CONSULTING SERVICES FOR THE DESIGN OF CAREC CORRIDOR 3 ROAD RECONSTRUCTION PROJECT

TERMS OF REFERENCE

I. Introduction

1. The government of the Kyrgyz Republic has agreed with the Asian Development Bank (ADB) on a small expenditure financing facility to design the CAREC Corridor 3 Road Reconstruction Project (Project). The Project is intended to enhance efficiency of people and goods movement amid increased traffic from the planned China–Kyrgyzstan–Uzbekistan railway, the new Jalal-Abad international airport, and the alternate North-South highway scheduled for commissioning in 2026. The Ministry of Transport and Communications (MOTC), the Project's executing agency who will be the Client, is seeking to engage a consulting firm (Consultant) to prepare a detailed engineering design for the Project, and assist the PIU in preparing a complete set of tender documents for procuring the civil works, and the terms of reference for a consulting form for supervising the civil works and serving as the Engineer. The civil works will be procured using the January 2026 version of ADB Standard Bidding Document for Single-Stage: Two-Envelope Bidding Procedure without Prequalification (2026).

2. The main output of the Project is 62 kilometers the CAREC Corridor 3 between Manas (approximate station Km 574) and the northern end of the Uzgen By-Pass Road (approximate station Km 595) and from the southern end of the Uzgen By Pass Road to Osh approximate station Km 620) to Osh city (approximate station Km 661), upgraded to a four-lane divided road that meets Category II road standards of the Kyrgyz Republic. The road at present is a two-lane divided facility. A consortium of private investors financed the 14 km Uzgen By-Pass Road construction as a toll road (the road has already been built and commissioned).

3. The mean daily temperature in the Project area ranges from 4 to 34 degrees Celsius throughout the year, and average annual precipitation ranges from 6 to 60 mm. The altitude of the site varies from about 750 meters to 950 meters. Consequently, the risk of road failures at the Project site is high due to sliding soil masses in the area. This will require special measures for mitigating the risk. Therefore, the Client requires the Consultant to have experience in Central Asia to design the road with cost-effective, eco-friendly, climate-resilient, and low-carbon mitigation measures meeting national standards and ADB requirements.[1]

4. The Client has already studied and confirmed the economic, social, environmental, and technical feasibility, and prepared a preliminary engineering design for the Project. The Consultant shall employ all data and findings of the feasibility study, supplemented by further investigations and assessments as needed, to produce the detailed design and the tender documents.

II. Implementation Arrangements

5. This selection relates to the services for: Part 1: Feasibility Study (FS) and Part 2: Detailed Engineering Design (DED). Full technical proposals are required from the firms addressing both Parts.

6. Details of the required outputs and scope of work, deliverables and reporting requirements, indicative staffing, consultant expert positions, qualifications and key tasks,

[1] The consultant should refer to the ADB Green Roads Toolkit, which provides practical guidance for integrating sustainable, climate-resilient, and low-carbon road design measures into projects. https://data.adb.org/dataset/green-roads-toolkit

contract administration and reporting for this contract are provided in the following sections, separately for Part 1 and Part 2.

7. The Part 2 of the assignment will be subject to satisfactory performance of the selected firm under Part 1 and official certification on it issued by the Client.

8. The time for completion of the Detailed Design is twelve (12) months from the commencement date stated in the notice to proceed.

9. The Consultant shall be based in Osh with periodic visits to Bishkek for consultation with the Client. In addition to gathering data for the engineering design, the Consultant must engage with all the stakeholders and gather information from them, and build consensus with those affected by the Project. The Client expects the Consultant's team to spend at least 65% of their total time in the field, and this must be clearly shown in a phased output delivery program. The Consultant must also provide a detailed program of its team's home and field inputs as part of its RFP submission. This program must correspond to the output delivery program, showing each international expert's home and field input at each phase of the output delivery program.

10. The ADB Project Implementation Unit (PIU) of the MOTC will be the Client's representative and be responsible for managing the consulting services contract. The Consultant will report to the Head of the PIU and work in consultation with the relevant PIU specialists on day-to-day operational matters. The PIU will assign a project manager to the Consultant's team to facilitate better coordination and communication between the parties.

11. The Client will assist the Consultant in establishing communication with government stakeholders, community leaders, etc., and supply the relevant documents from the past projects and consulting services. The Consultant will submit a monthly progress report during the contract period in the format agreed with the Client before the commencement date.

III. Scope of Services (Part 2: DED)

12. The scope of services comprises the activities summarized below. Details of the scope of the technical studies are in **Appendix 1** Details of Expected Technical Assessments

(i) Strategic planning (agreeing with the client on the approaches to optimizing safety, efficiency, sustainability, lifecycle cost, environmental, and social benefits of the design)
(ii) Engineering surveys
    a. Topography
    b. Water bodies
    c. Hydrology and geology
    d. Soils and materials
    e. Archaeological and religious sites
    f. Existing structures
    g. Climate
    h. Traffic
(iii) Geometric design
(iv) Pavement design
(v) Structural design (e.g., bridges, culverts, drainage, pedestrian and wildlife crossings, slope protection, riverbank protection)

(vi) Environmental and social (E&S) impact assessment to update the E&S documents and design impact mitigation measures according to the national and ADB Environmental and Social Framework.[2]
(vii) Updating the geographic information system developed by the feasibility study consultants
(viii) Revising the specification if necessary and preparing detailed drawings
(ix) Revising and updating the bill of quantities and cost estimate
(x) Updating the economic (and financial, if needed) analysis
(xi) Assisting the PIU with preparing the tender document and the terms of reference for construction supervision services

IV. Key Tasks

A. Data Collection

13. The Consultant is expected to review the Client's data and conduct new surveys to obtain missing or update information needed for the detailed design. To this end, the Consultant will examine the:

(i) Client's feasibility study report (FSR) on the Project and all key reports and published information about the project and the project influence area.
(ii) Coordinates and dimensions of the existing alignment, existing structures, utilities, and land uses, and verify the current as-built drawings.
(iii) Condition of the road pavement and associated structures and elements, and determine the repair, rehabilitation, and reconstruction requirements.
(iv) Client's hydrological, geological, soil, and material information.
(v) Client's traffic forecasts.
(vi) The operational parameters, design standards, and specifications for roads and bridges in Kyrgyzstan.
(vii) Availability and suitability of local materials, equipment, and workforce supply chain with an emphasis on advanced materials and equipment.
(viii) Sources and supply chain of imported materials
(ix) The new alignment with reference to constructability, social and environmental impacts, traffic safety, sustainability, and lifecycle cost.
(x) The road structure (geometry, embankments, surface layers) and associated features (intersections, access roads/driveways to major developments identified in the pedestrian and heavy goods vehicle facilities, barriers, signs, landscaping) with due consideration to climate, safety, maintenance, and technological needs, including electric vehicle charging stations.
(xi) environmental and social documents prepared during the feasibility study, with particular attention to the environmental management plan and land acquisition and resettlement plan.

B. Design Considerations

14. Re-alignment of the centreline must be considered only as a last option.

15. The road must serve the future vehicle and driver characteristics, traffic volumes, peaking patterns, and climate conditions, which may require deviations from the current national standards. When design exceptions are required, the Consultant shall examine the costs and benefits and discuss them with the Client before incorporating them in the design documents.

[2] ADB. 2024. Environmental and Social Framework. Manila. December. https://www.adb.org/documents/environmental-social-framework

16. The Consultant shall design suitable traffic safety features and road furniture, including traffic signals, signs, markings, overhead sign boards, crash barriers, delineators, etc. The design must also include bus stops, truck lay-bys, parking areas, and rest areas, and prepare separate designs for each component. The common facilities like electric vehicle charging stations, first-aid medical facilities, police offices, restaurants, vehicle parking, roadside amenities, service centers, etc., should be included in the general layout. Where there are no national standards and specifications, the Consultant shall make recommendations based on their experience and consult with the Client on each aspect before finalizing the design.

17. Where repair, rehabilitation, replacement, widening, or new structures are required, the Consultant shall prepare a structural design report and discuss the methodology and assumptions underlying the design with the Client. The design must be based on hydraulic and geotechnical studies, climate change and natural event risk assessments, life-cycle cost analysis, and construction methods.

18. The requirement of roadside drainage structures and the integration of the same with the proposed cross-drainage system shall be worked out as per the hydrological and hydrogeological studies with reference to climate change and disaster risk. In addition to the roadside drainage system, the Consultant shall design the special drainage provisions. The designed drainage system should show locations of turnouts/outfall points with details of outfall structures fitting into natural contours. The Consultant shall refer to the appropriate guidebooks and technical notes when the traditional standards do not reflect the climate risks.

19. In addressing the climate-related risks, the Consultant shall:

(i) Identify key climate parameters relevant for the study, focusing on those applicable to the primary climate hazards of the project
(ii) Collect and analyze potential climate change impacts (environmental, economic, and social impacts) of changes in temperature and precipitation in the project area
(iii) Estimate the risks (probabilities and costs) of climate change.
(iv) Conduct field consultation with local community groups on existing vulnerabilities and coping strategies
(v) Include risk mitigation measures (materials, configurations, maintenance methods, etc.) in the design and describe the life-cycle benefits and costs. This may include, but shall not be limited to, measures such as the use of warm mix asphalt, use of low carbon cement, use of lower embodied carbon steel, a requirement for the contractor to use energy-efficient, low emission construction equipment, minimizing transportation distances and construction, and increasing the use of local material and workforce.

20. The Consultant shall include relevant slope failure mitigation measures based on detailed geotechnical and hydrological studies of the Project site. The standards and type of work being proposed should follow the local guidelines or the best international practices. These items should be part of the detailed final cost estimate.

21. The road must be fully integrated with the national transportation system to facilitate multimodal transportation and international trade. Critical links and facilities that support the integration are in the FSR. The Consultant shall discuss these with the Client and incorporate them into the design.

C. Specification and Drawings

22. The Client does not have standard national specifications at present. However, the Client expects specifications of recently completed and ongoing projects to be used in this Project with appropriate modifications to fit the purpose. The climate-change, environmental,

and social, and post-construction maintenance requirements of MOTC and ADB must be included where necessary.

23. The drawings must include:

(i) Existing Features: Drawings must indicate all existing natural and man-made features within the project area, including existing water courses, sewer lines, manholes, fences/boundaries, retaining walls, and electricity/telephone lines.
(ii) Horizontal and vertical alignments, cross-sections, superelevation details, and all dimensions (typically in millimeters unless stated otherwise).
(iii) Site Lines: Street Lines, Building lines, and right-of-way.
(iv) Coordinates: Geo-coordinates (GPS-based) of main boundary points covering the entire land.
(v) Drainage: Details of drainage systems, including weep holes, pipe sizes, berms, and slopes.
(vi) Structural Details: Reinforcement details, concrete mixes, and formwork specifications for structures like bridges or signal column bases.
(vii) Safety & Signage: Provisions for traffic control devices, safety measures, road markings, and signage.
(viii) Standard Sheet Size: Plans must be presented on standard metric size sheets of the international 'A' series (A0, A1, A2, A3, etc.).
(ix) Seals and Signatures: As-built or construction drawings require an Engineer's/Surveyor's statement with an embossed or wet seal and an original signature on each sheet to verify true field conditions.
(x) Scale: The scale must be clearly indicated, such as 1:100 or 1:50 for detailed plans.
(xi) Title Block: A standardized title block is required on each drawing,

24. The Consultant must discuss and agree with the Client on the drawing contents and formats.

D. Bill of Quantities and Cost Estimates

25. The Consultant shall compute the quantities of each work item and unit price of each and prepare a bill of quantities in the standard format used by the Client. The estimated quantities and prices of environmental and social safeguard works, monitoring, and reporting by the contractor must be included as line items in the BOQ. Moreover, include the work items for special works, for example, access roads and service and viewing areas agreed with the Client, as separate bills in the BOQ. The BOQ must contain an Appendix showing the compositions of the unit rates, the underlying data, their sources and dates, and the bases of the contingency estimates (physical and price). The price contingency must be based on the historical price indices and the assumed adjustment formula that will be included in the bidding document corresponding to Sub-clause 13.7 [*Adjustments for Changes in Cost*].

26. Additionally, the Consultant shall estimate the cost of consulting services for construction supervision based on the terms of reference, team composition, and specialists' inputs.

E. Social and Environmental Assessment

27. The Consultant must review the Client's E&S documents and update and revise them based on the design and construction methods to comply with national and ESF (2024) requirements. These documents include, but are not limited to:

- Environmental and Social Impact Assessment (ESIA) report
- Environmental and Social Management Plan (ESMP)
- Environmental and Social Audit report

- Cumulative Impact Assessment report
- Environmental and Social Commitment Plan (ESCP) and Environmental and Social Action Plan (ESAP)
- Environmental and Social Management System

F. Economic Analysis

28. The Consultant shall update, based on the updated costs, benefits, and risks, if applicable, the economic analysis in the FSR. The Client expects a separate section in the Detailed Design Report (DDR), confirming the economic viability of the project. This section must include a Monte Carlo simulation-based sensitivity analysis with full descriptions of the underlying assumptions. Costs and benefits from the reduction in CO_2 generation, extensions in service life due to climate-proof design features, and road safety improvement in the form of expected reduction in fatal and serious injuries must be included if applicable.

V. Team Composition and Inputs

29. The Client expects the Consultant's team to provide a total of 108 person-months of input over the 12 months when the detailed design will be prepared. This will comprise a total of 40 person-months of input from the eight key international experts, 48 person-months from the ten key national experts, and 20 person-months from non-key national experts and support staff, as shown in Table 1. The experts must possess the qualifications and experience listed in Annex 2 below.

30. Table 1 also shows the indicative allocations of total person-months among the experts. The Consultant may reassign these inputs according to the approach and methodology it proposes to adopt for delivering the outputs and preparing their financial proposal.

Table 1: Team Composition and Inputs

Consultant's Personnel	**Inputs**
Key experts (International)	**(person months)**
1. Highway and Materials Engineer/Team Leader	10
2. Structural Engineer	6
3. Geotechnical Engineer	8
4. Hydraulics Engineer	4
5. Transport Economist	1
6. Environmental and Climate Specialist	6
7. Road Safety Specialist	2
8. Procurement Specialist	3
Sub-Total	**40**
Key experts (National)	
1. Highway and Materials Engineer/Deputy Team Leader	12
2. Structural Engineer	8
3. Geotechnical Engineer	4
4. Environment Safeguards Expert	6
5. Climate and Disaster Resilience Expert	1
6. Social Safeguards and Land Acquisition and Resettlement Specialist	3
7. Computer-Aided Design Specialist	4
8. Social Development and Gender Expert	2
9. Survey Engineer	4

10. Quantity surveyor/ cost estimator	4
Sub-Total	**48**
Non-Key expert (National)	
• Assistant Engineer	8
• Survey Engineer	8
• Other Non-Key Experts [a]	4
Sub-Total	**20**
Total	**108**

The Consultant may distribute this allocation among its additionally proposed non-key experts.

VI. DELIVERABLES AND PAYMENT SCHEDULE

31. The Consultant, under the overall guidance of the PIU and in consultation with other relevant ministries/agencies of the government, will prepare the following deliverables outlined in Table 3. The structure and contents of each deliverable shall be agreed with PIU before initial submission.

Table 3: Schedule for Submission of Reports and Documents

Deliverables	Submission Deadline After Commencement Date (Cumulative Elapsed Time)	Indicative Payments (Cumulative Payments) % *	Special conditions of payment approval
Milestone Payment 1			
1. Inception Report (Strategic design plan, work schedule, personnel deployment schedule, plan for additional surveys)	No later than 4 weeks (8%)	5 (5)	-
Milestone Payment 2			
2. Technical and social survey and test results	No later than 12 weeks (25%)	10 (15)	-
Milestone Payment 3			
3. Climate Change and Disaster Risk Assessment	No later than 20 weeks (42%)	15 (30)	ADB no objection
4. Hydrological study report			-
5. Geotechnical study report			
Milestone Payment 4			
6. Detailed design of road alignment and pavement	No later than 32 weeks (67%)	20 (50)	
7. Environmental and Social Impact Assessment report			ADB no objection
8. Environmental and Social Management System			
Milestone Payment 5			
9. Detailed design of structures	No later than 40 weeks (83%)	20 (70)	-
10. Detailed design of slopes and roadside features stabilization measures			-

11. Up-to-date E&S documents			ADB no objection
Milestone Payment 6			
12. Specification and drawings	No later than 48 (100%)	20 (90)	
13. BOQ and Cost estimate and			
14. Updated economic analysis			
15. Draft final of the detailed design report (DDR), draft bidding document, Sections 3.1.4 and 6, and terms of reference for construction supervision consultants			
Milestone Payment 7			
16. Final DDR	No later than 60 weeks (125%)	10 (100)	MOTC and other government agencies have no objection

*The percentage reflected shall be calculated against the total lump sum cost, excluding reimbursable expenses and provisional sum.

32. The Consultant shall submit 2 hard copies and one soft copy of each deliverable. Presentation (hybrid mode) of each deliverable will be required. Reports must be submitted in English, Russian, and Kyrgyz.

33. Each deliverable will be reviewed by the PIU and, if required, counterpart government agencies, who will be requested to provide comments within 10 working days after the receipt of reports other than the draft final detailed design report (DDR), for which 30 working days will be provided for review by the Client (and ADB). If comments necessitate revisions and resubmission of the report, the Consultant shall resubmit within 10 working days, and the Client will review and give notice of no objection within 10 working days of the submission.

VII. CLIENT'S SERVICES AND RESOURCES

34. The Client will assist the Consultant with the following:

(i) Accessing current and historical data and information, such as research reports and survey reports
(ii) Obtaining visas, work permits, and customs clearances, etc. The visa processing fees shall be borne by the Consultant at the time of application, and they shall be reimbursed by the Client in the next claim
(iii) Obtaining permits, licenses, approvals, etc., not specified above. Any fees for document processing are paid by the Consultant at the time of application and are reimbursed by the Client upon subsequent claim
(iv) Guidance and advice on security and logistics;
(v) Nominate staff to be trained and attend training workshops; and
(vi) PIU staff to work together and to liaise with other local and national government bodies

35. All equipment, software, and facilities purchased with prior approval of the Client by the Consultant using provisional sums will remain the property of the Client and will be returned to the Client at the conclusion of the contract.

Annex 1: Details of Expected Technical Assessments

A. Traffic Surveys

1. The Consultants shall undertake necessary surveys for classified traffic volume count, origin-destination and commodity movement, characteristics axle loading, characteristics intersection volume count, speed-delay characteristics, pedestrian/animal crossing, etc. In addition to the traffic survey done during the feasibility study, additional surveys need to be carried out wherever required. For the additional surveys, the Consultants shall submit to PIU proposals regarding the total number, the time of the surveys, as well as the locations of the traffic survey stations as part of at each stage. Suitable maps and charts should accompany the proposals, clearly indicating the rationale for selecting the location of survey stations. The methodology of collection and analysis of data, number, and location of traffic survey stations shall be finalized in consultation with PIU.

B. Traffic Demand Estimates

2. Based on the alignment selected during the FS, the Consultants shall make traffic demand estimates and establish possible traffic growth rates in respect of all categories of vehicles, taking into account the past trends, annual population and real per capita growth rate, elasticity of transport demand in relation to income, and estimated annual production increase. Traffic demand related to regional transport is to be assessed as part of the study on traffic projections. The methodology for traffic demand estimates shall be finalized by the Consultants in consultation with PIU. Overall traffic forecast thus made shall form the basis for the design of pavement types and other facilities/ancillary works.

C. Engineering Surveys and Investigations

a) Reconnaissance and Alignment

3. The Consultants shall make an in-depth study and review of the available land width (ROW), topographic maps, and other available relevant information collected by them concerning the selected alignment developed in the feasibility study. The Consultant, in coordination with the PIU, will arrange the required maps and the information needed by them from the potential sources. The detailed ground reconnaissance may be taken up immediately after the study of maps and other data. The primary tasks to be accomplished during the reconnaissance surveys include:

(i) Topographical features of the area;
(ii) Typical physical features along the existing alignment within and outside the ROW (i.e., land use pattern);
(iii) Alignment and realignment requirements;
(iv) Preliminary identification of improvement requirements, including treatments and measures needed for the cross-roads, if any;
(v) Traffic pattern and preliminary identification of traffic homogenous links;
(vi) Sections through congested areas;
(vii) Inventory of major aspects including land width, terrain, pavement type, carriageway type, bridges and structures (type, size and location), intersections (type, crossroad category, location), urban areas (location, extent), geologically sensitive areas, environmental features;
(viii) Critical areas requiring detailed investigations; and,
(ix) Requirements for carrying out supplementary investigations;
(x) Soil (textural classifications) and drainage conditions;
(xi) Type and extent of existing utility services along the alignment (within ROW).

1. The data derived from the reconnaissance surveys will be utilized for planning and programming the detailed surveys and investigations. All field studies, including the traffic

surveys, should be taken up on the basis of information derived from the reconnaissance surveys.

b) Topographic Surveys

4. The detailed topographic surveys should be taken up after the completion of reconnaissance surveys. The field surveys shall be carried out using high precision instruments, i.e., total station, auto level, etc. The detailed topographic survey shall pick up all topographical features that need to be considered for the detailed design of roads, bridges, and other structures.

c) Details of Utility Services and Other Physical Features

5. The Consultants shall collect details of all important physical features along the alignment. These features affect the project proposals and should normally include buildings and structures, monuments, burial grounds, cremation grounds, places of worship railway lines, stream/river/canal, water mains, sewers, gas/ oil pipes, crossings, trees, plantations, utility services such as electric, and telephone lines (O/H & U/G) and poles, optical fibre cables (OFC) etc. The survey would cover the entire right-of-way of the road with an adequate allowance for possible shifting of the central lines at some of the intersection's locations. The information collected during reconnaissance and field surveys shall be shown on a strip plan so that the proposed improvements can be appreciated and utility removals of each type and tree cutting, etc., assessed, and suitable actions can be initiated. A separate strip plan for each of the services involved shall be prepared for submission to the concerned agency. The details that are picked during the FS need to be checked, and additional details must be collected during the detailed study.

d) Road Inventory Surveys

6. Detailed road inventory surveys carried out during the FS need to be checked and updated.

D. Investigations of Structures

a) Inventory and Condition Survey of Structures

7. The Consultants shall review the Client's inventory of all the structures (bridges, culverts, etc.) along the road (i.e., the FSR), and update it if necessary. The Consultants shall inspect the existing structures and shall include a description of their condition in the design report.

b) Hydraulic and Hydrological Investigations

8. The Consultants shall collect information on high flood levels (HFL), low water levels (LWL), discharge velocity, etc., from available records, local inquiries, and visible signs, if any, on the structural components and embankments. Local inquiries shall also be made with regard to the road sections getting overtopped during heavy rains. The Consultants shall make a desk study of available data on topography, storm duration, rainfall statistics, topsoil characteristics, vegetation cover, etc., to assess the catchment areas and hydraulic parameters for all existing and proposed drainage provisions. The findings of the desk study would be further supplemented and augmented by a reconnaissance of the area. All-important hydrological features shall be noted during this field reconnaissance. For bridges and cross drainage structures having inadequate waterways, a history of overtopping, and proposed for reconstruction, the detailed hydrological and hydraulic studies shall be carried out. Based on the study done during the FS, detailed hydrological

and hydraulic studies must be carried out for the design of drainage structures, bridges, and culverts.

c) Geo-technical Investigations and Sub-Soil Exploration

9. The Consultants shall carry out requisite geo-technical investigations and sub-surface explorations for the proposed new bridges/bridges proposed for reconstruction, etc., along high embankments and any other location as necessary for proper design of the works, and conduct all relevant laboratory and field tests on soil and rock samples. The scheme for the boring locations and the depth of boring shall be prepared by the Consultants and finalized in consultation with PIU.

d) Materials Investigations

10. The Consultants shall identify sources (including use of fly-ash/ slag), quarry sites, and borrow areas, undertake field and laboratory testing of the materials to determine their suitability for various components of the work, establish the quality and quantity of various construction materials, and recommend their use based on techno-economic principles. The Consultants shall prepare a mass haul diagram for haulage purposes, giving quarry charts indicating the location of selected borrow areas, quarries, and the respective estimated quantities. It is to be ensured that no material shall be used from the right-of-way except by way of levelling the ground as required from the construction point of view, or for landscaping and planting of trees, etc., or from the cutting of existing ground for obtaining the required formation levels. The identified sources must be reflected, verified, and shown on the final design drawings and reports.

11. Environmental restrictions, if any, and the availability of these sites to prospective civil works contractors, should be duly taken into account while selecting new quarry locations. The Consultants shall make suitable recommendations regarding making good the borrow and quarry areas after the exploitation of materials for the construction of works. The Material Investigation aspect shall include preparation and testing of bituminous mixes for various layers and concrete mixes of different design mix grades using suitable materials (binders, aggregates, sand filler, etc.) as identified during Material Investigation to conform to the latest MORTH specification.

E. Road Safety Audit

12. Road safety audit shall be carried out for the road to identify areas of major concern, including black spots, and measures to be taken for improving design with respect to road safety. The audit should be in line with the ADB's Road Safety Audit for Road Projects – An Operational Toolkit and other references or publications reflecting international best practices. 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 (such as poor geometric features, pavement condition, etc.) of accidents should be investigated, and suitable cost-effective remedial measures should be suggested for implementation.

Team Responsibilities and Qualification Requirements

Responsibilities	Qualification Requirements
International Team	
1. Team Leader/Highway Engineer • Managing the design team to ensure that each member understands their responsibilities, deliverables, and timelines • Responsible for managing the surveys and ensuring data reliability • Finalizing and submitting all deliverables in the format and quality expected by the Client • Maintaining contact and liaison with the PIU to ensure that the consultancy services are conducted in accordance with the contract • Evaluating the preliminary design and identifying the additional data and consultation requirements. • Identify and present advanced/alternative materials, forms, and fabrication and construction methods with the other team members and the Client • Based on the agreement with the Client, finalizing the draft specifications. • Finalizing the alignment and pavement design and drawings, earthwork and pavement work items and quantities, and unit prices. • Guiding the experts preparing the BOQ, ensuring the accuracy of the total cost estimate. • Ensuring that the assignment is completed on time and on budget.	• At least a bachelor's degree in engineering, preferably specializing in highway engineering or a post-graduate qualification in highway engineering, from a state-accredited university. • Member of an internationally acknowledged engineering institution in relevant fields. • Excellent written and verbal communication skills in English. <u>Experience:</u> • Min. 15 years cumulative experience in team leadership • Min. 20 years of total professional experience in highway planning and design, or construction, and a sound understanding of design and construction standards, preferably in Central Asia. • Min 10 years of experience in developing countries, preferably 5 of those years in Central Asia [preferably in the Kyrgyz Republic] • Min 10 years of cumulative experience designing, managing, or implementing FIDIC contracts. • Experience in projects funded by ADB or other multilateral funding agencies.
2. Structural Engineer • Carry out the bridge detailed study and design according to the bridge requirements and locations identified in the FS. • Carry out detailed designs of related structures, including river training, bridge protection works, etc. • Supervise and conduct field surveys for the structures. • Identify and present advanced/alternative materials, forms, and fabrication and construction methods with the other team members and the Client • Based on the agreements with the Client, prepare the structural specifications, Bill of Quantities, ensuring that the unit prices and cost estimates for all bridges and related structures are included. • Coordination with all team members. • Provide input for the relevant parts of the deliverables listed in Table 3 and/or requested by the Client and the Team Leader.	• At least a bachelor's degree in civil engineering, preferably specializing in concrete structures, from a state-accredited university. • Excellent written and verbal communication skills in English. <u>Experience:</u> • Min. 15 years of professional experience in the design of structures, with min. 10 years of experience in the design of highway bridges and structures. • Experience working in developing countries, preferably in Central Asia, and familiar with design and construction standards and codes in Central Asia, CIS countries [preferably in the Kyrgyz Republic]. • Experience in projects funded by ADB and other multilateral funding agencies is preferable.
3. Geotechnical Engineer • Carry out the geotechnical investigations and prepare the reports and inputs required by the highway and structural engineer.	• At least a bachelor's degree in civil engineering, geotechnical engineering, geology or geological

Responsibilities	Qualification Requirements
• Identify and present advanced/alternative materials, forms, and fabrication and construction methods with the other team members and the Client • Based on the agreement with the Client, design the mitigation measures, technical specifications, detailed drawings, bill of quantities, and cost estimates for these measures. • Provide input for the relevant parts of the deliverables listed in Table 3 and/or requested by the Client and the Team Leader.	science, soil mechanics, or a similar field of study. • Excellent written and verbal communication skills in English <u>Experience:</u> • Min 12 years' experience in geotechnical investigations of embankment slopes, structures either underground or surface, including tunnels & bridges, landslide studies, identification of chronic slip zones, slope stabilization, Q-value/RMR, rock classification, and geological mapping. • At least 10 years' experience in soil and material surveys & investigations, identification of borrow & quarry areas, determination of density & CBR of subgrade soil, identification of dumping yard for disposal of unsuitable material during execution of civil works, sub-soil/ geo- technical investigations for deep foundations for bridges, or shallow or deep foundations for other structures and embankment/ slope design, laboratory and field testing, analysis of results, report preparation, slope stability analysis, embankment (low/ high) design, identifications of chronic slip zones & mitigation measures for slope stabilization, finalization of foundation types for bridges/ structures etc. in highway design and/or construction projects in the Central Asia, CIS countries [preferably in the Kyrgyz Republic] • Experience in projects funded by ADB and other multilateral funding agencies
4. Hydraulics Engineer • Manage the hydrological surveys if needed, and in consultation with the environmental and climate change experts, identify potential transboundary impacts of any interventions on the existing rivers or streams and debris flow. • Conduct hydraulic modeling for the drainage system and structures and evaluate the impacts of climate change and natural disasters. • Consult with the highway engineer, geotechnical engineer, and the structural engineer on the methods of addressing the hydraulic risks and mitigation measures for inclusion in the respective designs. • Identify and present advanced/alternative materials, forms, and fabrication and construction methods with the other team members and the Client • Revise the specifications as necessary and ensure that the features agreed with the Client are included in the designs of the various elements • Ensure that the cost of these features is reflected in the quantities and the unit prices.	• Bachelor's degree in civil engineering, hydraulics engineering, or hydrology. • Excellent written and verbal communication skills in English. <u>Experience:</u> • Min. 15 years of total experience in infrastructure design or construction, including min. 5 years of experience in designing hydraulic systems. • At least 5 years of experience working in developing countries, preferably in Central Asia, and familiar with design and construction standards and codes in Central Asia, CIS countries [preferably in the Kyrgyz Republic].

Responsibilities	Qualification Requirements
• Provide input for the relevant parts of the deliverables listed in Table 3 and/or requested by the Client and the Team Leader.	
5. Transport Economist • Evaluate preliminary economic analysis to ensure that the demand analysis, least economic cost analysis, economic cost and benefit analysis, economic internal rates of return, average incremental economic costs, sensitivity analysis, risk analysis, benefit distributional analysis, and poverty impact ratios are up to date and reliable. • If updating is needed, manage the data collection in consultation with the Client and the Team Leader. • Perform a Monte Carlo simulation to test the sensitivity of the economic viability of the project • Provide input for the relevant parts of the deliverables listed in Table 3 and/or requested by the Client and the Team Leader.	• Bachelor's degree in economics, transport planning, or relevant fields. • Master's degree or post-graduate degree holder in the relevant field is an advantage. • Excellent written and verbal communication skills in English <u>Experience:</u> • Min. 15 years of professional experience in conducting economic analysis of transport projects financed by ADB or other multilateral development banks. • Min. 10 years of experience as a transport economist of major highway projects in Central Asia, CIS countries [preferably in the Kyrgyz Republic]. • Able to analyze HDM-4 Version 2.12.02
6. Environmental and Climate Change Specialist • Review, update, and improve, if and where necessary, the environmental and climate change documents in the feasibility study. • If new data are needed for updating or filling gaps, conduct primary baseline monitoring surveys for air, water, noise, vibration, ecology, and biodiversity. • Consult with the residents and local stakeholders about the potential impacts and mitigation measures. • Consult with CSOs working in the area about the lessons learned and other concerns about the environmental and climate impacts of the project. • Refine or update the Grievance Redress Mechanism (GRM) for the project and integrate it into the E&S assessment and management documents. • Review the climate risk level estimated in the feasibility study, and if necessary, prepare, revise, update, or improve the Climate Risk and Adaptation assessment according to ADB requirements • Employ a reliable and practical modeling technique, such as CMIP6, or available data, to quantify the risk if deemed high. • Ensure that the cost of environmental protection and climate risk adaptation or mitigation measures, monitoring, and reporting are reliable and adequately reflected in the specification and the BOQ.	• Bachelor's degree in environmental science or environmental engineering, or relevant fields. • Master's degree or post-graduate degree in environmental science or relevant fields preferred. • Excellent written and verbal communication skills in English. <u>Experience:</u> • Min. 15 years of professional experience in environmental reviews. • Min. 3 years of experience in climate risk assessment and working with ADB's Climate Risk Management Framework • Min. 5 years of experience with preparing environmental safeguard documents for highway projects financed by multilateral development banks. • Experience in highway construction projects financed by multilateral development banks in Central Asia and CIS countries [preferably in the Kyrgyz Republic].

Responsibilities	Qualification Requirements
• Based on the consultations, provide input for the other team members and the relevant parts of the deliverables listed in Table 3 and/or requested by the Client and the Team Leader.	
7. Road Safety Specialist • Evaluate the past road safety record of the Project road • Conduct a complete safety inspection of the Project road to identify risky sites by time of day and by vehicle type • Rank the sites according to the risk level (e.g., high, medium, and low) • Evaluate alternative countermeasures in consultation with the Team Leader and other relevant team members • Select physical measures for incorporating in the design • Estimate the costs and benefits of the countermeasures, including any new materials and construction methods that may be needed • Prepare a safety audit plan and terms of reference for a safety auditor to be included in the construction supervision team	• Bachelor's degree in engineering, specializing in roads and highways. • Familiarity with road design standards in Central Asia <u>Experience:</u> • Min. 10 years of professional experience in road design and/or construction. • Min 5 years of experience in conducting road safety audits and using the ADB Road Safety Audit Toolkit • Authoring at least three safety audit reports in the past 10 years
8. Procurement Expert • Update and improve, if necessary, the procurement documents in the feasibility study report • In consultation with other members of the team, in general, the national quantity and quality management expert and the computer-aided design expert in particular, review the BOQ to ensure that the items (terms, definitions, references) are consistent with the drawings and specifications. • Together with the Client and the national quality and quantity estimation specialist, review the unit prices and obtain PIU's concurrence with the prices • Assist PIU in preparing the draft terms of reference for recruiting the construction supervision engineer.	• Bachelor's degree in civil engineering, commercial law, or relevant fields. • Excellent written and verbal communication skills in English. <u>Experience:</u> • Min. 10 years of professional experience in procuring civil works and recruiting consulting firms according to ADB or multilateral bank policies. • Min. 5 years of experience in procuring civil works and consulting services for highway projects in developing countries.
National Team	
1. Deputy Team Leader/Highway Engineer	
• Coordinate and plan all tasks and assist the Team Leader in managing team members and serving as Acting Team Leader in the absence of the Team Leader from the site • Coordination with all team members and providing necessary input to the feasibility study. • Responsible for all local communication and coordination. • Assist the team leader in ensuring all deliverables are made with high quality and promptly.	• Min. bachelor's degree in civil engineering, highway engineering, road construction, or relevant fields • Written and verbal proficiency in English and the local language. <u>Experience:</u> • Min. 15 years of total professional experience, including 8 years of experience in planning,

Responsibilities	Qualification Requirements
• Coordinate between the PIU and the Consultancy firm and other relevant agencies. • Verify the suitability of the surveys, data, and their accuracy. • Carry out design verifications on land. • Coordinate with all team members and provide necessary input to the detailed design. • Assist the international highway engineer with the detailed design, preparation of the Bill of Quantities, rate analysis, cost estimates, initial contract packaging, and documentation for the ensuing project. • Prepare design drawings and relevant design reports, in collaboration with all the experts.	project preparation, and design of highway projects, including externally aided projects. • Experience in Feasibility Study and DPR/Construction Supervision of major highway projects. • Experience in projects funded by ADB and other multilateral funding agencies is preferable. <u>Status of Employment:</u> • The expert must be a full-time employee of the lead firm or its associated firm and should have completed 2 years of service with the firm by the final day of technical proposal submission.
2. Structural Engineer • Carry out the bridge detailed study and design based on the bridge requirements and locations identified in the FS. • Work with the International bridge engineer throughout the assignment. • Prepare a detailed design of bridges and similar structures, including river training works, bridge protection works, etc. • Prepare technical specification, bill of quantities, rate analysis, and cost estimates for all bridges and related structures. • Supervise and conduct field surveys. • Coordinate with all team members and provide necessary input for the detailed design.	• Bachelor's degree or post-graduate degree in bridge engineering, civil engineering, structural engineering, or relevant fields. • Excellent written and verbal communication skills in English. <u>Experience:</u> • Min. 12 years of professional experience in the design of structures, with min. 8 years of experience in the design of bridges for highway projects. • Experience in the design of major bridges is preferred. • Experience in projects funded by ADB and other multilateral funding agencies is preferable.
3. Geotechnical Engineer • Carry out the geotechnical investigation and prepare the geotechnical investigation/ assessment report. • Work with the international geotechnical engineer throughout the assignment. • Design geotechnical countermeasures/ mitigation measures and prepare detailed drawings and cost estimates for the structures with rate analysis. • Carry out geotechnical studies for bridges on the alignment and provide geotechnical backstopping to the bridge engineer.	• Bachelor's degree in geotechnical engineering, geology or geological science, soil mechanics, civil engineering, or relevant fields. • Master's degree or post-graduate degree holder in the relevant field is an advantage. • Excellent written and verbal communication skills in English <u>Experience:</u> • Min. 12 years' experience in geotechnical investigations of embankment slopes, structures, either underground or surface landslide studies, identification of chronic slip zones, slope stabilization, Q-value/RMR, rock classification, and geological mapping. • Experience in soil and material surveys & investigations, identification of borrow & quarry areas, determination of density & CBR of subgrade soil, identification of dumping yard for disposal of unsuitable material during execution of civil works, sub-soil/ geo- technical investigations for deep foundations for bridges, or shallow or deep foundations for other structures and embankment/ slope design, laboratory and field testing, analysis of results,

Responsibilities	Qualification Requirements
	report preparation, slope stability analysis, embankment (low/ high) design, identifications of chronic slip zones & mitigation measures for slope stabilization, finalization of foundation types for bridges/ structures etc. in highway design and/or construction projects. • Experience in projects funded by ADB and other multilateral funding agencies.
4. Environment Safeguard Expert	
• Coordination with all team members and providing necessary input to the feasibility study. • Work with the international environment safeguard expert, biodiversity/ wildlife expert, and a climate and disaster resilience expert on data collection, review, and any necessary input. • Support conducting Primary baseline monitoring surveys for Air, Water, Noise, ecology, biodiversity, Traffic, and Soil. • Integrate the findings of the CHA study in the environmental screening report. • Support coordinating with CSOs working in the area about the existing measures and other concerns towards environmental factors. • Conduct meaningful consultations with the community and various stakeholders, the CSOs, and the Climate Expert and Social Development expert in the team, and prepare a report on the gaps and deficiencies in the E&S documents that must be corrected. • Conduct knowledge transfer sessions and input for training on the ESF and ESS guidance notes.	• Min. bachelor's degree in environmental engineering, Environmental science, Climate Sciences, Meteorology, or related fields. • Excellent written and verbal communication skills in English. <u>Experience:</u> • Min. 8 years of professional experience in initial environmental examination/ environmental impact assessment and preparation and monitoring EMP implementation for infrastructure projects in the Kyrgyz Republic. • Experience of working on externally aided projects is preferred. • Experience with multilateral development banks, particularly familiarity with ADB's SPS 2009 and/or ESF, is preferred. • Experience in projects in hilly/ mountainous terrain and protected areas is highly preferred.
5. Climate and Disaster Resilience Expert	
• Coordination with all team members and providing necessary input to the detailed design. • Work with the international climate and disaster resilience expert on data collection, review, and any necessary input. • Conduct a literature review of reports, surveys, and available documents to assess the disaster risk, which includes river flooding and sediment loading, and other disaster risks along the road alignment, and evaluate the results. • Support in conducting all necessary studies stipulated in the TOR.	• Min. bachelor's degree in Climate Sciences, Meteorology, Environmental Engineering, and related fields. • Excellent written and verbal communication skills in English. <u>Experience:</u> • Min. 8 years of professional experience in development projects and designing adaptation measures. • Experience designing and implementing climate and disaster risk reduction measures is preferred. • Familiarity with the Paris Agreement is an advantage. • Experience in projects funded by ADB and other multilateral funding agencies is highly preferred.
6. Social Safeguards / Land Acquisition & Resettlement Expert	
• Coordination with all team members and providing necessary input to the feasibility study.	• Min. Bachelor's degree, or equivalent, in social, community, or international development, gender and development, labor and social protection.

Annex 2: Indicative Team Responsibilities and Qualification Requirements

Responsibilities	Qualification Requirements
• Coordinate and work with the international safeguard experts to conduct necessary field surveys, consultations, data collection, and assessments. • Work with the international expert to determine the institutional arrangements for land acquisition and resettlement. • Work with the international expert to determine the land acquisition and resettlement budget and implementation schedule.	• Min. 10 years of professional experience in land acquisition, rehabilitation, and resettlement services • Written and verbal proficiency in English and the local language. <u>Experience:</u> • Experience in social impact assessment and related studies, preparation of Resettlement Plan, Land Acquisition Plan, Indigenous Peoples Plan documentation, along with related due diligence reports • Resettlement and land acquisition expert in at least one highway project. • Experience with multilateral development banks, particularly familiarity with ADB's procedures, is preferred.
7. Computer-Aided Design Specialist • Design & Drafting: Create, modify, and update precise 2D/3D drawings, schematics, and prototypes based on the feasibility study using software like AutoCAD. • Collaboration: Work closely with the international and national experts and other professionals to understand design intent and requirements. • Documentation & Reporting: Produce documentation packages, technical reports, review BOQ, and maintain accurate design files. • Quality Assurance: Verify designs for accuracy and compliance with codes, standards, and specifications. • Technical Support: Troubleshoot design issues, provide technical advice, and offer help desk support for CAD systems.	• Proficiency in CAD software (AutoCAD, SolidWorks, Revit, etc.). • Strong understanding of drafting principles, mathematics, and engineering fundamentals. • Excellent attention to detail, problem-solving, and analytical skills. • Good communication and teamwork abilities. • Ability to manage multiple projects and work under pressure.
8. Social Development and Gender Expert • Prepare poverty and social analysis and gender assessment and action plan (GAAP) in accordance with ADB guidelines. Conduct necessary surveys, as needed. Assessment should be evidence- and context-based. • Map potential stakeholders, including key women, vulnerable groups, and relevant CSOs to engage with for GAAP preparation and GAP implementation. • Develop a work plan and coordinate with all team members, and provide necessary input to the detailed design study. • Conduct meaningful consultation with directly affected persons and other stakeholders (including NGOs) of the ensuing project. • Make recommendations on GAP implementation arrangements, and strategic and practical gender/GESI elements in the project design. • Identify relevant items and cost estimates to be considered for GAP implementation.	• Min. Bachelor's degree, or equivalent, in social sciences, community or international development, gender and women studies, labor and social protection. • Min. 7 years of professional experience in integrating GESI approaches across all components of the project • Written and verbal proficiency in English and the local language. <u>Experience:</u> • Familiarity with gender mainstreaming and GESI principles in the context of the Kyrgyz Republic. • Experience in the development of the project's GESI analysis and GESI strategies • Experience with multilateral development banks, particularly familiarity with ADB's procedures, is preferred.

Responsibilities	Qualification Requirements
• Assess the social dimensions that will influence the design and implementation of the ensuing project, including CSO participation and communication strategy, communicable diseases (e.g., STIs including STDs), human trafficking, and core labor standards. • Timely consultation and seek feedback from the ADB gender officer before finalizing surveys for rollout, workplan schedules, and GAAP for the project.	
9. Survey Engineer	
• Support all other experts in conducting surveys alongside the selected alignment. • Carry out detailed engineering topographic surveys. Establish three intervisible permanent benchmarks for every kilometer, and reference beacons required for the preparation of detailed engineering design to enable estimation of construction quantities. • Fix batter pegs at 20-metre intervals. • Carry out a detailed topographic survey for the design of bridges and related structures. Establish at least two permanent stations for every bridge. • Coordinate with all outsourced survey activities. • Bookkeeping of all survey records. • Coordination with all team members and providing necessary input for the detailed study.	• Min. Diploma in civil engineering, survey, or related field. • Written and verbal proficiency in English and the local language. • Min. of 10 years of professional experience • Min. 5 years of experience in carrying out survey works. • At least carried out 1 No. of road topographical survey work for major roads of 5 Km and longer in the past 10 years. • Experience in working with GIS.
10. Quantity Surveyor/Quality Assurance Expert	
• Help prepare cost estimates, budgets, cash flow forecasts, and monthly cost reports. • Assist in site measurements, verifying quantities, and preparing interim payment valuations. • Perform quantity takeoffs (material, labor, equipment) from blueprints, drawings, and specifications. • Collect, analyze, and interpret historical bid prices and market data to identify trends and patterns. • Help prepare tender documents, analyze project plans, and support procurement processes. • Provide general support, including data entry and document management. • Support all other experts to deliver the detailed design. • Coordination with all team members and providing necessary input to the detailed design.	• Ability to understand construction plans and specifications. • Familiarity with estimating software (e.g., for takeoffs). • Good communication for contacting vendors/teams. • Basic knowledge of construction methods and project lifecycle.

1. *The Consultant may propose additional experts/staff/support staff to complete the assignment within the given timeline.*

2. *The Consultant has to certify that all the key personnel as envisaged in the Contract Agreement have been actually deployed in the projects at the time of submitting bills/ invoices to PIU from time to time.*