that all drainage structures are designed to be self-cleaning to the extent possible, vii) oversizing large culverts to provide an additional factor of safety and potential wildlife crossing, viii) additional wildlife crossing such as underpass and overpass and iv) adopt preventative measures in design including public awareness program to avoid public misuse of bridges underneath through depositing market garbage / toileting at bearing platform in bridge abutment head particularly on bridges which are close to urban locations. The Consultant is required to add these or similar recommendations in the report accordingly.

Inclusive design (also called universal access design) makes places usable by everyone, regardless of age, ability and circumstance. It is based on the simple principle that designing for the widest range of people creates better designs and benefits everyone. The road and bridge detailed design should ensure that the proposed infrastructure is more inclusive and amenable, particularly to pedestrians and cyclists.

b. Design of Road

Design of Road shall include the following:

- i. Design of the vertical and horizontal alignment for a design speeds appropriate as per NRS 2070 and subsequent revision if any.
- ii. Design of highway cross-section. Drawings shall include proposed vs. existing cross sections every 20m.
- iii. Based on the data collected from reconnaissance and topographic surveys, the sections with geometric deficiencies, if any, should be identified and suitable measures for improvement should be suggested for implementation.
- iv. The data on accident statistics should be compiled and reported showing accident type and frequency so that black spots are identified along the project road section. The possible causes of accidents should be investigated into and suitable cost-effective remedial measures suggested for implementation.

- v. Inclusion of 2 x additional ducts at signalized intersection crossings to allow for the installation of services such as fiber optical telecommunication lines in the future.
- vi. Design of cut and fill slopes.
- vii. Structural design of retaining structures (Gabion, Masonry, Plum concrete, etc.).
- viii. Structural design of all RCC structures (including of bridges, grade separated interchanges and underpasses).
- ix. Slope protection, bio-engineering and green road.
- x. Service lanes along settlement areas and bus bays.
- xi. Identification and design of road crossings for pedestrians and Vehicles from one side of road to another side.
- xii. Identification and design of wildlife passes/crossings.
- xiii. Identification of roadside service area and its design like bus lay by, weighing stations etc.
- xiv. Production of design drawings (A0 size or appropriate) showing plan in 1:1000 scale, Longitudinal profile in 1000H to 200 or 100V scale, cross-sections at 20 m interval in 1:200 or 1:100 scale

Road alignment designed on Digital Terrain Model (DTM) shall be set out at the site with staking the central line and taking levels with verification of design. The Consultant may use internationally recognized software for the road and bridge design. However, availing the software for the design purpose and any errors arising thereof during construction shall be the responsibility of the Consultant. All the coordinates in the drawings shall be in reference to the coordinate value acquired from Department of Survey.

c. Design of Pavement

While designing the pavements, the Consultant shall:

- i. Maximize the use of existing pavement layers (scrapping only in case of strength deficiency)
- ii. Design axle load as per NRS 2070.
- iii. Design shall consider the AADT data which needs to be collected by the Consultant at the junction/road sections, direct traffic counting at critical junctions.
- iv. Design of pavement on the bridges and approach roads.

The pavement design task shall also cover working out the maintenance and strengthening requirements and periodicity and timing of such treatments predicted through a Pavement Performance Curve developed for given pavement type, traffic, etc.

d. Design of Drainage Structures

While designing the drainage structures, the Consultant shall use the data collected during the hydrological survey, road safety audit and wildlife habitats and migration corridor/pattern and determine the following:

- i. Type of surface and sub-surface drain
- ii. Type of the cross-drainage structure
- iii. Structural design of slab and box culverts
- iv. Size and location of road-side drainage and cross drainage structures (appropriate side drains and cross drainages such as pipe culverts);

- v. Design of the water conduit/rainwater inlets/manholes to take storm water safely to the nearby natural stream
- vi. Maximize the use of the existing structures
- vii. Retrofit safety measures in existing culverts while upgrading to 4 lane.

The Consultant shall also prepare drainage layouts on a plan scale of 1:1000, showing all drainage structures and contours of road surface and surrounding landscape.

e. Design of Bridges

Based on the collected information and results of the discussions mentioned above, the Consultant shall design the bridges following the standard codes of practice, norms and guidelines acceptable to the DoR. In addition, the designer shall take into considerations of general aesthetics and architectural perspectives of the bridges to be designed. In respect of span arrangement and type of bridge at least three different alternatives (functionally and structurally) with cost benefit analysis considering environmental and social aspects (including wildlife habitat and behavior) shall be submitted to the client with recommendation of best alternate for each and every bridge.

The Consultant shall conduct a thorough condition survey of existing Bridges and estimate the remaining life of the bridges. The Consultant shall assess the need for strengthening/rehabilitation of existing bridges or for bridge replacement/new construction. Then, the Consultant shall study the possibility of construction of the following alternatives:

- i. Singular 4-lane bridge
 - ii. Singular two-lane bridge on either side of the existing bridge
 - iii. Two separate singular two-lane bridges
- Each option above to be presented with detailed cost benefit analysis and a report to Client for approval.
 - The Consultant shall prepare General Arrangement Drawing (GAD) and Alignment Plan showing the salient features of the bridges and structures proposed to be constructed/ reconstructed along the road sections covered under the Study. The width of bridges shall be double lane or 4 lanes (depending upon the width of the road) with footpath. The Consultant shall also carry out the design and make suitable recommendations for protection works for Bridges as well as river training works. The design of bridge shall also include design of approach road with proper geometric design to connect with existing road alignment including road safety provision.
 - Utilize hydraulic modeling software (e.g., HEC-RAS, various 2D modeling solutions) to inform design and to analyze scour potential at and near bridge substructure units (for example abutments, piers, and bents) given climate risks and include climate resilient scour mitigation measures in design. Develop a cohesive strategy for the movement or restriction of movement of water underneath the roadway embankment, in accordance with DOR standards and international best practices, and incorporate into design.
 - The Consultant shall produce detailed quantity estimate of the bridge and its accessories. They shall collect information on sources of materials and their lead distances and prepare rate schedules and cost estimates based on the standard norms and prevailing district rates.
 - All activities related to field studies, design and documentation shall be done as per the latest guidelines, standard codes of practice (Nepal Bridge Standards) and norms. The Consultant shall

work in close coordination with the Bridge Branch of Department of Roads in all design steps.

- Each design shall be site specific and comprehensive comprising design drawings for all components of a bridge including designs for all ancillary activities such as false works, road safety measures, approach roads, river protection works, and slope treatment works including bio-engineering works. The DoR design review and check team shall confirm the appropriateness of each ancillary provisions and their design standards.
- The design Consultant is required to liaise and cooperate in a proactive manner with the DoR Bridge Branch and Bridge Design Checking Expert (as available), supplying design information for checking in accordance with an agreed schedule. It is the design Consultant's responsibility to resolve all technical issues raised by the checking expert (as available) and DoR relating to the design to get the approval from DoR.

f. Topographical survey and mapping

The topographical survey shall collect adequate data to show the following details in the subsequent topographical map:

- i. Topography survey with details such as: trees & forest, water bodies, wildlife habitat and movement corridors, sacred/ cultural & religious sites (including natural features with cultural values, e.g., trees, cliffs, etc.), existing infrastructures and other land features
- ii. Existing road details such as: formation width, paved area, access roads, bus bays, footpath, parking places, traffic signs, islands, signals and right of way (RoW) limits (Buildings, Taharas, shops etc.)
- iii. Details of existing cross-drainage structure details (including wildlife crossing if any) such as: length, width and heights of culverts, bridges, details about bridge spans, pier, abutment, railing and vertical clearances, existing access under the bridge, river training works and riverbank structure details
- iv. Existing power line (electricity transmission line) alignments and elevations (if buried) such as: high-tension poles, low-tension poles, transformers, sub stations, Streetlights poles, underground electrical supply (if any) etc.
- v. Existing telecommunication alignments and elevations (if buried) such as: telephone lines, poles, cabinets, towers, and underground lines (if any)
- vi. Existing water supply line details such as: supply mains, distribution lines, valves, valve chambers, underground water storage, fire hydrants, etc.
- vii. Existing sewer line details such as: trunk sewers, branches, manholes, location/position of septic tank and soak pit of the adjacent building on both sides of road within the RoW
- viii. Existing buildings and structures details such as: religious shrines, tangible cultural heritage, community building governmental building, and residential building, type of foundation and tentative depth of foundation of the building
- ix. Existing or potential flood prone zones/ spots, low laying areas and riverbank cutting areas
- x. Survey and Production of a map of a minimum 100 m wide road corridor in 1:1000 scale and with 0.20m contour interval and clearly showing the centerline of existing roads and all features. The Consultant may consider and propose wider bandwidth or

additional survey areas, if necessary, for design.

While conducting Survey works, the survey team should be accompanied by a highway engineer. The Consultant shall acquire the reference coordinate points from the Department of Surveys and referencing of all the survey works shall be made on these references. It should establish benchmarks at every 300m along the road and on both sides of the riverbanks in case of bridges.

While conducting the topographical survey for bridge design, the survey area should cover a minimum distance of 500m upstream, 200m downstream and 200m from the riverbanks on either side of the river at the proposed bridge site or more, if necessary, for analysis and design. In case of the topographical survey of the bridge site, the topographic map should show the following:

- a) Contours at 0.2 m intervals
- b) Flood lines on either side of the river in the entire area surveyed
- c) Both banks of the river
- d) River cross section at 25 m intervals, or less if required for modeling, analysis, and/or design, one cross section along the proposed bridge axis showing cross profile of 1m interval using suitable method
- e) Details of government and/or public establishments on the riverbanks, details of existing river training works (if any)
- f) Traverse lines, benchmarks reference lines and/or points with respect to which the present topo map is prepared
- g) The angle and direction of skew if the bridge is proposed to be aligned skew
- h) The foundation type and zone of influence of the existing foundation of the bridge or any other structures adjacent to the proposed bridge site.
- i) Other information relevant to design, construction and/or maintenance of the bridge.

g. Hydrological survey

For determination of all design data the Consultant shall carry out a detailed hydrological survey and study of the river and bridge sites, which shall include the following:

- i. Catchment area of the river up to bridge site
- ii. Nature, size, and quantities of debris carried by the river
- iii. Intensity, duration, and distribution of rain in the catchment
- iv. Existing bridge or other hydraulic structures across the river in the vicinity of the proposed bridge site with their details as much as possible
- v. General slope of the river from the critical point (origin) of the river up to bridge site and general slope of the catchment in both sides of the river
- vi. Cross sections covering 100m on either side. Beyond flood lines of the river at proposed bridge site, at about 500m. u/s and about 200m d/s, wherein HFL, LWL, LBL, area of the cross section, wetted perimeter, and geological profile with silt factor of each strata (at proposed bridge site only) shall be indicated. (Horizontal and vertical scale of the cross section shall be the same.);
- vii. Bed slope of the river which must start from 100m up of the U/S cross section and end at 100 m. down of the d/s. cross section
- viii. Maximum discharge calculated by established formulas with different return periods and the peak discharge observed over a period of 100 years; This

- ix. Velocity and depth of flow at the time of survey
- x. Shifting of the river in the past at proposed bridge site and in its vicinity
- xi. River-bed degradation or aggradation (covering 500 m upstream and 500 m downstream)
- xii. Use of river as migration corridor of wildlife and fisheries
- xiii. Other information required for river control, design, construction, and maintenance of the bridge.

The hydrological survey shall collect secondary data, preferably from the governmental sources, to determine the following:

- i. Unit hydrograph for the catchment of River for bridge construction
- ii. Size of the opening and location of cross drainage structure
- iii. Minimize modification to the natural drainage pattern

After the selection of the proposed bridge site with alternatives and preparation of topographic maps, the Consultant shall discuss the collected hydrological and other data and decide the following points with the client for final decision of the bridge site:

- i. Design discharge
- ii. Scour depth, Maximum Scour depth
- iii. Linear waterway needed to be provided
- iv. Anticipated soil condition for foundation
- v. The most feasible proposed bridge site
- vi. River- training & approach roads
- vii. Type of proposed foundation, substructure, and superstructure

The Consultant shall also carry out a detailed hydrological survey and study along the road alignments and identify catchment, discharge in drain, cross drainage, seepage area etc.

h. Geotechnical Survey

For the pavement design, structures and buildings, the following geotechnical tests should be performed as per site requirement:

- i. Determine the sub-soil condition through pitting (1mx1mx1m) and Dynamic Cone Penetration (DCP) tests at every 500m along the road section and adding necessary locations to determine.
 - in-situ density and moisture content, Characterization (grain size and Atterberg limits) and field CBR using DCP at each test pit,
 - Laboratory moisture-density characteristics (modified AASHTO compaction) and Laboratory CBR as well as swelling test
- ii. Determine the sub-soil condition through 2m deep pitting and DCP test at each 25 m interval where a retaining wall of height more than 3 m is required.
- iii. Determine the stability of the cut slopes using appropriate stability analysis or through study, field surveys and investigation of materials at site.
- iv. Conduct other tests as required by the geological, geotechnical survey and study.
- v. Benkelman Beam test for existing pavement evaluation (if necessary).

For the design of the bridges, the Consultant should conduct sub surface exploration. The subsurface exploration shall include the following:

a) Test pits and auguring

Test pits and auger-holes in the riverbed to a depth as required by the site condition or scouring criteria of the river shall be made and the required samples shall be taken for lab testing.

b) Bore-holes, field tests and laboratory tests

The properties of the underlying soil are determined by field and laboratory tests of the soil samples obtained from the boreholes drilled to a depth as mentioned in the next paragraph. As far as possible, the locations of the boreholes shall be under each abutment and piers. Generally, the tests listed in Table 2 are conducted for determination of soil properties:

Table 2: Type of tests and sampling frequency

SN	Type of Tests	Sampling Frequency
1	Undisturbed Soil Sampling	at least 2 at each borehole
2	Standard Penetration Test	as required but the interval not less than 1.5
3	Grain size analysis	at least 2 at each borehole
4	Hydrometer analysis	at least 2 at each borehole
5	Moisture content	at least 2 at each borehole
6	Bulk and dry density	at least 2 at each borehole
7	Unconfined compression test	at least 2 at each borehole
8	Consolidation test	at least 2 at each borehole
9	Direct shear test	at least 2 at each borehole

c) Depth of soil exploration

The depth of soil exploration from ground level shall be as follows (Table 3):

Table 3: Tentative depths of soil exploration

SN	Type of soil	Governing depth
1	Silty, sandy, clayey soil	3 times the design scour depth, or 1.5 times the least dimension of the foundation footing, or 25 m, whichever is maximum
2	Granular soil (gravels, boulders)	dimension of the foundation footing, or 20 m, whichever is maximum
3	Rocks (soft or hard)	Not exceeding 8 m and minimum 5 m

The above-mentioned depths are indicative. The Consultant shall decide the actual required depth of soil investigation according to the field condition and design parameters. If rock is found at the beginning or at mid-depth, then the drilling works shall not exceed the depth as mentioned in the table above.

d) Changes in soil strata

During the boring, if there is any change of soil strata, the number of sampling of soils for different tests will be increased and the Consultant shall carry out the entire test required for each layer of soil. No additional payments will be made for such tests.

e) Soil exploration works to be certified

The client, if required, may ask the Consultant to submit the soil/rock samples obtained from the drilling works in core boxes and/or a bore-log certified by the concerned personnel at site. The Consultant shall take site photographs, video, or other documentation as appropriate for all site investigation, surveys and studies.

i. Seismological Study

The Consultant shall collect and refer to the available data regarding the seismic records of the area. The Consultant shall conduct seismic vulnerability analysis of all roads and structures and incorporate the findings in the design. While considering seismic forces on the bridge design, the Indian Standard Criteria for Earthquake Resistant Design of Structures, IRC: 6 along with other international codes may be followed.

j. Material Availability Survey

The Consultant shall conduct material availability survey and study for sand, gravel, boulders, timber, etc. with their engineering properties, quantities and lead up to the road works site and bridge site. Quarry site of materials with their available quantities should be shown on a sketch plan with reference to bridge /road construction site. It shall determine the quality and quantity of the materials required for construction. The availability of the necessary material shall be surveyed to determine the following:

- i. Suitable quarry site for boulder, sub-base/base/pavement aggregates, concrete aggregates, sand, fill materials
- ii. Material to be transported from elsewhere
- iii. Material to be imported from outside Nepal, their source and route of transport
- iv. Source of water for construction, location of boring if ground water to be used

The Consultants will assess local capacity to produce adequate material for the different phases of the constructions and based on this assessment they will make recommendations to use existing quarries and/or to open new quarries. Procedures associated with the opening of new quarries should be detailed, when necessary, in coordination with the ESIA consultant.

The Consultant shall prepare mass haul diagram for haulage purposes giving quarry charts indicating the location of suggested/selected borrow areas, quarries, and the respective estimated quantities.

k. Traffic Study and Analysis, Axle Load Survey

For the design purpose, the traffic study at the critical points and intersection shall be made. Conduct traffic counts in strategic locations (e.g., adjacent to major junctions) along the Section, validate these counts against DoR data. The Consultant shall make traffic demand estimates and establish possible traffic growth rates in respect of all categories of vehicles, considering the past trends, annual population and real per capita growth rate, elasticity of transport demand in relation to income, estimated annual production increase. socio-economic development plans and the land use patterns of the region having impact on the traffic growth, the projections of vehicle, manufacturing industry in

the country, development plans for the other modes of transport, commodity movement behavior should also be considered while working out the traffic demand estimates, and other factors as appropriate. Consider peak hour volumes, peak hour factors, seasonal adjustment factors, passenger vehicle equivalent conversions, and other adjustments as appropriate to recommend widening scenarios.

Axle load surveys in both directions shall be carried out at suitable location(s) in the project road stretch on a random sample basis and deduce the result. While selecting the location(s) of axle load survey station(s), the locations of existing bridges with load restrictions, if any, should be considered and such sites should be avoided. The Consultant shall ascertain from local enquiries about the exceptional live loads that have used the highway in the past in order to assess the suitability of existing bridges to carry such loads.

Conduct turn movement volume counts at all major junctions and selected minor junctions with substantial traffic volume, as appropriate to inform design options and to incorporate into design. Junction survey information shall be collected and thoroughly analyzed prior to starting work on the detailed design. This is necessary to adequately inform access control decisions, which need to be made prior to the start of detailed design to avoid rework and design schedule delays. In-person surveys, community engagement, and coordination with E&S Consultant and others as appropriate to propose pedestrian crossing and other ancillary feature locations.

Based upon the above-mentioned studies and investigations, the Consultant shall make the best use of their technical know-how and professional skill to arrive at conclusion and recommend the most cost-effective design parameters. The Consultant shall discuss with comparative study in detail all possible options and shall recommend the most appropriate option.

l. Condition Surveys for Bridges, Culverts and Structures

The Consultant shall thoroughly inspect the existing Bridges, Culverts (including wildlife crossing if any) and Structures and shall prepare a report about their condition including all the parameters in the approved format. The condition and structural assessment survey of the bridges/culverts/structures shall be carried out by senior experts of the Consultant for the bridges identified to be in a distressed condition based upon the visual condition survey, supplementary testing. Selection of tests may be made based on the specific requirement of the structure. The Consultant shall assess the maintenance intervention (matching with the Maintenance Classification and definition in practice under Bridge Improvement and Maintenance (BIMP) in the DoR) and the report shall include all necessary information regarding short, medium- and long-term works, work plan with the details regarding quantity, necessary specification, cost etc. The consultant shall use the *Standard Condition Assessment* format.

m. Inventory survey of Road and Roadside structures

The Consultant shall thoroughly survey existing alignment of Roads and prepare a detailed inventory report. The Consultant shall prepare detailed drawings of the existing alignments showing plan, profile, drainage, structures, cross-section, roadside barriers, and other details.

n. Design of Major Intersections

The Consultant shall conduct all traffic volume surveys, origin-destination surveys, and other surveys as necessary to inform the design of Major Intersections. The Consultant shall utilize one or more state of the art traffic modeling software packages (such as VISSIM, Synchro, SimTraffic, or others) to model the existing condition and proposed options using the traffic volumes and turn movements forecasted at different points in time. The Consultant shall Prepare and present short traffic simulation videos depicting options for each junction to the DOR.

The Consultant shall prepare drone survey video of status of road section and bridges including other structures throughout the road so that it could be compared to the status after project implementation.

o. Road Safety Audit, Traffic Safety Features, Road Furniture and Road Markings

- i. The Consultant shall conduct a complete road safety audit and analysis, and design suitable traffic safety features and road furniture including traffic signals, signs, markings, overhead sign boards, crash barriers, delineators etc. The locations of these features shall be given in the reports and shown in the drawings. The road safety audit shall consider forecasted crash numbers and severities, the cumulative economic costs of crashes without mitigation, and the costs and benefits of mitigations measures.
- ii. DPR shall undergo the exercise of Road Safety Audit through the Road Safety Auditor (separate from design team) and recommendations mentioned be incorporated.
- iii. All roadside signs and other furniture placed or retained within the proposed roadway clear zone shall be crashworthy or protected by roadside barrier.
- iv. Ensure that all auxiliary lanes (including turn lanes, ramp acceleration / deceleration lanes, and others) have adequate deceleration/acceleration length, storage length, and taper length in the design year to mitigate the risks of rear end collisions and traffic delays.
- v. Based on proposed site conditions, the Consultant shall conduct a thorough roadside barrier warranting process considering whether the hazard is within the clear zone, hazard severity, roadway geometrics, and an economic analysis.
- vi. The Consultant shall i) conduct a systematic and thorough safety analysis presenting existing deficiencies, ii) set road safety performance improvement goals for the designer to include during detailed design, iii) collect, analyze, forecast and consider vehicle crash/fatality history in developing the list of road safety mitigations.

p. Weighing Station, Market, Parking, and Rest Areas

The Consultant shall select suitable sites for weighing stations, parking areas and rest areas and prepare suitable separate designs in this regard. The common facilities like petrol pump, first-aid medical facilities, police office, restaurant, vehicle parking etc. should be included in the general layout for planning.

The Consultant should take into consideration the provisions for persons with disabilities in way side amenity centers /rest areas and provide ramp facilities, exit /entrance door with minimum clear opening of 900 mm and special toilet facilities for use of handicapped persons.

q. Utility shifting proposal and estimates

- a. *Identify type and location of all existing utilities within the proposed ROW*

The Consultant will review information available with all utilities agencies in the region, consult maps/plans available with DOR, Nepal Electricity Authority, Nepal Telecommunication Corporation (NTC) and other necessary bodies, consult with locals and municipal bodies to ascertain the presence and location of utilities and future plan, including but not limited to water-mains, telephone, electricity, and fiber-optic installations in and around the project road.

b. Plan for utilities in future road design

The Consultant is required to identify utilities that will require shifting to enable construction of the proposed project road. The Consultant shall incorporate space required for elevated and underground utilities corridors and utilities crossings as required for existing and future utilities in consultation with user departments.

c. Develop a utilities relocation plan

The Consultant is required to develop and submit a utilities relocation plan in consultation with DOR and user departments clearly identifying current utilities and suggested relocations along with crossings as required. The Consultant shall plan, and conduct discussions, consultations and joint site visits required for the planning of utilities shifting and the development of required drawings and proposals.

The Consultant shall prepare all necessary details including costing, documents, and suggested relocation plan to be submitted to user department and agreed with the user department for facilitating the upgradation of the road.

r. Procurement Assistance

Procurement of works shall be carried out in accordance with WB's Procurement Procedure or as agreed with DoR. The Consultant shall prepare bidding documents, necessary standard/special specifications, contract packaging and any other appropriate assistance.

s. Capacity Development

The consulting services shall include organizing in house, national training for capacity development of DoR personnel in different disciplines (Training should be conducted by each International key Expert on their respective topic for 5 days training each).

The Consultant shall propose the capacity development component in their technical proposal and include the cost in their financial proposal. The Consultant shall conduct at least 5 capacity development workshops.

t. Miscellaneous Studies/Investigations

If not covered by aforesaid, the Consultant shall perform other studies, explorations, tests surveys, calculations, etc. required to produce full and complete set of working drawings, specifications, bills of quantities, requirement of materials and complete cost estimates for the bridge/s including related works based upon which construction activities can be started to complete without further study and/or reference to them.

3.2 Part I.b. – Environment Assessment for Upgradation Works for Gorusinghe-Chanauta (19Km) highway section and associated Bridges.

The main objectives of the consulting services under Part III are to conduct Environmental and Social Assessment of the Gorusinghe-Chanauta Road section as per Government of Nepal's rules and regulation EPA, 2076 and EPR, 2077. A separate consulting firm or Individual consultants will be hired for preparing

Environment and Social Impact Assessment Study (ESIA) as per the World Bank ESF requirements. The consultants under this terms of reference need to support and provide the necessary information to the ESIA team that will be hired separately for the Bank's purposes of completing ESIA which incorporates all the requirements of the World Bank ESF:

3.2.1 Social Assessment

1. The consultants will carry out the following tasks but are not limited to:
 - i. Conduct 20% poverty & social assessment taking into account socioeconomic and poverty status of the project area of influence, including the nature, extent and determinants of poverty in the project area. Identify and estimate the likely socioeconomic and poverty reduction impacts of the project. Assess local demand for the proposed road investments, employment opportunities, child labor, affordability, gender specific capacity to take advantage of the likely socioeconomic opportunities that would result from the project.
 - ii. Identify project-related interests of key stakeholders, likely barriers to their participation in and benefiting from the project resources, and suggest possible strategies for addressing their concerns.
 - iii. Conduct studies by using participatory approaches. With the participation of stakeholders, identify and analyze the reasons behind the vulnerability of at risk groups, including their exposure to risks. Suggest participatory development strategies for key stakeholders to apply when designing and implementing the project.
 - iv. Prepare a gender analysis. Identify project design elements (policy, investment, or implementation) in which women can participate in and thus benefit from the project.
 - v. Conduct assessment of risks of human trafficking and HIV/AIDS due to the project. Provide suggestions for measures to be incorporated in the project to mitigate possible adverse impacts through human trafficking and HIV/AIDS, and identify possible partners for assisting in implementing such measures.
 - vi. Identify any necessary mitigation measures and a strategy for implementing them. Identify potential proactive measures, in terms of additional components and design options, which will make it easy for the poor and vulnerable to benefit from the project.
 - vii. In coordination with the economic analysis, design a time-bound benefit monitoring and evaluation program, including monitoring indicators and baseline data, to assess the project benefits to local communities before and after the construction of project. The program should address not only the economic benefits but also poverty reduction impacts and other social benefits such as stability of the region and integration with other parts of the country.

Submit a draft final Poverty and Social Analysis (PSA) report to DOR for review and comments. Incorporate comments and finalize the PSA accordingly.

3.2.2 Resettlement and Indigenous People Assessment

The consultants will carry out Resettlement and Indigenous People Planning of the project roads and bridges in accordance with World Bank ESF requirements as well as Government's acts, regulations and policies. The major tasks include, but are not limited to, the following:

- i. Conduct a preliminary social impact assessment for the project including assessment of possible land acquisition/resettlement impacts for the candidate road alignments in accordance with WB ESF requirements. Prepare and complete screening and impact categorization form for involuntary resettlement for the candidate road alignments.
- ii. Identify whether the project will be located in, or pass through, areas of significant indigenous people's settlements, and if this is the case propose how to specifically include indigenous peoples in project planning and implementation in accordance with WB ESF document. If relevant, make an

- overview of population characteristics in the project area and anticipate project impacts. Prepare and complete checklist for indigenous people screening and impact categorization for the candidate road alignments.
- iii. Prepare a resettlement action plan (RAP) as necessary acceptable to the Government in compliance with the WB's Safeguard Policy document ESF, and Government related acts and policies.
 - iv. Assess the Resettlement budget requirement for acquisition of land of different width from footprint of the road to the full Right of Way (ROW) of the road and recommend the best alternative.
 - v. Define categories for impact and eligibility of affected people for compensation and prepare a matrix of entitlements covering compensation and other assistance for all types of impacts to fully replace lost assets, income, and livelihood. Assess whether the compensation standards for all types of assets, crops, and trees are based on replacement value and discuss in detail the valuation methodology used.
 - vi. Prepare a comprehensive income and livelihood restoration program, supported by adequate budget, to help DPs improve, or at least restore, their incomes and livelihoods. Identify specific measures for the affected poor, ethnic minorities, or other vulnerable households.
 - vii. Ensure that (a) the compensation standards are based on replacement value, and (b) the overall resettlement budget is sufficient to implement the resettlement plan based on the proposed entitlements and rehabilitation plans.
 - viii. Assist Government officials to initiate and expand consultation with the affected communities, local leaders, proponents, and stakeholders who may be opposed to the Project. Prepare a consultation plan for the DOR and a format for documenting consultation with affected people.
 - ix. Assess the capacity of the Government in implementing the proposed RAP, recommend improvements and actions required before land acquisition, and proposed necessary training to enable the DOR and the Government to implement the RAP and assess the social and resettlement issues of the follow-on subprojects, if required. Assist the DOR to (i) prepare a resettlement implementation schedule, (ii) recruit NGO/Agency for RAP and IPP implementation (if required), and (iii) recruit consultants for external monitoring and evaluation.
 - x. Assist the DOR to develop a computerized database management system for recording DPs and lost assets. The system should reflect the present impact on DPs and accordingly the entitlements for DPs are planned. The system should be in place from the beginning of the resettlement survey.
 - xi. Develop cadastral mapping of affected plots for construction of the alignments using road inventory map developed under the engineering study. Also, prepare file map and trace map of individual plot of land that needs to be acquired.

3.2.3 Environmental Assessment

The consultants will carry out Environmental Assessment (EA) of the project roads and bridges in accordance with Government's acts, regulations and policies. The EA can require Environmental Impact Assessments (EIA) or Initial Environmental Examination s(IEE) as the case may be. The major tasks include, but are not limited to, the following:

- i. In accordance with Government's notification on Environmental Impact Assessment (EIA), review and confirm the environmental classification of the project, and indicate which sections pass through National Park (NP), Wildlife Sanctuary (WS), other Sanctuary (S), and reserve forest if any. From the review, prepare a summary matrix for environmental classification, showing the length of sections passing through NP, WS, S, or RF areas, necessary environment-related information, and environmental classification;
- ii. If the project is classified as listed in 'Annex 3' of EPR, 2077, draft terms of reference for the EIA study and scoping, to be submitted to the Ministry concerned for approval. After the approval of the TOR and scoping for the EIA study, undertake the EIA study and prepare an EIA report. The Consultant will lay special emphasis to induced/cumulative impacts of the projects and estimate and

- analyze climate change impacts while assessing the environmental sustainability of the proposed project designs;
- iii. If the project is classified as listed in ‘Annex 2’ of EPR, 2077, undertake IEE study and prepare an IEE report including an environment management plan (EMP) in accordance with EPR, 2077;
 - iv. Carry out a climate risk and vulnerability assessment (CRVA) for projects with medium or high climate risk. If the project passes through ecologically sensitive areas, collect necessary primary data on ecology (vegetation analysis, rapid assessment on biodiversity) needs to be used as a basis for predicting the environmental impacts;
 - v. Ensure that the IEE/EIA study be carried out by taking into account Government’s EA guidelines, and that the EI/IEEA report and its summary be prepared in accordance with the EPR, 2077. The study has to cover project area and affected area, and provide assessment of impacts, analysis of alternatives, environmentally sensitive regions, loss of biodiversity, suitable mitigation measures, adequate consultation with affected people, and a proper management plan;
 - vi. Analyze greenhouse gas emission levels in the project cycle, and recommend technically and financially feasible and cost-effective options to reduce or offset project-related greenhouse gas emissions during project design, construction and operation;
 - vii. Recommend occupational and community health and safety measures, and proper Grievance Redress Mechanism for the affected people in the course of the project cycle;
 - viii. Finalize EIA or IEE report including EMPs and their summaries, as required. Prior to finalization, draft reports should be submitted to DOR for review.
 - ix. Environmental Assessment (EA) report should perform census study while performing biological survey and should mention the details of each tree including; GPS position, name of species, diameter, height and category of timber and should be clearly provided in annex of the report.
 - x. Details of chainage wise information for each community forest/national forest/government forest trees be clearly mentioned and loss from each category should be reported clearly.
 - xi. The consultant shall work in close coordination with respective district forest office during field survey specially in case of tree counting and should submit its proof in the EA report.
 - xii. The location of the project structures/facilities should be clearly mentioned in the EA report showing in colored topographic and google maps with proper scaling.
 - xiii. There should have coherency in the design report and the EA report.
 - xiv. Environmental Management Plan should be precise and applicable as per Nepalese standards/norms.

3.2.4 Noise, Air pollution and Water Quality Parameters

The Consultant shall perform baseline study for measurement of total suspended particle (TSP), Particulate matter in air, sulphur oxides, nitrogen oxides, lead, carbon monoxide and benzene as of acceptable standards (WHO/national Ambient air quality standard 2012) and required modelling in the format accepted to DOR and WB. The consultant shall also measure water quality parameters for collecting baseline information in case of surface and ground water contamination as per National water quality standard for drinking water/WHO as accepted by DoR. and WB.

3.2.5 Ecological Survey

The Wildlife Expert will carry out wildlife survey based on available secondary data as well as primary data to be collected. Wildlife expert should recommend the location and number of plots/transects where primary data collection is undertaken based on secondary data review and field visit during scoping phase. The ecologist should undertake flora survey to identify the plant species (other than trees to be identified under 3.3.3 ix. above) in the survey area. Critical habitat screening as per WB ESS 5 should be also carried out to determine the presence of critical habitat in the study area. Based on the ecological survey and critical habitat screening and/or assessment, the wildlife expert should recommend the locations, design and numbers of

underpasses/overpasses that will be required to be constructed in the design. The Wildlife Expert shall coordinate with the Environmental Specialist and include his/her findings and recommendations in the EMP and EIA/IEE Reports.

3.3 Part II – Construction Supervision of Improvement/Upgrading of Butwal-Gorusinghe-Chanauta section (69Km) of EWH

The main objective of the consultancy service under Part IV is to carry out Construction Supervision of Butwal-Gorusinghe-Chanauta road and bridge works including environmental and social management plan, health and safety plan, and other environment and social-related plans, resettlement implementation support, relocation of utility services, quality management, and all aspects of contract management as “Engineer” for the implementation of civil works contracts including Construction and 5 years Maintenance Phase.

3.3.1 SCOPE OF SERVICES

To fulfill the main objectives as defined above the main scope of services for the consulting services are:

Part A: Construction Phase

- i. Verify the proposed design and check suitability based on the site condition. If necessary, the design may need to be revised and finalized to suit the site condition.
- ii. Construction supervision of three (3) contracts (i) & (ii) Butwal-Gorusinghe (50Km) and (iii) Gorusinghe-Chanauta Road Section (19Km) under FIDIC conditions for Butwal-Gorusinghe-Chanauta road (69 km), bridges (New Bridge Construction and maintenance of Existing Bridges) to ensure that the construction is achieved in scheduled time period, within budget and that the work is carried out in complete compliance with the approved engineering designs, technical specifications within the terms and condition of the contract documents and sound engineering practices.
- iii. Complete Contract management as an “Engineer” to the contract for construction supervision and contract administration ensuring full compliance with the design drawing, quality assurance and control as specified in the specification, and contract document.
- iv. Conduct regular supervision, monitoring, and reporting of social and environmental aspects, which includes Environmental and Social Management Plan (ESMP), Resettlement Action Plan (RAP), Indigenous People Development Plan (IPDP), Environmental and Social Commitment Plan (ESCP), Labor Management Procedures (LMP), Stakeholder Engagement Plan (SEP) and Gender Based Violence (GBV) Action Plan and other environment and social-related plans such as Occupational and Community Health and Safety Plan, Traffic Management Plan, Labor Influx Management, Incidents and Accidents, etc.. The Consultant team to ensure full compliance with national legislation and World Bank Environmental and Social Framework (ESF) prior to commencement of construction activities in a specific location as construction progresses.
- v. The Consultant team will ensure that the necessary traffic management plan is in place before start of specific road or bridge works and is implemented throughout construction phase.
- vi. The Consultant shall support the Client team to develop a communication plan consistent with the

Stakeholder Engagement Plan and coordinate with the local stakeholders, organization and institutions, traffic police, and road users for the purpose of implementation of the project activities as well as shifting/ removing the utilities for construction purpose.

- vii. The Consultant shall prepare and submit bi-monthly progress reporting as well as specific reports necessary for the environmental and social management issues, and other reports for Extension of time, variation, adjudication, arbitration, disputes, if any. The Consultant shall also report to the Client any project-related incidents and accidents at the workplace and at the community level.
- viii. The Consultant shall advise and assist the Client and the Contractor to incorporate the tested techniques and technological developments, especially on climate resilience designs in road and bridges, and road safety.
- ix. The Consultant shall design suitable traffic safety features and road furniture including traffic signals, signs, markings, overhead sign boards, crash barriers, delineators etc for the proposed Structure and its approach roads.
- x. The Consultant shall act as “Engineer” to the contract and shall deliver their services through their Team Leader/ Representative and team. The Consultant will have roles and responsibilities as defined in the civil works contract under FIDIC conditions regarding contract administration. However, the Consultant shall seek and obtain the Client’s specific approval prior to undertaking actions that would incur additional costs and time for completion of contracts.
 - a. Issuing variation orders which have financial implications or significant in quantities.
 - b. Revising the Time for Completion of the Works
 - c. Approving any subcontracting of any part of the works
 - d. Fixing new rates or prices that are not in the contract,
 - e. Issuance of Taking Over Certificate
 - f. Issuance of Performance Certificate,
 - g. Any other as mentioned in the Contract Documents for works.
- xi. Further, the Consultant's responsibilities shall include, but not necessarily be limited to, the followings:
 - a. Approve contractor's quality assurance/management plan, work program, method statements, material sources, manpower and equipment deployment, contractors ESMP, OCHS Plan, Traffic Management Plan, Waste Management Plan, Site Restoration Plan, Workers’ Camp Management Plan, Emergency Response Plan and other environment and social-related plans, etc.
 - b. Ensure at all times the Contractor works in strict compliance with the Contractor's quality assurance/management plan, work plan, and contract specification, including instruction issued as per contract and non-compliance notification
 - c. Carryout and recommend necessary adjustments in the design/drawing required during construction due to site requirement and considering value for money. Finalize the design drawings approve, and issue working drawings
 - d. Check and approve the setting out of the works undertaken by the contractors on the basis of the control/reference points
 - e. Prepare suitable standard formats and establish effective and efficient documentation and reporting procedure for contract administration, monitoring of schedules and quality assurances of the construction works
 - f. Carry out survey work to provide adequate control points and reference points to the

contractor for setting out of the works to be carried out by the contractor. Reconfirm site specific environmental and social issues/ conditions and provide data for preparing necessary site plans for mitigation works.

- g. Prepare Supervision procedures / Manual for supervision staff and ensure that the team follows the Manual.
- h. Review, approve, and ensure to implement the site-specific traffic management plan ensuring safety to the road users, construction workers and the locals. No works shall start before the traffic management plan is implemented.
- i. Inspect and supervise the day-to-day operations and activities of the contractor to ensure quality of materials, workmanship and compliance with the specification and contract.
- j. Review, check and certify acceptance of each part of work as completed based on the submitted Request for Inspection (RFI) from the contractors. Major activity like foundation for structures, reinforcement, and other layer of works should be checked and approved by the Consultant before next layer of work start. The bearing capacity of each foundation should be checked, recorded, and approved in the inspection sheet by the authorized site staff and should be submitted in the monthly Progress report.
- k. Review the Contractor's organizational arrangements, key personnel and work plan, materials, and their sources
- l. Review the Contractor's Labor Management Plan (including Code of Conducts), Camp Management Plan and Working methodology of specific activities.
- m. Obtain, check, and approve the contractors' resource-based work program, resource plan, method statements for quality assurance and material sources.
- n. Monitor progress of works against baseline work plan and advise on measures to be taken to improve progress and quality
- o. Conduct regular progress review meetings at site with the contractor to discuss issues and problems affecting the progress, prepare and circulate minutes and report to the Client for necessary action, if any
- p. In the event of variations to the works being required, prepare the necessary documents, verify / discuss with contractor, determine new rates, if necessary, and advise Client for approval. The variations to be well justified and with possible alternatives, and should have prior discussion with the Client's team
- q. Supervise the contractor in all matters concerning Environment Health and Safety (EHS) at work site, workers' personal safety and community health and safety. Ensure that the civil works shall not start without the provision of necessary signs, safety barriers, traffic management measures, lights, fencing, security or safety persons at place
- r. Prepare and issue monthly and quarterly progress reports for the contracts and projects in the form acceptable to Client. These reports will include details of the physical and financial status of the contract/project, details of delays and consequences, if any, comments, and solution on the quality of works in accordance with the contract. These reports shall also include updated status of all resources like manpower, machinery, materials including imported items, if any for each contract. There should be specific section on the Traffic Management, Safety, Labor Management, Social and Environmental safeguard implementation activities, incidents/accidents, if any.
- s. The Consultant shall make the proper record of contractor's equipment, material and

manpower on the daily basis and jointly signed by the Consultant team and Contractors' site representative and submit to the Client on monthly basis.

- t. Regular review/ check of design drawings by the Consultant's team and if necessary, recommend better options to the Client for correcting shortcomings identified during implementation, if any including in safety related aspects. The Consultant shall ensure that engineering measures for safety improvement of all road users such as improved geometry, forward visibility at blind corners and climbing lanes, improved signage and safety features at all bazaars, school zones and public amenities for safety of vulnerable road users (VRUs), and truck laybys for emergency truck stops are designed and implemented along the road.
- u. Approve and/or issue working drawings, instructions to the contractor as required in accordance with the contract specification and Contractor's quality management plan
- v. Measure and keep detailed records of the completed works measurements
- w. Supervise the tests in field and in laboratory, analyze and justify the results, and keep the record for all the test results whether failed or passed the test result. If necessary, undertake independent field and laboratory testing if required to verify. On the basis of test results, prepare the non-conformity reports and instruct the rectification work or solution
- x. Regularly monitor and evaluate project physical progress and ensure that the works are executed on schedule and meet the established standards of performance and quality.
- y. Maintain records, correspondence, detailed diaries, photographs and other documents concerning relevant events and activities to assist the Client to process contractor's claims/disputes, if any
- z. Review, check and approve interim certificates for progress payments and recommend for payment to the Client as specified in the contract. Before recommending the interim and other payment certificates completion of Environmental and Social mitigation works, Environmental Management Plan, and Social Commitment Plan, EHS Plan and other environment and social-related plans must also be checked.
- aa. Periodic checking of contract quantities and a constant check on the cost variation including a quarterly updating of monthly cash flow projections.
- bb. Assess and make recommendations to the Client on the Contractors claims for additional payment, extension of time and any other matters, based on the Engineers interpretation of the contract as per Contractors detailed submissions
- cc. Assist the Client on preparation of documents and responses for the purpose of presenting to the hearings in case of dispute adjudication board, adjudication, arbitrations, or other litigation process with the contractor.
- dd. Assist the Client in maintaining the consolidated project accounts, and with preparation of financial statements and withdrawal applications for submission to the World Bank
- ee. Certify completion of works and issue the Taking Over Certificate or Completion certificate as per the provisions of the Contract
- ff. Provide the Client with complete records of contract, inception, monthly and completion reports, and other specific report, as required. Provide other specialized services upon request of the Client
- gg. Assist the Client to provide on-site trainings to DoR Engineers/staff on quality assurance, contract administration, Claims' management / Avoidance and or other specific area related to the supervision activities
- hh. Assist and support the Client to comply with the audit requirements/ observations/

- recommendations of the Government as well as the World Bank.
- ii. Assist the Client for necessary communication and coordination for relocation of utilities to be carried out during construction.

Part A.1 Social Aspects:

a. Implementation of Resettlement Action Plan and other measures

The Consultant will assist the Client in implementing and monitoring the Resettlement Action Plan (RAP) and other social mitigation plans. The Consultant will:

- i. Assist the DOR and Chief District Officer (CDO) for acquiring of land, Structures and houses and other properties of interest to local people.
- ii. Improve and work in accordance with the Implementation of RAP.
- iii. Develop resettlement and rehabilitation (R&R) information campaigns and implement Stakeholder Engagement Plan.
- iv. Assist the Project Affected Persons (PAPs), especially from indigenous people, vulnerable groups, in resettlement and rehabilitation, including redressing grievances, and coordination with all stakeholders.
- v. Update the database of PAPs and their entitlements for implementation and monitoring purposes.
- vi. Monitor and evaluate the construction induced impacts and propose action plan to address the impacts.
- vii. Monitor and evaluate progress and achievement of resettlement objectives.

b. The administrative responsibilities of the Consultant will include:

- i. Working in co-ordination with the Project In Charge and Chief District Officer.
 - ii. The Consultant shall help to promote good working relationships between the PAPs, the Project In Charge and Local Consultative Forum (LCF). This will be achieved through regular meetings with both the LCF and the PAPs. All meetings and decisions taken shall be documented by the consultant.
 - iii. Preparing monthly Progress Reports including action plans with targets in consultation with the stakeholders.
 - iv. Updating the database of PAPs and vulnerable community and their entitlements.
 - v. In consultation with the PAPs, preparing micro-level plans indicating the categories of entitlement, alternative livelihood options, and relevant institutions for obtaining additional training and support. Stakeholders are important to be incorporated in the development of these plans.
 - vi. Organizing orientation program to contractor's team regarding Social/ Environmental / Health and Safety/ Gender aspects once in a year.
 - vii. Assist GESU / DOR in preparedness check and compliance monitoring of ESMPs, RAPs, SEPs, other social management plans, and Indigenous People's Development Plan (IPDP).
 - viii. Implementing the recommendations of Resettlement Action Plan
- c. Assist the Client to implement, monitor and ensure the compliance of the approved RAP and IPDP and provide information on the implementation processes and report the progress in the**

monthly progress reports in line with ESMF provisions.

- d. Provide necessary support to the PAPs/PAFs to understand the project procedures and receive compensation payment in time.
- e. Assist the Client for the ownership/deed transfer process of land compensated by the project as well as land used by the existing road.

Part A.2 Environmental Management Aspects

- a. The Consultant will ensure and monitor that the Government's Rules, Regulations and World Bank's Environmental and Social Framework, 2018 requirements are adequately complied with at construction sites and along the direct impact area of the project, including communities along the road corridors:
- b. Undertake monitoring of the implementation of ESMP and Environmental Health and Safety Plans and other relevant environmental and social plans during construction period
- c. In case of unexpected environmental impacts during project implementation period, prepare detailed recommendations for remedial actions to handle such impacts
- d. Prepare a reporting system on implementation of ESMP and preparing monthly report to DOR.
- e. Prepare a report on project-related accidents and report to the Client within 24 hours from the occurrence of the accident/incident.
- f. Coordinate with GESU/DOR in monitoring of implementation of ESMP and other related plans.
- g. Consultant is to ensure that the approved ESMAPs are implemented, providing supportive supervision and technical backstopping/ instructions where necessary.

In this regard the consultant's services shall pay special attention to the following:

- i. Ensure that all activities and sites including spoil disposal, quarry, borrow, material crushing, material stockpiling, compaction etc. are operated and reinstated.
- ii. Identify environmentally safe tipping areas for surplus mass of excavated or any other material in addition to that specified in the design specifications. The consultant, in consultation with Client, shall ensure that the contractor and the work force engaged in construction are aware and comply with the ESMP provisions, environmental requirements and spoil disposal restrictions. Obtain, check and approve the site-specific quarry or disposal plan of the contractor: ensure that each of such site-plans show current and finished conditions with necessary protection measures.
- iii. Ensure that the contractor implements site restoration plan including removal of all installations and surplus materials and leaves the site in clean condition and restored.
- iv. Ensure that the contractor follows all Occupational and Community Health Safety and Emergency measures during construction.
- v. Brief, orient and aware implementing agency at field including contractor, as well as communities and other stakeholders on ESMP provisions/ requirements, environmental good practices, and site-specific issues/ concerns.
- vi. Ensure that the wildlife crossing, fencing and other wildlife protection infrastructure/equipment are installed as proposed in ESIA for Butwal-Gorusinghe Road section and ESIA for Gorusinghe-Chanauta Road section.

Part B: Maintenance (Performance Based Maintenance)Phase

The consultant's services during the Maintenance phase shall be as detailed below and the services during this period shall be provided based on intermittent input of the consultant's staff.

- a. The consultant, upon completion of the works, shall carry out an inspection of the completed section or sections and recommend to the Client the date or dates of completion. The inspection should also check satisfactory completion of environmental and social mitigation works. Supervision of routine, recurrent, specific and emergency maintenance works as per the provision of the civil works contracts during the 5 year maintenance (Performance Based maintenance) period including 1-year Defect Notification Period. Inspections, reporting and certifying the works during Maintenance shall be as mentioned in Specifications and conditions of the Works contract during the maintenance phase.
- b. During the Maintenance period, the consultant shall carry out thorough inspection of the works. Consultant shall supervise all type of maintenance works such as routine, recurrent, specific and emergency maintenance works.
- c. The role of the Engineer, on behalf of the Client, is to enforce the contract by verifying compliance with the agreed Service Levels and with all applicable legislation and regulations. The Contractor will receive a Monthly maintenance fee for the Performance Based Maintenance Works and Services. Consultant is to recommend the Payment reductions as per the contract document if the Contractor fails to comply with the Service Levels in any given month. Consultant can instruct Emergency Works as per the requirement with proper justification after consultation with the Client.
- d. Carrying out inspection of the completed works at appropriate interval to note down any defects and issue instructions to the contractor for the rectification of the defective works and ensuring that the contractors are carrying out their contractual obligations in respect of maintenance, repair, and reconstruction of the works.
- e. Shortly before the end of the Defects Notification Period, the consultant shall carry out thorough inspection of the works and designate the rectification work to be done and supervise the rectification works. Once all the designated rectification work is completed to the Client's satisfaction the consultant shall issue a certificate of DNP as per contract. The final inspection report shall also capture status on the environmental mitigation works implemented in the road providing initial indication on the adequacy, appropriateness, and effectiveness.
- f. Approve the final accounts for contracts and recommend for payments as per contract provisions after the completion of Defect notification period and Maintenance period
- g. At the completion of the works, undertake project monitoring and evaluation in the format acceptable by the Client and the World Bank and assist in preparing a consolidated Project Completion Report. Consultant should mention the findings of Contracting approach and Performance based Maintenance system and recommendation for future.
- h. Submission of "As built" drawings showing details of changes from the original plans in construction details or materials, drainage, utilities, etc. checking and certifying precise and correct "As built "Drawings submitted by the contractor will be the responsibility of the Consultant. The Consultant shall make cost provision for the final print of the checked drawings. Six copies of the approved as built drawings and electronic soft copy shall be enclosed in the Project Completion Report and shall be supplied to the concerned DOR office as instructed by the Client.
- i. Complete a final report highlighting any residual environmental impacts following the completion of construction work, and recommended actions, responsibilities, and timeline to mitigate, manage

- or monitor these impacts.
- j. Issue a certificate of Final acceptance after the completion of Maintenance period. The final inspection report shall also capture status report on the environmental mitigation works implemented in the road providing initial indication on the adequacy, appropriateness, and effectiveness.
 - k. The consultant shall furnish the important documents, reports, drawing, field data (such as pavement strength, normal and generated traffic etc.) and other necessary information in the DOR acceptable format in soft copies compatible with DOR's Management Information System.

4. DURATION OF THE SERVICES

Considering the start date and follow-on activities, the Consultant's service is basically divided in to two Parts as :

Part I(a) – Detailed Design of Upgradation Works for Gorusinghe-Chanauta (19Km) highway section and associated Bridges.

Part I(b) – Environment Assessment for Upgradation Works for Gorusinghe-Chanauta (19Km) highway section and associated Bridges.

Part II Construction Supervision of Improvement/Upgrading of Butwal-Gorusinghe-Chanauta section (69Km) of EWH

Considering the Consultant's service requirement up to maintenance phase, Part II of the Consultant's services is divided into two parts as:

- i. Part A: Construction Phase: This phase includes design review and construction supervision and contract management for improvement works of Butwal-Gorusinghe-Chanauta Road and Bridges and Maintenance of Existing Bridges during construction. The Consultant's services shall start from the beginning and continue until completion of the works contracts for the road and bridges. The duration of Construction phase is anticipated to be 3.0 years for Butwal-Gorusinghe Section and 2.5 years for Gorusinghe-Chanauta Section.
- ii. Part B: Maintenance phase: This Part will be 5 year including 1 year Defect Notification Period (DNP). DNP for each contract will start after the issuance of Taking over certificate and accordingly the Maintenance for each contract will start as specified in the contract document.

Consultant's services duration for Construction supervision for each contract is to be planned for total 8 years 3 months for Butwal-Gorusinghe Section (3-year construction and 5 years for Maintenance period including 1 year Defect Notification Period and 3 months for post maintenance period) and 7 years 9 months ((3-year construction and 5 years for Maintenance period including 1 year Defect Notification Period and 3 months for post maintenance period) such that all the responsibilities related to the contractual requirements to be completed within three month after the completion of Maintenance period of the works contracts. In case if there is any ongoing and or new claim, adjudication, arbitration, or disputes even after duration of Part A and B, the Consultant shall provide necessary information and report to assist the Client/DOR, under the same conditions of engagement as applicable to this Agreement.

The total duration of Consulting Service for all parts is estimated to be **8 years 8 months (104 months)** including service for the defect notification period and maintenance period for supervision services (Section 2). The tentative start date and duration for each part is shown in the table 4 below. The expected duration for the Part I.a and Part I.b is 7 months.

Table 4: Proposed Duration of the Consulting Services

Section	Description of Services	Expected Duration	Months
1	Part I.a – Detailed Design of Upgradation Works for Goringhe-Chanauta (19Km) highway section and associated Bridges. Part I.b. – Environment Assessment for Upgradation Works for Goringhe-Chanauta (19Km) highway section and associated Bridges.	March 2023- September 2023	7 months
2	Part II- Construction Supervision of Improvement/ Upgrading of Butwal-Goringhe- Chanauta section (69Km) of EWH		
	Improvement/ Upgrading of Butwal-Goringhe Road Section	May 2023- July 2031	99 months
	Improvement/ Upgrading of Goringhe – Chanauta Road Section	February 2024- October 2031	93 months

5. Team Composition and Qualification Requirements for Professional Staff/Experts

Consultants are encouraged to form association with national Consultants.

Consultant shall have minimum 5 years of experience. Consultant with experience of conducting detailed design of road for upgrading/improvement/new construction of 15km length of four-lane road (or equivalent), construction supervision of road for upgrading/improvement of 65 km length of four-lane road (or equivalent) is encouraged to submit Expression of Interest. Estimated **56 person-months** of professional experts with international experience, **514 person-months of other professional experts** are estimated to carry out the assignment.

However, the firm should assess their own estimates of professional input requirements. The qualification requirement for evaluation of key experts is set out in Annex 2. Tentative person-month detail required for assignment is provided under Table 5, however, the Consultant is free to assess and propose the required input to complete the scope of services.

Table 5: Proposed Staff Input

Position	Quantity	No. of Person Months			DLP/PBMC	Total Person - Months	Remarks
		Detailed Design	EA Study	Construction Supervision			
A. Key Experts							
K-1: Team Leader/ Sr. Highway Engineer (International Experience)	1	7		39	5	46	5 months overlap period
K-2: Highway /Pavement Engineer (International Experience)	1	3		3	0	6	
K-3: Contract Management /Procurement Specialist (International Experience)	1	2		12	3	17	
K-4: Resident Engineer -1	1			36	63	99	
K-5: Resident Engineer -2	1			30	0	30	
K-6: Senior Material Engineer	1	2		36	0	38	
Total Key-Experts Inputs						236	
B. Non-Key Experts							
Senior Road Safety Engineer (International Experience)	1	2		2	0	4	
Highway Engineer	1	2	1	6		9	
Bridge Engineer/ Structure Engineer	1	4		6		10	
Geotechnical Engineer	1	2	1	3		6	
Road Safety/Traffic Engineer	1	2		6		8	
Hydrologist	1	2	1	1		4	
Assistant Resident Engineer	3			102	63	165	
Geologist	1	2		0		2	
Health and Safety Expert	1			9		9	
Office Engineer/Quantity Surveyor -1	1	4		36		40	

Position	Quantity	No. of Person Months			DLP/PBMC	Total Person - Months	Remarks
		Detailed Design	EA Study	Construction Supervision			
Office Engineer/Quantity Surveyor -2	1			30		30	
Biodiversity expert/Ecologist	1		4	3		7	
Environment Safeguard Expert	1	4		16	0	20	
Social Development Specialist	1	4		16	0	20	
Total Non-Key Experts						334	
C. Support Staffs							
Inspector of Works	6			204	0	204	
Senior Laboratory Technician	3			102	60	162	
Senior Surveyor	2	2	2	5.5		9.5	
Social Mobiliser	2		4	66		70	
Health and Safety Inspector	1			36		36	
Environmental Inspector	1			36		36	
Draft person/Autocad Operator	1	6				6	
Technical Assistants (physio chemical, biological, socioeconomic)	1		2			2	
Survey Assistant/helper	4	8	8	6	0	22	
Computer Operator	1	4	3	36		38	5 months overlap period
Office Manager	1	7		36	63	101	5 months overlap period
Office Assistant/Runner	2	14		72	63	139	5 months overlap period
Total Support Staffs						825.5	

Note:

1. *The above professional staff composition and estimated total professional staff man-month is Client's estimate. The Consultant is advised to assess their own requirement and propose their own staff composition and staff input requirement for efficient performance of their job as per the Terms of Reference. If the proposed consultant's team is found inadequate or not sufficient during the performance of the services, then additional staff shall be provided by the Consultant at their own cost.*
2. *A Technical Proposal shall be considered unsuitable and shall be rejected for further evaluation if it does not respond to important aspect of TOR.*

6. TECHNOLOGY TRANSFER

The Consultant shall consider the technology transfer as an important aspect of Detailed Engineering Design and Construction including Maintenance Period.

The Consultant shall have to organize workshops once a year to demonstrate the Overall Supervision, Quality Assurance, Monitoring etc.

The consultant should involve 2 DOR Engineers for 1.5 years in the working team of consultants during Contract Administration, Construction supervision, Quality Control and Maintenance as a consultant's team member for their capacity development. The consultant has to pay DOR Engineers per diem as per the Government rules. As per the request of DOR PCU, the Consultant shall brief and demonstrate the working procedure, design concept, pavement design, quality control procedure, software operation, contract management, Maintenance Management procedures, and Claim /Dispute management. The consultant shall assist the DOR PCU and its staff to build their capacity as a part of the on the job training under this project.

The Consultant should provide minimum one week training to 40 DoR officials in each of the following topics –

- (i) Detailed Design of Highway considering Safety Requirements
 - (ii) Design of Bridge and challenges encountered during Construction
 - (iii) Contract management (FIDIC) and arbitration as per UNCITRAL procedure during the initial phase of service. The schedule and the participant of the training program will be finalized with consent from the Department of Roads. The expert should have international experience. The contract management Training should be based on FIDIC and trainer should be FIDIC Certified.
- (Note : The Consultant shall have to bear the cost of all workshops and training to be organized by them as per ToR and should reflect such a cost in their financial proposal)***

7. Reporting Requirement and Time Schedule

The total duration of the consulting services shall be over **104 (One Hundred Four)** calendar months

from the commencement date.

7.1 Reports and Submissions - Parts I.a, I.b. and II

For Works under Parts I.a and Part I.b., consulting services shall be implemented over 7 months from the commencement date of the Work.

The Consultant shall submit the reports in minimum 8 hard copies and soft copy in specified manner and as enumerated in Table-6

The Consultant shall initially submit 5 copies of documents/reports as draft in ring/spiral binding form. After approval from the client, the Consultant shall submit the remaining 8 copies of each report in book binding form. The Consultant shall sign and stamp on all the pages of Design documents, drawings, estimates, rate analysis, investigation report etc., before submitting to the client. All the reports shall also be submitted on electronic copy compatible with respective program on which they are prepared. All the alignments, including bridges, shall be tracked on GPS, and shall be submitted on compatible format. The Consultant shall also produce separate-colored posters in appropriate paper size of each roads and bridge showing detailed plan, profile, and other relevant information.

Table-6: Reports and Submissions

No.	Preparatory Outputs	Submission Deadline (no. months after the commencement date)	Remarks
2	<i>Part I.a – Detailed Design of Upgradation Works for Gorusinghe-Chanauta (19Km) highway section and associated Bridges</i>		
i	Inception Report	1.0 month	
ii	Submission of Concept Design Report with possible alternatives for road and bridges to initiate presentation/ discussions with the DOR team. The Concept Design should be based on the Field Survey Reports: Inventory, Condition Survey, Ground Survey Mapping, Traffic Volume Counts and Updated Recommendations, Hydrological, Geological and Soil Investigation Reports, Environmental data, social data, Road Crash data, Road Safety audit. Also, the Concept Design should take into consideration the preliminary assessment report on environmental and social issues along the road and bridges (to be done by a separate consultant).	2.5 month	The Consultant may propose the timeline for submission of various design reports for road and bridges in different segments for road and bridges respectively
iii	Small-scale workshop to present, review, discuss the concept design and alternative selection, and finalize/ select the design concept for road alignment, pavement, geometric standards, structures, drains, cross drainage structures, junctions, road safety features, bridge design including the approach and the river training works, as necessary	3.0 month	To be completed as soon as possible to move forward for detail design. DoR may use individual experts to review the concept design
iv	Draft Detailed Design Report: based on the selected concept and standards, prepare and submit Draft Detailed Design Reports for the selected road sub- section and bridges including the Design, Drawings, geological/ geotechnical, hydrological, construction material, rate analysis, cost estimate,	5.0 month	

No.	Preparatory Outputs	Submission Deadline (no. months after the commencement date)	Remarks
	draft bidding documents with specification. Also, the Detailed Design should take into consideration the assessment reports on environmental and social issues along the road and bridges (to be done by a separate consultant).		
v	Small-scale workshop to present, review, discuss the detailed design	5.5 month	
vi	Final Detailed Design Report: Based on the review, feedback and comments provided on the Draft, finalize and submit the Final Detailed Design Report for the selected road sub-section and bridges including detailed design, the drawings, geological/geotechnical, hydrological, road safety audit, construction material, rate analysis, cost estimate, bidding documents with specification and EMP. The final report shall also include the animated video showing the existing road/ bridges improved with the proposed design. Including the updated drone information, they need to update based on final design.	6.0 month	
vii	Monthly Progress Report	Expected within one week of the end of each calendar month	
3	<i>Part I.b. – Environmental Assessment for Upgradation Works for Gorusinghe-Chanauta (19Km) highway section and associated Bridges</i>		
i	Inception Report	1	
ii	ToR Preparation and submission/Scoping (if any)	2	
iii	Approval of ToR , Scoping (if any)	3	
iv	EIA/IEE Baseline Study, public consultation	4	
v	Draft EIA/IEE Report of Road and Bridge, including Biodiversity/Ecological Assessment	6	
vi	Final EIA/IEE Report of Road and Bridge	7	
vii	Monthly Report	Within one week of the end of each calendar month	

7.2 Reports and Submissions for Part II - Construction Supervision

The Consultant shall keep full records relating to all aspects of the work covered by his service contract. Such records shall be available for inspection and use by the Client. All original drawings, work sheets, field notes, computer programs, reports and other documents relating to the study shall become the property of the Client and shall not be used in other purpose without approval from the Client. Reports required to be submitted by the Consultant during their services for Part A and B are as follows:

Part A: Construction Phase

a) Inception Report (Six copies each in paper and electronic soft copy in original version)

Within a month of commencement of Part A activities, the Consultant shall submit an Inception report including the detail formats for quality, time and cost control including recording, reporting, payment

certificates, quality assurance and quality control, resource plan and details of taking over consulting service of Butwal-Gorusinghe-Chanauta Road and Bridges. This should provide initial assessment with regard to readiness for environmental and social safeguard measures implementation, and highlight any immediate actions needed.

b) Monthly Progress Reports (Six copies each in paper and electronic soft copy in original version)

The Consultant shall prepare a monthly progress report on the project activities during construction period. It shall include physical and financial status of different construction activities, information on validity of various advance and performance guarantees issued from the banks. Resources mobilized such as construction material requirement and the stock at site, information on equipment requirement and equipment mobilized by the contractor, adequacy of contractor's manpower shall be also part of the report. It shall include the daily records of equipment, material and manpower and jointly signed with contractor and consultant. The Consultant should also record letter issued to the contractors and letter received from the contractors, and weekly/ monthly progress review meeting minutes. It shall also include the details regarding issues or problems related to the contract or project works, action agreed by the Contractor / Consultant/Client to resolve the issue with due dates, and status. It should also include information on the extension of time, contract variation order, contractor's claims/ dispute, if any. For Claim and disputes a separate monitoring format shall be included in the report showing contract wise issues, claims date, engineer's decision, disputes, and their status. Report should specifically include the environmental and social safeguard implementation and monitoring part showing the details of activities implemented and their status. Documenting the progress on implementation of ESMP and site-specific EMAP requirements, grievances received, if any and their status towards resolution, accident information, and Road Closure Information is must. Report should also include brief information on Consultant's and project staff' activities. The report format shall be agreed by the Client during inception period.

c) Specific reports on the EOT, variation, claims, and or disputes: as per need basis the Consultant are required to prepare and submit specific reports to the Client for necessary approval and or dispute resolution process.

d) Project Management Report (Six copies each in paper and electronic soft copy in original version)

The Consultant shall prepare Trimester Project Management Reports for monitoring financial, procurement and physical activities including the environmental and social status in agreed format with DOR.

Part B: Maintenance Phase

a) Bi-Monthly Progress Reports (Six copies each in paper and electronic soft copy in original version)

The Consultant shall prepare a bi-monthly progress reports (every two months) on the project activities during the maintenance period. The reports shall include the Consultant's team activities and progress status on activities related to the maintenance and defects restoration works, if any.

It shall include physical and financial status, information on validity of various advance and performance guarantees for each contract, contractor's management team and resources mobilized such as construction material, and adequacy of manpower. It shall include the daily records of equipment, material and manpower,

and record letters exchanged between Consultant, Contractor and Client, if any. It shall also include the details regarding issues or problems related to the contract or project works, action agreed by the Contractor/ Consultant/Client to resolve the issue with due dates, and status. It should also include information variation order and contractor's claims/ dispute, if any. For Claim and disputes a separate monitoring format shall be included in the report showing contract wise issues, claims date, engineer's decision, disputes, and their status. Report should specifically include the environmental and social safeguard implementation and monitoring part showing the details of activities implemented and their status. Documenting the progress on implementation of ESMP and site-specific EMAP requirements, grievances received, if any and their status towards resolution, accident information, and Road Closure Information is must. The Consultant should include the routine, recurrent and emergency maintenance plan for the next month and activities performed during the reporting period. The report format shall be agreed by the Client.

b) Project Management Report (Six copies each in paper and electronic soft copy in original version)

The Consultant shall prepare Trimester Project Management Reports for monitoring financial, procurement and physical activities including the environmental and social status in agreed format with Client/DOR.

c) Specific reports on the EOT, variation, claims, and or disputes: as per need basis the Consultant are required to prepare and submit specific reports to the Client for necessary approval and or dispute resolution process.

d) Final Project Completion Report (Ten copies each in paper and electronic soft copy in original version)

Upon completion of each civil works contract's period for construction and issuance of performance certificate, the Consultant shall prepare a contract wise Final completion report. This report shall include the project completion report prepared after completion as Part 1 followed by Part 2 capturing the overall physical and financial activities under design, construction and maintenance period. It should also include the information regarding environmental and social safeguard. The report shall also mention the final financial statement, variation in contracts, claim/ dispute status and future steps, further operation and maintenance guide. The report should include lessons learned and recommendation for improvement in future projects regarding the contract documents, applied methodology, and use of PBMC contract. A Detail evaluation on the maintenance contract performance, issues in supervision, quality assurance, Environment, and social management during maintenance, and needed improvement in the contract provision and management will be required.

e) Final Confidential Report (Two copies for each contract in paper and electronic soft copy in original version)

The Consultant shall submit a final confidential report on the performance of each contractor upon completion of the Maintenance period. The report format shall be as specified in the Public Works Directive, Nepal. Such performance evaluation shall be based on the guidelines provided in Public Works Directives, Nepal.

7.3 Additional Details on Expected Outputs

a. Inception Report

Complete report detailing the Consultant's intended means, methods, design standards, reference documents to be used, and assumptions for design. The report should effectively demonstrate that the Consultant possesses a firm grasp on the required scope of work.

Prepare a quality assurance / quality control (QA/QC) plan for the necessary, investigation and design review process. Ensure that all major 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 design component and deliverable and shall list what documentation will be submitted to verify that the procedures have been followed. Include sample checklists, or similar documentation, that will be used to indicate that an internal quality review has been performed.

Prepare a survey plan that summarizes the methodologies and instrumentation proposed to provide the survey mapping accuracies required for effective design and construction. It is incumbent upon the Consultant to ensure that the survey plan and survey will result in sufficient mapping to complete all design and environmental permitting activities associated with this project. Prepare a field investigation plan. This shall include pavement condition surveys proposed, drilling and sampling of existing pavement, proposed geotechnical drilling and soil sample location maps, and a narrative summary.

Prepare a complete schedule (Gantt or bar chart) of the survey, investigation and designer's activities to complete all items required in this scope, clearly depicting the critical path(s) and the float for each activity. Provide a narrative detailing any foreseen schedule risks and the designer plan for mitigating any future schedule issues.

Prepare for the construction cost estimate.

b. Concept Design Submission (For Detailed Design of Gorusinghe-Chanauta section)

Prepare conceptual level drawings and reports depicting preliminary items of work and impacts that include:

- a) High-level location maps that include plan view schematic locations of the work.
- b) Roadway drawings that include typical sections, plan and profile sheets (where the alignment is changing) or straight-line schematic sketches with chainage (where the alignment is not changing), critical cross sections, locations of existing and proposed key features such as bridges, flyovers, pedestrian crossings, wildlife crossings, bus lay-bys, buildings, retaining walls, noise walls, median crossing locations, roadside barrier, and other ancillary features, locations of existing and proposed culverts and drainage structures, horizontal and vertical locations of all existing utilities, and mapping and topography, represented on plan and profile sheets.
- c) Plans and cross sections for all major and unique junctions.
- d) Typical plans, typical cross sections, and locations for all minor junctions.
- e) Conceptual-level type, size, and location drawings for each proposed bridge, flyover, wildlife crossings, pedestrian crossing, and other structures.
- f) Complete detailed benefit cost analysis and life cycle cost analysis for each bridge, considering different bridge types, alignments, widths, and other design features.
- g) Preliminary land acquisition plans if required for the work, depicting the proposed limits of work, the existing and proposed right of way, proposed full and partial, land acquisition takes, and summary table of proposed takes for each impacted parcel.

- h) Include detailed geotechnical report providing boring logs, materials lab analyses results, geotechnical analyses, and design recommendations. Recommendations are to be incorporated into concept and final design.
- i) Prepare concept design report, including information on the proposed design standard and with the design work completed at this stage.
- j) Provide information necessary for designer and stakeholders to make key decisions prior to starting work on detailed design. Key decisions requiring DoR approval prior to proceeding with detailed design may include but are not limited to: i) locations of flyover ramps, pedestrian crossings, wildlife crossings, bus lay-bys, etc., ii) junction types, turning lanes, and conceptual plan drawings, iii) bridge construction schematics (i.e. concentric vs. eccentric, iv) bridge types selected for each bridge, v) whether to design structures and the roadway to accommodate cost- effective future widening, and vi) other items as appropriate.
- k) The designer shall prepare concise and informative summaries informing each decision using decision matrices summarizing the key benefits, risks, and costs for each option, the designer's recommended option, and a narrative summarizing the reasons for the designer's recommendation.

8. Consultants Facilities, Client's Input and Counterpart Personnel

The Consultant shall be fully responsible to mobilize the necessary professional (key and non- key) expert and should arrange all the administrative, technical and support staff needed to carry out the services. The inputs provided in Section 5 of this ToR (i.e. Team Composition and qualification requirements for professional staff/experts) are the minimum inputs required and the Consultant is required to assess the works requirement and may add additional inputs (Engineers, Technical Support, Administrative Support, specialists etc.), as required and should propose the additional inputs in their technical proposal and financial proposal.

The Consultant shall establish an office space at Kathmandu (within 2 Km radius of DoR-DCID Office for better coordination) and other sub offices as necessary to complete the job **for Part I.a and Part I.b (For Detailed Design and Environmental Social Studies). For the Construction phase (Part II)**, the Consultant should establish their main office in between Butwal to Chanauta and the key supervision staff should be based on the main office and satellite offices at appropriate places to cover the main works from Butwal to Chanauta, including bridges. For Maintenance phase, the Consultant's office set up may be reduced considering limited scope of supervision for maintenance. The Consultant will need to provide the key technical professional staff, including administrative and support staff needed to carry out their services during the construction phase and maintenance phase.

The Consultant shall arrange the necessary air transportation, land transportation including necessary vehicles for all type of surveys to deliver their services, effectively. The Consultant shall also arrange accommodation, travel, and visas necessary for international staffs.

The Consultants will also be responsible for providing all other necessary facilities and logistical support for its staff, including accommodation, sufficient vehicle/transportation, office equipment, Survey equipment, communications, utilities, office supplies and other miscellaneous requirements required to render their services effectively.

The Consultant shall have provision of sufficient transport facilities during the whole period of consulting service. There should be at least SUV to each Professional staff with international experience and Double cab pickup to each Professional Staff having full time input should not be less than twelve vehicles. There should be at least 3 SUV in pool basis for experts having intermittent

inputs in construction phase and one SUV in pool basis for the maintenance phase. There should be at least motorcycles to each support staff involved in supervision to deliver their service effectively during Construction Phase and Maintenance Phase of the service. The Consultant shall also make provision of at least one additional SUV in pool basis for the Construction period.

Except provision of laboratory and laboratory equipment including laboratory boys, other additional staff and facilities will not be included in the civil works contract.

7.1 Data and Assistance to be Provided by the Client

The Client will provide all the available study reports and related information available with the Client. The Client will also help the Consultant team to coordinate with the DOR offices, Bridge Branch, and other governmental offices for related activities, as necessary. For the approved international staff, the Client may support the Consultant to process visa.

7.2 The Contract form will be Time Based Contract

ANNEX-1: List of Existing Bridges

S No.	Bridge / River Name	District	MRM Chainage (Km)	Length of Bridge	Carriageway Width(m)	Span No	Bridge Type	Category
1	Agiya Nala (Dumara nala)	Kapilbastu	641.125	7.6	6.15	1	RCC Slab	Minor
2	Kusma Nala	Kapilbastu	641.685	7.4	6.1	1	RCC Slab	Minor
3	Dry Nala	Kapilbastu	647.67	13.3	7	1	RCC T-Beam	Minor
4	Bel nadi	Kapilbastu	648	64.7	7	3	RCC T-Beam	Major
5	Jawai Khola	Kapilbastu	648.775	16.6	7	1	RCC T-Beam	Medium
6	Dry Nala (Irrigation)	Kapilbastu	650.26	7.7	5.7	1	RCC Slab	Minor
7	Dry Nala (Banatiya Nala)	Kapilbastu	651.13	7.15	5.65	1	RCC Slab	Minor

Annex – II : Bridges along Butwal-Gorusinghe Section (Chainage 590+000 ~ 640+000)

S.N	Name of Bridge	Lane	Existing Bridge Parameter							New Proposed Bridge Parameter											Remarks
			Existin g Chain age	Bridge ID	Type of Bridge	Span			Bridg e Lengt h	Design Chainag e	Span			Bridg e Lengt h	Chainage		Type of Bridge				Upstream (US) / Down stream (DS) / Twin
						No	Span	Len gth			No	Span	Lengt h		Startin g	End	Superstr ucture	Substruc ture	Pier	Found ation	
1	Jitgadi Bridge	6	586+65 7	46 / HOO1 / 287	RCC Girder	1	21.3	21.3 0	21.30	590+048 .50	1	22.00	22.00	22.70	590+03 7.15	590+059 .85	RCC - CAST IN SITU	RCC wall Type (Inverted T)		Bored and Cast in Situ RCC Pile	Twin (New)
2	Narsinga Dry Nala Bridge	6	586+74 5	46 / HOO1 / 288	RCC Girder	1	16.3	16.3 0	16.30	590+187	1	17.00	17.00	17.70	590+17 8.15	590+195 .85	RCC - CAST IN SITU	RCC wall Type (Inverted T)		Bored and Cast in Situ RCC Pile	Twin (New)
3	Dry Nala Bridge	6	587+01 6	46 / HOO1 / 289	RCC Slab	1	7.24	7.24	7.24	590+699	1	10.00	10.00	10.00	590+69 4.00	590+704 .00	RCC BOX - CAST IN SITU				Twin (New)
4	Dry Nala Bridge	6	587+11 7	46 / HOO1 / 290	RCC Slab	1	8.3	8.30	8.30	590+760	1	10.00	10.00	10.00	590+75 5.00	590+765 .00	RCC BOX - CAST IN SITU				Twin (New)
5	Pakhapani Bridge	6	587+28 8	46 / HOO1 / 291	RCC Box	3	3.2	9.60	9.60	590+992	1	10.00	10.00	10.00	590+98 7.00	590+997 .00	RCC BOX - CAST IN SITU				Twin (New)
6	Satgadi -1 Bridge	6	592+63 7	46 / HOO1 / 292	RCC Girder	3	21.43	64.2 9	64.29	596+090	3	22.00	66.00	68.14	596+05 5.93	596+124 .07	RCC - CAST IN SITU	RCC wall Type (Inverted T)	RCC HAMM ER HEAD	Bored and Cast in Situ RCC Pile	DS
7	Satgadi -2 Bridge	6	592+90 0	46 / HOO1 / 293_B	RCC Girder	2	14.3	28.6 0	28.60	596+331	1	30.00	30.00	31.20	596+31 5.40	596+346 .60	PRECA ST PSC	RCC wall Type (		Bored and Cast in	DS

S.N	Name of Bridge	Lane	Existing Bridge Parameter							New Proposed Bridge Parameter												Remarks
			Existin g Chain age	Bridge ID	Type of Bridge	Span			Bridg e Lengt h	Design Chainag e	Span			Bridg e Lengt h	Chainage		Type of Bridge				Upstream (US) / Down stream (DS) / Twin	
						No	Span	Len gth				No	Span		Lengt h		Startin g	End	Superstr ucture	Substruc ture		Pier
																	GIRDE R	Inverted T)		Situ RCC Pile		
8	Soila Bridge	6	594+01 1	46 / HOO1 / 294_B	RCC Girder	1	13.14	13.1 4	13.14	597+459	2	6.00	12.00	10.00	597+45 4.00	597+464 .00	RCC BOX - CAST IN SITU				DS	
9	Rajpur Bridge	6	594+34 3	46 / HOO1 / 295_B	RCC Girder	1	26.35	26.3 5	26.35	5977+78 5	1	27.00	27.00	28.20	5977+7 70.90	5977+79 9.10	PRECA ST PSC GIRDE R	RCC wall Type (Inverted T)		Bored and Cast in Situ RCC Pile	DS	
10	Bamaha Bridge	6	594+95 0	46 / HOO1 / 296_B	RCC Girder	2	16.18	32.3 6	32.36	598+251	1	33.00	33.00	34.20	598+23 3.90	598+268 .10	PRECA ST PSC GIRDE R	RCC wall Type (Inverted T)		Bored and Cast in Situ RCC Pile	DS	
11	Ghamaha Bridge	INT	600+11 1	46 / HOO1 / 297_B	PSC Girder And Slab	3	11+29 +11	51.0 0	51.00	603+565	3	10+3 0+10	50.00	52.68	603+53 8.66	603+591 .34	PRECA ST PSC GIRDE R	RCC wall Type (Inverted T)	RCC HAMM ER HEAD	Bored and Cast in Situ RCC Pile	DS	
12	Tulbuliya Bridge	4	600+39 5	46 / HOO1 / 298_B	RCC Girder	3	14.3	42.9 0	42.90	603+825	1	42.00	42.00	43.20	603+80 3.40	603+846 .60	PRECA ST PSC GIRDE R	RCC wall Type (Inverted T)		Bored and Cast in Situ RCC Pile	DS	
13	Marthirwa Bridge	4	601+25 8	46 / HOO1 / 299_B	RCC Girder	1	16.35	16.3 5	16.35	604+680	1	17.00	17.00	17.70	604+67 1.15	604+688 .85	RCC - CAST IN SITU	RCC wall Type (Inverted T)		Bored and Cast in Situ RCC Pile	DS	

S.N	Name of Bridge	Lane	Existing Bridge Parameter							New Proposed Bridge Parameter											Remarks
			Existin g Chain age	Bridge ID	Type of Bridge	Span			Bridg e Lengt h	Design Chainag e	Span			Bridg e Lengt h	Chainage		Type of Bridge				Upstream (US) / Down stream (DS) / Twin
						No	Span	Len gth			No	Span	Len gth		Startin g	End	Superstr ucture	Substruc ture	Pier	Found ation	
14	Meghawa Bridge	INT	601+57 1	46 / HOO1 / 300_B	RCC Girder	1	21.2	21.2 0	21.20	604+974	1	21.00	21.00	21.70	604+96 3.15	604+984 .85	RCC - CAST IN SITU	RCC wall Type (Inverted T)		Bored and Cast in Situ RCC Pile	DS
15	Inguria Bridge	INT	603+24 3	46 / HOO1 / 301_B	PSC Girder And Slab	3	11+29 +11	51.0 0	51.00	606+683	3	10+3 0+10	50.00	52.68	606+65 6.66	606+709 .34	PRECA ST PSC GIRDE R	RCC wall Type (Inverted T)	RCC HAMM ER HEAD	Bored and Cast in Situ RCC Pile	DS
16	Banarhwa Bridge	INT	603+72 8	46 / HOO1 / 302_B	RCC Girder	3	13.2	39.6 0	39.60	607+184	1	40.00	40.00	41.20	607+16 3.40	607+204 .60	PRECA ST PSC GIRDE R	RCC wall Type (Inverted T)		Bored and Cast in Situ RCC Pile	DS
17	Dry Nala Bridge	INT	604+42 8	46 / HOO1 / 303_B	RCC Slab	1	11.2	11.2 0	11.20	607+844 .50	2	6.00	12.00	12.00	607+83 8.50	607+850 .50	RCC BOX - CAST IN SITU				DS
18	Pahila River Bridge	INT	607+56 6	46 / HOO1 / 304_B	RCC Girder	3	16.45	50.8 0	50.80	610+995	3	17.00	51.00	53.14	610+96 8.43	611+021 .57	RCC - CAST IN SITU	RCC wall Type (Inverted T)	RCC HAMM ER HEAD	Bored and Cast in Situ RCC Pile	DS
19	Dry Nala Bridge	INT	607+69 2	46 / HOO1 / 305_B	RCC Slab	1	10.62	10.6 2	10.62	611+101 .50	2	6.00	12.00	12.00	611+09 5.50	611+107 .50	RCC BOX - CAST IN SITU				DS
20	Kanchan Bridge	INT	607+87 2	46 / HOO1 / 306_B	RCC Girder	3	21.28	63.8 4	63.84	611+406	3	22.00	66.00	68.14	611+37 1.93	611+440 .07	RCC - CAST IN SITU	RCC wall Type (Inverted T)	RCC HAMM ER HEAD	Bored and Cast in Situ RCC Pile	DS

S.N	Name of Bridge	Lane	Existing Bridge Parameter							New Proposed Bridge Parameter											Remarks	
			Existin g Chain age	Bridge ID	Type of Bridge	Span			Bridg e Lengt h	Design Chainag e	Span			Bridg e Lengt h	Chainage		Type of Bridge				Upstream (US) / Down stream (DS) / Twin	
						No	Span	Len gth				No	Span		Len gth		Startin g	End	Superstr ucture	Substruc ture		Pier
21	Kothi Bridge	4	611+480	46 / HOO1 / 307_B	RCC Girder	2	21.5	43.00	43.00	615+258	1	42.00	42.00	43.20	615+236.40	615+279.60	PRECAST PSC GIRDER	RCC wall Type (Inverted T)		Bored and Cast in Situ RCC Pile	DS	
22	Gageda Bridge	4	616+617	46 / HOO1 / 308_B	RCC Slab	1	8.6	8.60	8.60	620+006	2	5.00	10.00	10.00	620+001.00	620+011.00	RCC BOX - CAST IN SITU				Twin (New)	
23	Banganga Bridge	4	618+491	46 / HOO1 / 309_B	RCC Slab	51	5.68	289.68	289.68	622+020	10	30.00	300.00	312.18	621+863.91	622+176.09	PRECAST PSC GIRDER	RCC wall Type (Inverted T)	RCC HAMMER HEAD	Bored and Cast in Situ RCC Pile	DS	
24	Kaila Bridge	4	623+753	46 / HOO1 / 310_B	RCC Girder	3	31.2	93.60	93.60	627+144	3	32.00	96.00	99.64	627+094.18	627+193.82	PRECAST PSC GIRDER	RCC wall Type (Inverted T)	RCC HAMMER HEAD	Bored and Cast in Situ RCC Pile	DS	
25	Balhundra Bridge	4	626+073	46 / HOO1 / 311_B	RCC Girder	1	20.95	20.95	20.95	629+426	1	22.00	22.00	22.70	629+414.65	629+437.35	RCC - CAST IN SITU	RCC wall Type (Inverted T)		Bored and Cast in Situ RCC Pile	DS	
26	Harkon Bridge	4	628+256	46 / HOO1 / 312_B	RCC Girder	1	20.9	20.90	20.90	631+598	1	22.00	22.00	22.70	631+586.65	631+609.35	RCC - CAST IN SITU	RCC wall Type (Inverted T)		Bored and Cast in Situ RCC Pile	DS	
27	Dry Nala Bridge	4	630+009	46 / HOO1 / 313_B	RCC Girder	1	21.45	21.45	21.45	633+334	1	22.00	22.00	22.70	633+322.65	633+345.35	RCC - CAST IN SITU	RCC wall Type (Inverted T)		Bored and Cast in Situ	DS	

S.N	Name of Bridge	Lane	Existing Bridge Parameter							New Proposed Bridge Parameter											Remarks
			Existin g Chain age	Bridge ID	Type of Bridge	Span			Bridg e Lengt h	Design Chainag e	Span			Bridg e Lengt h	Chainage		Type of Bridge				Upstream (US) / Down stream (DS) / Twin
						No	Span	Len gth				No	Span		Len gth		Startin g	End	Superstr ucture	Substruc ture	
																				RCC Pile	
28	Kundra Bridge	4	630+36 2	46 / HOO1 / 314_B	RCC Girder	1	29	29.0 0	29.00	633+692	1	30.00	30.00	31.20	633+67 6.40	633+707 .60	PRECA ST PSC GIRDE R	RCC wall Type (Inverted T)		Bored and Cast in Situ RCC Pile	DS
29	Ghorai Nala Bridge	4	633+42 9	46 / HOO1 / 315_B	RCC Girder	1	21.5	21.5 0	21.50	636+746	1	22.00	22.00	22.70	636+73 4.65	636+757 .35	RCC - CAST IN SITU	RCC wall Type (Inverted T)		Bored and Cast in Situ RCC Pile	DS
30	Dry Nala Bridge	4	636+59 8	46 / HOO1 / 316_B	RCC Girder	1	13.15	13.1 5	13.15	639+814	2	7.00	14.00	14.00	639+80 7.00	639+821 .00	RCC BOX - CAST IN SITU				DS

ANNEX-3: QUALIFICATION REQUIREMENTS OF EXPERTS

1.	K-1: Team Leader/ Sr. Highway Engineer (International Experience) The Team Leader / Sr. Highway Engineer will take the overall responsibility for the Detailed Engineering Design, Design Review, Preliminary Design Report and Construction Supervision of the project in accordance with the Terms of Reference and also for the conduct and the co-ordination of all professional inputs. S/He will be responsible to the Project Director (PD). S/He will assist and advice the PD, Project Coordination/ Unit (PCU), and Project Field Offices (PFOs), and Project Team members on all aspects of the Project implementation. S/He will also maintain contact and liaison with the related Project offices, Units of DOR, Federal offices to ensure that the project is implemented in accordance with the Government's / DOR's policies and objectives. The Team Leader will be leading the team of consultant for all the works and required to coordinate for the Parts I and Part II. TL shall be responsible for overall implementation of Project.	
i.	Educational Qualification	
	Minimum:- Bachelor degree in Civil Engineering Preferable :- Master Degree in Highway /Transportation /Construction Management/ Engineering Management/ Project Management or related field	
ii.	Experience	
	• Total general Experience	Minimum: 15 years Preferable: 25 years
	• Experience in Related Field, Road/Bridge Works	Minimum: 10 years Preferable: 20 years
	• Experience in the Proposed Field of Expertise	<u>Requirements:</u> - Shall have international experience of construction supervision of two road projects outside the native country as Team Leader/Resident Engineer/Project Manager. - Experience of having at least construction Supervision of two ICB Contract of size equal or more than US \$40 million as Team Leader/ Resident Engineer/Project Manager using FIDIC Conditions of Contract. - Shall have experience of detailed design of minimum 4 lane, two road projects of length ≥ 15km. Note : (Only those projects shall be taken into consideration having experience greater than or equal to one year.)
		Preferable: Experience in more number of Projects in above 3 sub-criterion
iii.	Language	Communicate fluently in English Language

2.	K-2 : Highway / Pavement Engineer (with International Experience) Highway/Pavement Engineer will assist the Team Leader/Chief Resident Engineer to perform the detailed engineering design of part I.a.(Detailed Design) and required works during Design verification, Construction and Maintenance phase of the service of part 2. (Construction Supervision)
i.	Educational Qualification
	Minimum :- Bachelor degree in Civil Engineering Preferable :- Master's Degree in Highway/Transportation or related field
ii.	Experience
	Total Experience Minimum: 10 years Preferable: 20 years
	Experience in Related Field, Road/Bridge Works Minimum: 5 years Preferable: 15 years
	- Experience in the Proposed Field of Expertise <u>Requirements:</u> - Shall have experience of pavement design works in at least 3 no. of road projects with Bituminous Pavement outside native country. - Shall have experience of construction supervision of 3 nos. of road projects outside native country with Bituminous Pavement as Highway/ Pavement Engineer.
	Preferable: Experience in a greater number of Projects in above 2 sub-criterion
iii.	Language
	Communicate fluently in English Language
3	K-3: -Contract Management /Procurement Specialist (International Experience) The Procurement Specialist / Contract Specialist will assist the Team Leader/Chief Resident Engineer in managing the overall works in Design and construction including Maintenance phase. S/He will be responsible for preparing bidding documents during design phase and resolving contractual matters/ disputes, delay assessment, variation, during the Construction and Maintenance period.
i.	Educational Qualification
	Minimum :- Bachelor degree in Civil Engineering Preferable: - Master's degree in Transportation Engineering/Highway Engineering/ Contract Management/ Construction Management
ii.	Experience
	Total Experience Minimum: 10 years Preferable: 20 years

	Experience in the Proposed Field of Expertise	<u>Requirements:</u> - Shall have experience of Bid Document Preparation using FIDIC Condition of Contract of at least 3 no. of road/ bridges work as Contract/Procurement Specialist - Shall have experience at least in 2 nos. of Construction Contracts as Procurement / Contract Management Specialist outside native country.
		Preferable: Experience in a greater number of Projects in above sub-criterion
iii.	Language	Communicate fluently in English Language
4	K-4 & K-5: - Resident Engineer-1 &2 Resident Engineer (RE) will perform duties under the guidance of the Team Leader/Chief Resident Engineer. RE will responsible for Construction Supervision and Contract Administration and required to make regular visits to site for implementation of effective supervision, verification of quantities, quality control, progress monitoring and reporting etc. Resident Engineer should be the same person for construction and maintenance phase of the service. One of the RE will act as Deputy Team Leader. He/she will also perform as an acting Team Leader in the absence of Team Leader/Chief Resident Engineer and take overall responsibility of the Project.	
i.	Educational Qualification	
	Minimum :- Bachelor degree in Civil Engineering Preferable: - Master Degree in Highway / Project Management / Construction Management or Related field	
ii.	Experience	
	Total Experience	Minimum: 10 years Preferable: 20 years
	Experience in the Proposed Field of Expertise	Minimum: - Experience in Construction Supervision of Bituminous Road Projects using FIDIC conditions of contract as Resident Engineer/Project Manager/Contract Manager for 5 years or 2 Road Projects (Involvement greater than one Year in a Project shall only considered) - Experience of construction supervision of 1 no. four lane road project
		Preferable: Experience in a greater number of Projects/ no. of years in above sub-criterion

iii.	Language	Communicate fluently in English Language
5	K-6 : - Senior Material Engineer (SME) Material Engineer will work under the guidance of the TL/ CRE and will have responsibility during Design and Construction Supervision phase in testing materials, identification of source of materials and other material related activities. For contract wise quality management, the SME shall be supported by the respective AREs, Lab Technicians and IOWs. Before start of works the SME shall establish the laboratory and prepare the necessary quality control procedures, check list, approval formats for materials, approval for foundation of Structures, and record. SME shall also train the Lab technicians, IOWs, Contractor's relevant personals, and other related project staff on necessary laboratory tests to control the quality of materials, workmanship, and completed works.	
i.	Educational Qualification	
	Minimum :- Bachelor degree in Civil Engineering Preferable: - Masters degree in Geotechnical/Transportation/Construction Management or related field	
ii.	Experience	
	Total Experience	Minimum: 10 years Preferable: 20 years
	Experience in the Proposed Field of Expertise	<u>Requirements:</u> 3 years or 2 road projects experience in quality assurance and quality control works of roads having Asphalt Pavement as Material Engineer
		Preferable: Experience in a greater number of Projects in above sub-criterion
iii.	Language	Communicate fluently in English Language
6.	Senior Road Safety Engineer (with International experience) Sr. Road Safety Expert will assist the Team Leader/Chief Resident Engineer to perform the required works during Design verification and Construction phase of the service. S/He will be overall responsible for the design works related to traffic safety, coordinate with other expert while performing road safety related works as per the requirement during supervision period.	
i.	Educational Qualification	
	Minimum:- Bachelor degree in Civil Engineering/ Road safety Engineering.	
ii.	Experience	
	Total Experience	Minimum: 10 years
	Experience in Related Field, Road/Bridge Works	Minimum: 5 years
	Experience in the Proposed Field of Expertise	- Shall have experience of road safety works in at least 3 nos. of road projects in detail design phase outside the native country as road safety specialist. - Shall have experience of road safety works in construction supervision of at least 3 nos. of road

		projects outside the native country as road safety specialist.
iii.	Language	Communicate fluently in English Language
7.	Highway Engineer (HE) Highway Engineer (HE) will perform duties under the guidance of the Team Leader/Chief Resident Engineer. S/he will be responsible for detailed design and assist in Environmental and Social Studies for Part 1. He also assists in design review and preparation of review report considering the value engineering. S/he will support the team for any revision/amendment in design, additional design and preparation of construction drawings for the proper execution of specific site activities during Construction Supervision phase of Part 2.	
i.	Educational Qualification	
	Minimum:- Bachelor degree in Civil Engineering.	
ii.	Experience	
	• Total Experience	Minimum: 10 years
	• Experience in Related Field, Road/Bridge Works	Minimum: 5 years
	• Experience in the Proposed Field of Expertise	▪ Shall have experience in design of Road Projects- 3 years or 3 Road Projects ▪ Shall have experience in Construction Supervision of Road Projects- 2 years or 1 Road Project
iii.	Language	Communicate fluently in English Language
8.	Bridge Engineer / Structure Engineer The Bridge Engineer / Structure Engineer will assist the Team Leader/Chief Resident Engineer in Detailed Design of Road and Bridge and also assist in managing the Survey, Design verification and Construction Supervision works during the service period. S/He shall also coordinate and support the TL/CRE and team in quality assurance during construction supervision.	
i.	Educational Qualification	
	Minimum :- Bachelor degree in Civil Engineering Preferable: - Master's degree in Bridge Engineering/Structural Engineering.	
ii.	Experience	
	• Total Experience	Minimum: 10 years Preferable: 20 years
	• Experience in Related Field, Road/Bridge Works	Minimum: 10 years Preferable: 15 years
	• Experience in the Proposed Field of Expertise	▪ Shall have experience of detailed design of at least 5 no. of highway bridges ▪ Shall have experience of Construction Supervision of at least two bridges outside of native country.

iii.	Language	Communicate fluently in English Language
9.	Geotechnical Engineer Geotechnical Engineer (GE) will work under the guidance of the Team Leader. GE will have the overall responsibility for geotechnical aspects in detailed design of road and bridges . He will also assist in reviewing the geology of road alignment, Bridge Sites and Road slopes as assumed during design of the road and suggest any improvement during construction. S/he shall also assess the geology of the alignment, properties of the soil and actual drainage system and recommend for any improvement for the stability of the alignment during Construction Supervision Phase.	
i.	Educational Qualification	
	Minimum:- Master degree in Geotechnical Engineering or related field	
ii.	Experience	
	• Total Experience	Minimum: 10 years
	• Experience in Related Field, Road/Bridge Works	Minimum: 5 years
	• Experience in the Proposed Field of Expertise	▪ Shall have experience in design of Road/Bridge Projects- 3 years or 3 Road/Bridge Projects ▪ Shall have experience in Construction Supervision of Road/Bridge Projects- 2 years or 1 Road/Bridge Project
iii.	Language	Communicate fluently in English Language
10.	Road Safety/Traffic Engineer The Road Safety Expert will assist the Team Leader / Chief Resident Engineer in road safety related aspects during detailed design of road and bridges and also assist in managing the road safety measures in Road and Bridge approaches. S/He shall also coordinate and assist the TL/CRE and team in reviewing and implementing road safety measures considering the value engineering and best practices.	
i.	Educational Qualification	
	Minimum:- Masters degree in Highway/Transportation/Road Safety or related field	
ii.	Experience	
	• Total Experience	Minimum: 10 years
	• Experience in Related Field, Road/Bridge Works	Minimum: 5 years
	• Experience in the Proposed Field of Expertise	▪ Shall have experience in Road safety audit or design of road safety measures- 5 numbers of roads. ▪ Shall have experience in Construction Supervision of Road Projects- 2 years or 1 Road Project
iii.	Language	Communicate fluently in English Language
11.	Hydrologist	

	Hydrologist will perform their duties under the guidance of the Team Leader/Chief Resident Engineer. S/He will assist TL/CRE during detailed design of Road and Bridge including assistance in Environmental and Social Studies. He will also assist TL/CRE for any modification in design during implementation of project activities considering the value engineering.	
i.	Educational Qualification	
	Minimum:- Master degree in Hydrology/Hydropower Engineering or related Engineering discipline	
ii.	Experience	
	• Total Experience	Minimum: 10 years
	• Experience in Related Field, Road/Bridge Works	Minimum: 5 years
	• Experience in the Proposed Field of Expertise	▪ Shall have experience in design of Bridge Projects as Hydrologist- 3 years or 3 Bridge Projects ▪ Shall have experience in Construction Supervision of Road/Bridge Projects- 2 years or 1 Road/Bridge Project
iii.	Language	Communicate fluently in English Language
12.	Assistant Resident Engineer ARE will work directly under TL/CRE and will have the responsibility for construction supervision, contract administration including design verification and preparing construction drawings. ARE will be responsible for implementation with quality assurance and quality control, measurement of works, compliance of Environmental and Social Safeguard requirements etc. ARE shall be working in close coordination with the SME/ ESE/ SDE and shall be supported by the Inspector of Works and Lab Technicians. ARE will be responsible for quantity measurement and verification in the role of quantity surveyor.	
i.	Educational Qualification	
	Minimum:- Bachelor degree in Civil Engineering	
ii.	Experience	
	• Total Experience	Minimum: 10 years
	• Experience in the Proposed Field of Expertise	▪ Experience of 5 years as an Assistant Resident Engineer in road projects in construction Supervision/ management of roads having bituminous surface pavement works or 10 Years as IOW (after completion of Graduation in Civil Engineering) in Road Projects with minimum experience of 2 Road projects in construction Supervision/ management of roads having bituminous surface pavement works
iii.	Language	Communicate fluently in English Language
13.	Geologist Engineering Geologist will work under the guidance of the Team Leader/Chief Resident Engineer. S/he will have the overall responsibility for assessing, testing and confirming the availability and quality of construction materials and reviewing the geology of road /bridges for both the design and Construction Supervision Stage.	
i.	Educational Qualification	

	Minimum:- Master Degree in Geology/Engineering Geology or related field	
ii.	Experience	
	• Total Experience	Minimum: 10 years
	• Experience in Related Field, Road/Bridge Works	Minimum: 5 years
	• Experience in the Proposed Field of Expertise	▪ Experience in geological study for Road / Bridge Works -5 years or five roads
iii.	Language	Communicate fluently in English Language
14.	Health and Safety Expert The Health and Safety Expert will work under the guidance of the TL/CRE and support team in performing his duty.	
i.	Educational Qualification	
	Minimum:- Bachelor/Master (preferably Master) degree in Civil Engineering / Environmental Engineering/Environmental Science or related field	
ii.	Experience	
	• Total Experience	Minimum: 10 years
	• Experience in Related Field, Road/Bridge Works	Minimum: 5 years (preferably 10 years)
	• Experience in the Proposed Field of Expertise	▪ Experience in the Health and Safety related works in Construction Contract- 3Years (preferably 5 years)
iii.	Language	Communicate fluently in English Language
15.	Office Engineer or Quantity Surveyor- 1 & 2 Office Engineer / Quantity Surveyor will support the Design works. S/he will also assist in Supervision team and will work under Team Leader/Chief Resident Engineer. S/he will support during the construction and maintenance phase of the service. S/he will assist the team leader in verification of quantities of works performed, design update/modification, preparation of monthly progress report and other required documents during the execution of works.	
i.	Educational Qualification	
	Minimum:- Bachelor degree in Civil Engineering or related field	
ii.	Experience	
	• Total Experience	Minimum: 10 years
	• Experience in Related Field, Road/Bridge Works	Minimum: 5 years
iii.	Language	Communicate fluently in English Language
16.	Biodiversity Specialist / Ecologist	
i.	Educational Qualification	
	Minimum:- Master's degree in Biodiversity/Wildlife/Ecology/Zoology	
ii.	Experience	
	Total Experience	Minimum: 10 years

	Experience in Related Field, Road/Bridge Works	Minimum: 5 years
iii.	Language	Communicate fluently in English Language
17.	- Environment Safeguard Expert (ESE) ESE will perform his/her duties under the guidance of the Team Leader / Chief Resident Engineer. S/he will assist in Environmental and Social Studies for Part 1 and also work in construction supervision during construction and maintenance phase of the service for the implementation of mitigation measures.	
i.	Educational Qualification	
	Minimum :- Bachelor degree in Civil Engineering/ Environmental Science/Environmental Engineering Preferable: - Master's degree in Environmental Engineering/Science or related field	
ii.	Experience	
	Total Experience	Minimum: 10 years Preferable: 20 years
	Experience in the Proposed Field of Expertise	- Experience of preparation of EIA/ESIA for three road projects as an Environmentalist/Environmental Safeguard Specialist or similar position - Experience of implementation of EIA/ESIA in two Donor funded Road Projects (World Bank/ADB/JICA etc) as an Environmentalist/Environmental Safeguard Specialist or similar position
iii.	Language	Communicate fluently in English Language
18	Social Development Expert (SDE) SDE will perform his/her duties under the guidance of the Team Leader/Chief Resident Engineer. SDE will assist in Environmental and Social Studies for Part 1 and support the Construction Supervision team and Project staff in implementing social safeguard activities as per the requirement of World Bank's Environmental and Social Framework and GoN's relevant policies, guideline, frameworks etc.for Part 2.	
i.	Educational Qualification	
	Minimum :- Bachelor degree in Humanity/ Social Science or related field Preferable: - Master's degree in Social Science/Anthropology/Sociology/Rural Development/Economics or related field	
ii.	Experience	
	Total Experience	Minimum: 10 years Preferable: 20 years
	Experience in the Proposed Field of Expertise	Experience of preparation of EIA/ESIA for three road projects as an Social Safeguard/Development Specialist or similar position

		Experience of implementation of EIA/ESIA in two Donor funded Road Projects (World Bank/ADB/JICA etc) as an Social Safeguard Specialist or similar position
iii.	Language	Communicate fluently in English Language
19.	Inspector of Works (IOW)	
	IOW should be a Civil Engineering Graduate with minimum 1 years of specific experience in construction supervision of road works with bituminous surfacing works or S/He should have a Certificate/ Diploma in Civil Engineering with minimum 10 years of experience in construction supervision of civil engineering works with minimum 2 years of specific experience in construction supervision of road works with bituminous surfacing works.	
20.	Senior Laboratory Technician (SLT)	
	SLT should have minimum 5 years general experience in Laboratory testing works and 3 years of specific experience in carrying out laboratory and field tests to maintain the quality of road works according to the specifications and a minimum education of Intermediate Level. SLT should also have a minimum of 2 years experience in conducting Laboratory testing works of bituminous surfacing road works.	
21.	Senior Surveyor (SS)	
	SS should have minimum 6 years general experience in surveying and 4 years of specific experience in surveying of or three projects related to road works as per standard practice. SS should also have a minimum of 3 years experience in surveying of hill roads or two hill road projects..	
22.	Senior Mobiliser (SM)	
	SM should have minimum 5 years general experience in social related mobilization works and SM should have also a minimum education of Intermediate level.	
23.	Health and Safety Inspector (HSI)	
	HSI should have minimum 5 years general experience in Construction works and should have also a minimum education of Intermediate level.	
24.	Environmental Inspector (EI)	
	EI should have minimum 5 years general experience in Environmental related works and at least 1 year in field experience. EI should have also a minimum education of Intermediate level with training in Environment.	

Note : The experts having common roles in both the design including E&S studies (Part I) and Construction Supervision should be the same person

.The CV's of non-key experts will not be used for the evaluation of the Technical proposals but the CV's of proposed non-key experts need to be submitted with the Consultant's proposal.

At commencement of service, the CV's of non key experts and support staffs mentioned in table no. 5 need to be submitted for approval from client before their appointment for the job. The approval criteria will be as mentioned above.