

ROAD ASSET MANAGEMENT CONSULTANT (PHASE III) TERMS OF REFERENCE

Institutionalization of RAMS in MOTC's Business Process

A. INTRODUCTION

1. Road network managed by the Ministry of Transport and Communications (MOTC) of the Kyrgyz Republic comprises a total of 18,962 km of public roads, classified as follows: International Roads - 4,306 km; National Roads - 5,840 km; and Local Roads - 8,816 km. The total length of paved roads is 8,740 km. MOTC is responsible for policy, regulation, coordination and control, as well as programming, planning, procurement of construction and rehabilitation works, and maintenance services. The structure of MOTC and its departments is shown in the chart below.
2. RAMS Phase I in the Kyrgyz Republic was piloted under the ADB-financed CAREC Corridors 1 and 3 Connector Road Project during 2018–2021. Phase I introduced RAMS processes and tools to support more efficient and transparent planning and budgeting for road maintenance, rehabilitation and improvement. It also strengthened the data-collection capacity of the State Agency “Production Innovation Center” (PIC). However, the available staffing and system functionality were insufficient to make RAMS fully operational. To address these limitations, MOTC initiated RAMS Phase II in March 2023 under the CAREC Corridors 1 and 3 Connector Road Project – Additional Financing. Project was scheduled for completion in February 2026. Its main objective was to build on the Phase I outputs, mainstream RAMS in MOTC business processes and develop the additional functionality required for full operation. The scope of Phase II included:
 - (i) Procure equipment to strengthen the capacity of RMD, Production Innovation Centre (PIC), and underlying entities to collect and manage data for the entire road network.
 - (ii) Update data for the paved road network and expand the data collection to include the unpaved road network.
 - (iii) Further develop the database in the Road Information System (RIS) to incorporate the collected data for paved and unpaved roads, as well as data for structures.
 - (iv) Further develop the web-Maintenance Planning System (MPS) to include functionality to present and combine data from the database, and to further improve the planning for paved roads and expand the planning to unpaved roads and other assets.
 - (v) Support MOTC in developing a legal basis for integrating the RAMS into annual planning and budgeting procedures and prepare an Action Program for further development of the RAMS.
 - (vi) Support the initial operation of the newly established Asset Management Unit under RMD, provide recommendations for strengthening the institutional structure of RMD, PIC, and underlying entities to operate and manage the RAMS.
 - (vii) Identify annual funding needs and suitable funding sources for road maintenance and repair, and support the operation of the Road Fund.
 - (viii) Provide capacity building and training to the staff of RMD, PIC, and underlying entities.
 - (ix) Develop a university course on RAMS to strengthen the capacities of future generations of engineers.
 - (x) Deliver 17 project-related and legal documents, including manuals, project reports and other implementation documents.
3. During Phase II, road condition data for 8,100 km of paved road were collected between 2023 and 2025 using the TRASSA survey system. TRASSA collected the International Roughness Index (IRI), rutting, and highresolution video of the pavement. The video was subsequently converted into image frames, and pavement distresses were identified and measured using Devli software. TRASSA is equipped with the following components, each of which supports specific data-collection functions:
 - Odometer - measures distance traveled during the survey.
 - GPS device - records geo-coordinates for accurate location referencing.
 - Bump Integrator - collects pavement roughness data.
 - Transverse evenness sensor – measures surface evenness across the pavement.

- A forward-facing camera – captures roadway imagery; this was upgraded with higher-quality camera supplied by Finnroad.

TRASSA was introduced to PIC and installed on the PIC laboratory van. The equipment was used for the Phase I surveys and continued to be used during Phase II.

In addition, TRASSA surveys were conducted on 2,075 km of unpaved roads in 2025. Both inventory and condition data were collected, processed and uploaded to RAMS. As a result, RAMS contains 1,690 road sections.

4. During Phase I and Phase II, twenty-four-hour traffic counts were conducted across the various road classes shown below.

Year	Counting Locations	International Road	State	Local
2020	231	84	71	76
2021	110	4	20	86
2022	350	10	100	240
2023	231	84	71	76
2024	192	27	50	115
2025	79	3	63	13
Total	1193	212	375	606

5. Main features implemented in RAMS during Phase I and Phase II are listed in the table below.

Functions	Phase I	Phase II
Applications	Two separate applications were used: RIS operated on local area network, while MPS was web-based.	Merged into single platform RAMS, which is now entirely WEB-based
Maps	Only roads surveyed during Phase I were displayed. Hardcoded data prevented updates when new survey data become available.	The MAP module was redeveloped, providing full coverage in RAMS for the entire road network
Data Entry	Data could only be added through direct import into the RIS database; no user interface or data-entry forms existed.	Web-based data entry module was developed with data entry forms and a data import facility.
Data processing	No in-system function for preparing annual maintenance plans. Processing tools existed only as standalone utilities accessible to IT experts.	A full Planning Module was developed, enabling: creation of homogeneous sections, an editable treatment matrix, and automated generation of treatments and plans.
Reporting	The system had no reporting module.	RAMS now includes a reporting module capable of generating 12 reports, with print and Excel export options.

Admin Module	Treatments and cost parameters could not be edited within the system.	A new administrative module allows users to add and edit treatments and cost data.
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6. MPS - Maintenance Planning System; RAMS – Road Asset Management System; RIS – Road Information System; RAMS currently has 9 modules, including the Home Module. The status of these modules is listed in the table below.

ID	Module	Function	Status
1	Home	Displays the dashboard.	Complete
2	Inventory	Allows to store and view Road Inventory	Complete
3	Surveys	Allows to store and view survey details	Complete
4	Planning	Generates Treatment, Maintenance Plan, and Title List	Complete
5	Project Monitoring	Allows converting plans to project and monitor progress	Complete
6	Bridges and Tunnels	Details of bridges and tunnels	Complete
7	Map	Displays the Road Network and Surveyed roads	Complete
8	Reports module	Generates 12 reports with print/export facility for some of the reports	Complete
9	Administrative Tasks	The various Setup / Master data items that are to be used with in the system are grouped and placed under this menu.	Complete

7. The principal Phase II documents relevant to the Phase III assignment include:

- (i) Inception Report.
- (ii) Equipment Calibration Manual.
- (iii) Data Collection and Management Manual.
- (iv) RAMS Planning Manual.
- (v) Road Financing Report.
- (vi) RAMS Operational Manual.
- (vii) RAMS Action Program.

- (viii) Capacity Development Report.
- (ix) RAMS Legal Report
- (x) Maintenance Implementation Report.

The principal RAMS Phase II reports and deliverables are available at:
<https://drive.google.com/drive/folders/1gCMIMWWeHWrO5chmozrW9jUa28CTkgP?usp=sharing>.

B. OBJECTIVE OF PHASE III

10. The primary objective of this Phase is to enhance the RAMS produced in Phase I and Phase II to facilitate the complete integration and institutionalization of the RAMS and its associated best practices within the Ministry of Transport and Communications (MOTC). It will also speed up data collection and improve the management of data. The success of this Phase will be measured not only by the technical capacity and improved efficiency of operation of RAMS tools, but also by the practical utilization of its outcomes and management level involvement. Ultimately, this Phase aims to ensure that RAMS outputs meaningfully inform management-level decision making, resource allocation, and the preparation of mid-term work programs.
11. Additionally, Phase III shall focus on modern, AI-based solutions, fit-for-purpose equipment and capacity-building activities. The target is to reduce data collection and processing time by at least 40% compared with the documented Phase II baseline, reduce manual data aggregation and achieve at least 90% defect-classification accuracy against a validated reference sample. These targets shall be verified through an agreed baseline and acceptance methodology during the inception stage.

C. SCOPE OF WORK

12. The Consultant will be responsible for the following broad activities that are individually described in more detail in the following sections:
 - C1.** Comprehensive study of implemented and planned institutional reforms relevant to road asset management and GAP analysis.
 - C2.** Business processes review and recommendations preparation for the improvements for the RAMS integration in the MOTC decision-making processes.
 - C3.** Assessment of the functionality of RAMS tools and the needed improvements to RAMS.
 - C4.** Development of Road Asset Management Policy and Strategy, Data Collection and Management Manual, Traffic Data Collection and Evaluation Methodology, National Traffic Monitoring Strategy and Action Plan.
 - C5.** Update of the multi-year planning manual and preparation of a five-year rolling program for road asset preservation and improvement.
 - C6.** HDM-4 integration with RAMS tools enabling strategy, program and project-level analysis.
 - C7.** GIS mapping of the road network, hazard risk, and vulnerability data.
 - C8.** Procurement of road surveying equipment, computer hardware and COTS GIS software.
 - C9.** Support for data collection for roads.
 - C10.** Capacity building for decision-making, road asset management, multi-year planning, traffic data collection procedures, COTS GIS solutions, etc.
 - C11.** Update of the KSTU RAMS course.
13. The Consultant must ensure that all solutions and proposals will be tailored to local capacities, and through comprehensive capacity building activities, MOTC, RMD, and PIC will be able to reproduce necessary data.
14. All software tools and/or equipment used for preparing a multi-year plan shall be transferred to the MOTC with the necessary documentation, training materials, manuals, etc.

D. DETAILED SCOPE OF WORK

D1. Comprehensive study of implemented and planned institutional reforms relevant to road asset management and GAP analysis.

1. As the initial task, the Consultant shall review the Phase I and Phase II deliverables and results, identify achievements and outstanding limitations, and determine any issues that may affect implementation of RAMS Phase III.
2. The Consultant shall conduct a comprehensive analysis of both implemented and planned institutional reforms related to decision-making on short and long-term road construction, rehabilitation, and maintenance investments planning, based on RAMS data. The Consultant shall assess the scope, nature, and effectiveness of these reforms and their impact.
3. The Consultant shall review the existing organizational structures and responsibilities of MOTC, RMD and PIC and, if needed, other agencies; identify areas of poor coordination or fragmented responsibilities; and recommend how RAMS should be introduced across the organizations to improve decision-making on road infrastructure investments. RAMS should serve as the principal basis for such decisions and as the common database for all relevant departments and agencies. Following the analysis, the Consultant shall prepare recommendations and an organizational improvement roadmap.
4. Additionally, the Consultant shall also assess the recommendations of the Road User Charges Study under the Knowledge and Support Technical Assistance (KSTA 6756: Improving Infrastructure Sustainability through Better Asset Management) and incorporate findings on progress made by the Government of the Kyrgyz Republic in the application of road user charges.
5. The findings from this analysis shall allow informed decisions for subsequent tasks and the formulation of a strategy for optimizing short and long-term road construction, rehabilitation, and maintenance planning and road asset management practices within MOTC.

Scope of this analysis shall include, but is not limited to:

- Institutional setup of RAMS operation and responsibilities.
 - Implementation of maintenance activities.
 - Asset Management Unit capacity and needs.
 - Operation of Road Fund and Road Board.
 - Application of Road User Charging.
 - Legal basis for annual data collection.
 - Legal basis for using RAMS in planning and budgeting.
 - Etc.
6. The Consultant shall compile a report with the list of specific recommendations in the form of an actionable plan. The Consultant shall support MOTC, RMD, and PIC in carrying out proposed and approved reforms where possible.

D2. Business processes review and recommendations preparation for the improvements for the RAMS integration in the MOTC decision-making processes.

1. Following the institutional review, the Consultant shall diagnose the existing business processes of MOTC, RMD and PIC related to short- and long-term road construction, rehabilitation and maintenance planning, and the use and updating of road-infrastructure data. The Consultant shall map the current RAMS workflow, identify gaps, redundancies and inefficiencies, conduct stakeholder interviews, and recommend process improvements.
2. The Consultant shall identify opportunities to streamline and strengthen business processes so that RAMS becomes the principal data source supporting road-infrastructure management. The review shall address the long term sustainability of the system and its alignment with operational needs.
3. The Consultant shall conduct consultations with related stakeholders to assess current business processes and future needs.
4. The Consultant shall compile a report with the described processes and list specific recommendations in the form of an actionable plan. The Consultant shall support MOTC, RMD, and PIC in carrying out proposed and approved process improvements where possible.

D3. Assessment of the functionality of RAMS tools and the needed improvements to RAMS.

1. The Consultant shall review the RAMS tools implemented under Phases I and II and map other MOTC IT tools, software and databases relevant to RAMS. The review shall identify their functionality, user interfaces and dataexchange formats; assess opportunities for integration; evaluate the skills required for data and system administration and maintenance; and prepare a system architecture and roadmap for future RAMS development, functionality and integration.
2. The Consultant shall assess the functionality of RAMS tools and equipment, including user-friendliness, usability, integration with other systems, automated and manual data entry, and the completeness of documentation and training materials. In parallel, the Consultant shall review the technical capabilities of the existing data-collection equipment for roads, bridges and tunnels. Based on the as-is assessment, the Consultant shall prepare prioritized recommendations for improvement.
3. The Consultant shall review how other existing IT tools, equipment and databases—such as video and speed cameras, weather devices, variable-message signs and accident databases—support current business processes, identify gaps, and prepare a roadmap for future RAMS functionality and integration.
4. The Consultant shall assess the coverage and quality of data collected under RAMS Phase II and, where necessary, propose standardized datasets and attributes for each infrastructure element (for example: ID, location, dimensions, construction year, condition rating, material type, inspection records and maintenance history), aligned with relevant international RAMS tools and practices, including HDM-4, pavement-management systems and GISbased systems.
5. The Consultant shall also review the existing asset-type lists and, where required, prepare an updated comprehensive list of assets to be included in RAMS, such as road condition, carriageways, shoulders, bridges, culverts, tunnels, signage, drainage, safety barriers, lighting and ITS elements. The inclusion criteria shall reflect functional importance, maintenance needs, cost implications and risk exposure.
6. As part of the gap analysis, the Consultant shall identify which data-transfer, quality-control and error-identification activities are performed manually or automatically and recommend practical automation opportunities. The Consultant shall also assess feasible AI applications, including pavement-distress classification, natural-language data queries, road-condition monitoring and proactive maintenance planning. Historical RAMS data shall be used to analyse and visualize network- and section-level condition trends.
7. Based on the gap analysis, the Consultant shall prepare a prioritized technical improvement and capacitydevelopment plan and, subject to MOTC approval, implement the following RAMS improvements:
 - At present, the sections cannot be split or merged using the features of RAMS. As this will be beneficial, an automated process to manage splitting and merging of sections shall be implemented without losing the historical data linked to the section.
 - There shall be a facility to see the history of treatments to road sections.
 - Analyze the traffic growth rate and propose a regional growth rate for traffic that can be used for traffic predictions.
 - At present, RAMS does not assign traffic to nearby sections. The outcome of this initiative may require changes to the traffic data forms, database, and analysis tools currently provided in RAMS.
 - Condition data is collected in about 30% of the network each year. Thus, data is updated every year in 1/3rd of the network. When preparing the maintenance plan, the system uses current data or data that is one or two years old. When using the road condition data of previous years, they are to be projected to reflect the current condition.
 - RAMS generates the treatments for each section based on the current condition of the road and the treatment matrix. The treatments are then prioritized based on a priority index, which is determined from: 1. ADT - annual average daily traffic of the section in six ranges; 2. Number of villages in the section; 3. Number of black spots (accidental areas) in the section; 4. Number of social importance in the section (tourist destinations, development of new towns, large industrial plants, etc.); These are not available for some of the road sections. In view of the importance, this data is to be obtained for all the sections and updated in the system during Phase III.
 - An ongoing Phase II project has collected accident data from the police department. This data shall be made use of and include a necessary table in the RAMS database to store the location, type and date of accidents. The accident information in RAMS should be integrated into GIS Mapping so that users can see all the fatal severe injury locations. This information shall also be considered in the prioritization process.
 - List the processes, activities, and areas where AI-based solutions could be implemented and ensure that AIbased solutions would be a cornerstone for all improvements.

D4. Development of Road Asset Management Policy and Strategy, Data Collection and Management Manual, Traffic Data Collection and Evaluation Methodology, National Traffic Monitoring Strategy and Action Plan.

1. The Consultant shall review relevant national documentation, standards, and existing data sources related to road infrastructure management, short and long-term road construction, rehabilitation, and maintenance investments planning in Kyrgyz Republic.
2. The Consultant shall conduct a diagnostic review of Kyrgyz Republic roads management and funding practices, legal frameworks, and compliance gaps related to full vertical integration of RAMS in the processes.
3. The Consultant shall develop a comprehensive Road Asset Management Policy and Strategy to guide short- and long-term investment planning for road construction, rehabilitation and maintenance. The document shall establish a clear vision and actionable measures for maintaining, improving and optimizing road infrastructure, taking account of sustainability, economic viability, safety and technological development. It shall address asset inventory and inspection, maintenance strategies, climate considerations, multi-year planning, funding mechanisms, performance evaluation, risk management and integration with broader transport planning.
4. The Consultant shall develop a Data Collection and Management Manual covering efficient data collection, quality control, management, storage and transfer to RAMS.
5. Reliable traffic data remain a constraint to data-driven multi-year planning. PIC currently has five mobile SDR traffic counters, which are used for periodic 24-hour classified counts. The Consultant shall review the existing traffic count programme, coverage, seasonality, vehicle classification, data quality and integration with RAMS, and shall prepare a National Traffic Monitoring Strategy and Traffic Data Collection and Evaluation Methodology based primarily on the effective use of existing equipment and institutional capacity.
6. The Strategy and Action Plan shall define the recommended future traffic-monitoring architecture, data standards, operating procedures, locations and priorities; prepare technical and functional specifications, cost estimates and a phased implementation plan; and assess feasible video- and AI-based vehicle-classification solutions. Procurement of permanent traffic-counting stations, WIM systems or additional SDR mobile counters is not included in this assignment or in the current contract cost estimate.

D5. Update of the multi-year planning manual and preparation of a five-year rolling program for road asset preservation and improvement.

1. The Consultant shall compare previous multi-year plans with works actually implemented by MOTC and determine the extent to which those plans influenced road construction, rehabilitation and maintenance decisions. Where differences are identified, the Consultant shall analyse the causes and recommend measures to strengthen the link between RAMS planning outputs and implementation. The Consultant shall review the RAMS Phase II Planning Manual and the findings of the institutional and business-process gap analyses and prepare an updated manual. In addition to the planning approach and tools, the manual shall incorporate non-monetary prioritization criteria based on international good practice, including population, climate vulnerability, poverty, tourism and road safety. It shall describe the sources and updating arrangements for such information and the methodology for integrating it into network-level analysis using RAMS and COTS GIS software. The Manual shall include at least the following annexes:
 - (i) A multi-year planning framework describing the required content and structure of the annually updated plan. The framework shall be reviewed and approved by MOTC management before preparation of the first updated rolling programme.
 - (ii) A technical annex describing, step by step, the data-acquisition and processing activities required to prepare the multi-year plan, including screenshots and operating instructions for the relevant tools and functions.
2. Based on the updated Multi-Year Planning Manual, the Consultant shall prepare a five-year rolling programme for road-asset preservation and improvement covering 2028–2032. The programme shall also be prepared in GIS format to enable visualization and thematic mapping. All project-specific tools, scripts, models and configurations developed by the Consultant shall be transferred to MOTC without restrictions on future use. Any third-party COTS software shall remain subject to the license terms approved by MOTC and financed under the relevant provisional sum.
3. The programme shall be supported by HDM-4 analysis incorporating economic indicators and multi-criteria analysis (MCA) for objective non-monetary factors. Subject to data availability, the indicators shall include population density, access to education and health facilities, climate exposure and vulnerability, tourism and other agreed

factors. Assignment of MCA indicators shall be automated through GIS spatial-analysis tools and covered by the GIS training programme so that MOTC can repeat the analysis annually.

4. The planning methodology shall be fully reproducible and documented in the Multi-Year Planning Manual.

D6. HDM-4 integration with RAMS tools enabling strategy, program and project-level analysis.

1. Under this Task, the Consultant shall ensure effective integration of HDM-4 and RAMS. The required functionality shall support dynamic sectioning, generating homogeneous sections based on condition, traffic, carriageway width, rutting, surface distress and other relevant parameters, and shall generate an appropriate condition index.
2. The Consultant shall verify the final RAMS Phase II functionality during the inception stage and, as necessary, develop or improve a standalone or integrated module that automatically converts country-level road-network data into homogeneous sections and exports them in a structure and format suitable for HDM-4 strategy-, programme- and project-level analysis. The final integration approach shall be agreed with MOTC.

D7. GIS mapping of the road network hazard risk and vulnerability data.

1. Under this Task, the Consultant shall assess at least two principal types of climate-resilience data that can be incorporated into planning:
 - (i) The first dataset shall cover asset criticality (for example, lifeline road links or bridges without viable alternative routes), asset vulnerability and exposure as road-asset inventory information.
 - (ii) The second dataset shall cover geohazards, including landslides, mudslides, erosion and rockfalls, as well as relevant historical and projected climate and weather hazards, including flooding and scouring.

Dataset (i) would normally be created and maintained by the infrastructure agency. Dataset (ii) may be available from national or local government entities, development partners, open-data platforms or private-sector providers.

2. For Dataset (i), the Consultant shall propose a database structure and data-collection forms and shall assist MOTC in compiling the available information through MOTC regional offices and DEPs.
3. For Dataset (ii), the Consultant shall identify available sources, assess data coverage and quality, define data requirements and technical specifications, prepare indicative cost estimates, and develop a phased action plan for any future acquisition. Purchase of commercial geohazard or climate datasets is not included in this assignment or in the current contract cost estimate.
4. All data made available by MOTC or obtained from accessible public sources under the assignment shall be converted into GIS format, with appropriate metadata, for visualization and analysis together with the multi-year plans.

D8. Procurement of road surveying equipment, computer hardware and COTS GIS software.

1. The Consultant shall review the existing equipment, IT tools, functionality and integration options within MOTC and determine the additional equipment, software and related services required to support RAMS and road surveying. No permanent traffic-counting stations, WIM systems or additional SDR counters shall be procured under this Task.
2. The Consultant shall assess the condition and technical adequacy of the existing computer equipment used for RAMS-related activities and determine the need for replacement or additional equipment required for the operation of RAMS tools, GIS platforms, and related applications.
3. If required and approved by MOTC, the Consultant shall procure additional desktop and/or notebook computers and a large-format (A0/A1) colour printer from the relevant provisional sum, in accordance with the applicable ADB procurement requirements and arrangements agreed with MOTC and ADB.
4. The Consultant shall assess available GIS software solutions, including free-of-charge and licensed Commercial Off-The-Shelf solutions, and recommend the most suitable option or combination of options for MOTC.
5. The Consultant shall define the intended use of GIS in MOTC operations, including its integration with RAMS tools and its application for asset inventory, maintenance planning, spatial analysis, data visualisation, and data-driven decision-making.
6. Based on the findings under this and the other Tasks, the Consultant shall review the ToR and information prepared under Phase II, identify and propose the improvements for the required technical functionalities, operational capabilities, and onboard equipment for a dedicated vehicle-based road surveying system.

7. The proposed vehicle-based road surveying system/equipment shall be capable of carrying out, at a minimum, pavement condition assessments, longitudinal and transverse profile measurements, roughness and rutting surveys, crack and surface distress detection, road geometry and alignment surveys, road asset and inventory surveys, road marking and traffic sign condition surveys, and the collection of other relevant road corridor data.
8. The special multifunctional geodetic vehicle shall be equipped, at a minimum, with a road surface profiler, laserbased pavement distress measurement equipment, high-resolution digital cameras, GNSS/GPS and inertial positioning systems, a distance measuring instrument, onboard control, processing and storage equipment, and dedicated software for synchronized data acquisition, analysis, and reporting.
9. When defining the technical requirements, the Consultant shall take into account the existing acceptance tests and protocols, operational requirements, current technological developments and good industry practice.
10. The Consultant shall provide technical and procurement support throughout the process, including needs assessment, preparation of procurement documents, technical support during evaluation, delivery, installation, commissioning, testing and final acceptance.
11. The Consultant shall prepare or update the required bidding documents, technical and functional specifications, qualification requirements and supporting documents.
12. The Consultant shall submit all procurement documents to MOTC for review and approval, and to ADB where required, and shall revise them in response to consolidated comments.
13. The Consultant shall provide technical support to MOTC during tender announcement and administration, including preparation of draft responses to technical clarification requests.
14. The Consultant shall provide technical and non-binding advisory support during bid review, compliance assessment, contract-award processing, delivery, installation, configuration, commissioning, testing, verification and final acceptance. All procurement decisions, evaluation approvals, complaint decisions, contract award and acceptance decisions shall remain the responsibility of MOTC and its duly authorized committees.
15. The procurement process shall commence with a needs assessment during the inception stage and shall be carried out in accordance with the applicable ADB procurement requirements and the arrangements agreed with MOTC and ADB.
16. The Consultant shall test and verify the functionality, performance, and accuracy of the procured equipment and software and confirm compliance with the specified requirements.
17. All activities under this Task shall be carried out in close coordination with MOTC and in accordance with the applicable ADB procurement requirements, as amended from time to time, and the approved Procurement Plan.

D9. Support for data collection for roads.

1. PIC, under MOTC, will carry out the road-surveying, traffic-counting, data-processing and database-entry activities under this Task. These operational activities will be financed from the state budget.
2. The Consultant shall support PIC in reviewing the existing asset-type list and, where necessary, developing an updated comprehensive list of assets to be included in RAMS, with clear inclusion criteria based on functional importance, maintenance needs, cost implications and risk exposure. The Consultant shall also propose standardized datasets and attributes for any additional infrastructure elements and align them with relevant RAMS, HDM-4, pavement-management and GIS practices.
3. The Consultant shall review the data-collection process, additional data needs, available equipment and any changes required in RAMS to store and process the data. The support shall include:
 - Prepare a draft comprehensive data collection manual involving what data are to be collected, how and when and which equipment is to be used.
 - Calibration and quality checks.
 - Processing requirements.
 - Presentation to PIC and other stakeholders.
 - Prepare Data Collection Manual.
 - Training to stakeholders to collect, process and upload the data.
 - Support PIC and RMD in collecting, processing and uploading the data into RAMS.

4. The Consultant shall review the existing data-collection tools, equipment and software; assess the division between manual and automated work; and recommend improved methods and feasible AI-based tools, including computervision solutions, to reduce manual work and the time required for data collection and aggregation.
5. Road-survey data collection and post-processing shall be carried out by PIC using the existing equipment and, once available, the new road-surveying system. The Consultant shall work closely with PIC and provide on-the-job training, quality assurance and capacity-building support.
6. The Consultant shall support PIC in ensuring that the target road lengths are surveyed and that the resulting data are properly post-processed, quality-controlled and transferred to the RAMS database.
7. PIC will collect updated condition and inventory data for approximately 8,100 km of paved roads surveyed under RAMS Phase II during the 2027–2028 survey seasons. The Consultant shall support survey planning, quality control, post-processing and database integration. The surveys will include, as applicable, GPS centreline, roughness, rutting, pavement imagery and other required road-asset data.
8. PIC will collect basic inventory and condition data for approximately 3,000 km of priority unpaved roads, including international unpaved roads and roads of significant traffic or connectivity importance, with the objective of closing the remaining data gaps across the road network under MOTC responsibility.
9. PIC, with the Consultant's support, will carry out one-day classified seasonal traffic counts at selected paved-road locations using the five SDR mobile traffic counters currently available to PIC. The Consultant shall support the selection of locations, quality assurance, processing and automated entry of traffic data into RAMS. Where feasible, counts at selected locations shall be repeated in different seasons.
10. PIC, with the Consultant's support, will carry out seasonal traffic counts at up to 100 unpaved-road locations. The Consultant shall review the 79 locations counted under RAMS Phase II, identify any additional locations required, and support quality assurance and integration of the resulting data.
11. Road surveying, traffic counting, data processing and related PIC operational costs will be financed from the state budget and are excluded from the consulting contract cost estimate. MOTC will confirm the required budget allocation and, in coordination with ADB, determine whether any adjustment to the financing plan or financing shares is required.

D10. Capacity building for decision-making, road asset management, multi-year planning, traffic-data collection procedures and COTS GIS solutions.

1. The Consultant shall prepare a comprehensive, phased capacity-building programme for MOTC management and technical personnel covering decision-making, improved business processes and road asset management. The tentative topics include:
 - Economic rationale, benefits of RAM and the roles of the public and private sectors.
 - Facts and data-based decision-making.
 - RAMS-based business processes.
 - Evolution of Intelligent Transport Systems and data-driven maintenance principles.
 - Key thematic areas and emerging challenges (such as climate change, net zero commitments, environmental sustainability, etc.) in RAMS.
 - Overview of techniques, technology, tools and systems in RAM, including specific examples from developed countries.
 - International legislations, differing standards and guidelines, policy and regulatory environment.
 - Road classification, asset inventory and asset valuation.
 - Climate resilience planning and data requirements.
 - Life-cycle costs versus total transportation costs.
 - Road Funds and funding strategies.
 - Performance based maintenance, definition of service levels, contract packaging.
 - Definition of key performance indicators based on performance, economic, environmental and social impacts, sustainability and other relevant criteria.
 - Risk assessment and management.
 - Road traffic design elements, intersection design and control and advanced analytic techniques.
 - Practical exercises on multi-year planning utilizing RAMS tools and relevant guideline developed by the Consultant.
2. Expected outcome of RAMS capacity building program:

- Increased awareness of emerging approaches, principles and data-driven decision-making, technologies, intelligent transportation systems, tools and techniques being applied globally in RAMS.
- Enhanced understanding and knowledge of quality control imperatives for road subsector within country-specific contexts and specifically, of the evolving ecosystem and specific roles of the public and private sector stakeholders involved in road asset management and the consequent changes it is engendering in road infrastructure development and management.
- Provide insights on how road asset management has evolved into a multidisciplinary cross-functional specialty cutting across engineering standards, commercial and business practices, socio-economic objectives, climate change and environmental sustainability risks, governance and regulatory and policy aspects that fits within larger developmental priorities.
- Efforts should be made to design a course that is transformative in nature and creates sustainable impact for the participants. As the evolution of RAMS is informed by real life cases, participants are expected to learn efficient examples RAMS across the globe.
- Established capacity in MOTC and PIC to reproduce and update multi-year plan annually.

3. The Consultant shall prepare and perform two trainings in the use of COTS GIS software. First training shall be at least 10 days and aimed at basic level of GIS functionality with wider audience up to 20 participants. Second training shall be at least 20 days duration for advanced level GIS for up to 10 participants. The Consultant shall prepare initial training program for both courses and submit for the approval to MOTC. Training sessions' duration is expected to be around 2-hours per day to allow participants to work on their day-to-day responsibilities and ensure high attendance. Tentative topics of 10-day basic GIS course should cover:

- Introduction to Geographic Information Systems.
- AI introductions, capabilities and possibilities to use on RAMS.
- Coordinate systems, Projections and Georeferencing.
- Vector Data, Information Display, Working with layers, Data and queries.
- Editing and Creating GIS data, digitization techniques, exporting and importing CAD, DGN, SHP, etc. formats.
- Calculation of geometric parameters, data joining, exporting and importing from Excel.
- Database management, Design of a database, Joins with Access databases and Excel files. Spatial joins. Obtaining statistics from database with spatial position of the elements.
- Spatial analysis, extract and overlay functions including clip, split, intersect and union.
- Map production, export, printing options.
- Etc.

Tentative topics of 20-day advanced GIS course should cover:

- Raster Data Models, purposes and application, raster data operations and conversions.
- Export/Import to KML (Google Earth).
- 3D data display, 2D and 3D spatial analysis.
- Contour, slope calculation, hill shade, orientation and visibility.
- Geospatial database, properties and subtypes.
- Network Analyst, Geometric networks, Transportation networks, Network components. Creating network datasets.
- Network analysis, optimal route, service areas, closest facility.
- Heat maps.
- AI introductions, capabilities and possibilities to use on RAMS.
- Data conversions.
- Spatial joins and calculations
- Etc.

4. The Consultant shall develop and deliver training on the use of HDM-4 software. The tentative topics include:

- Overall economic analysis of road projects and maintenance strategies.
- Definition of Vehicle Fleets and relevant parameters.
- Definition of road network.
- Definition of Maintenance and Improvements standards and modelling of intervention criteria.
- Diverted and Generated traffic assignments.
- Project, Program and Strategic Analysis.
- Pavements Deterioration model coefficients and calibration.
- Speed model and Road User Effects.
- Impact of climate zone parameters.

- Data preparation: homogenous sections, road network import file.
 - Data extraction from RunData.mdb.
 - Reporting and data presentation.
 - Etc.
5. The Consultant shall prepare and deliver training on the operation and maintenance of the existing mobile traffic-counting equipment and on the approved traffic-data collection procedures. The training shall cover equipment setup, calibration, data collection, troubleshooting, routine maintenance, quality assurance, processing and transfer of data to RAMS.
 6. The Consultant shall ensure that all RAMS, GIS, HDM-4, road-surveying and traffic-data training and capacity-building workshops are recorded and archived as multimedia files, including classroom videos, narrated screen recordings and practical exercise files. The complete archive shall be submitted as part of the deliverables.

D11. Update of KSTU RAMS course.

1. The Consultant shall continue the support initiated under RAMS Phase II to the Kyrgyz State Technical University (KSTU) by updating and further developing, together with KSTU staff, a university course on road asset management and RAMS and by training the teaching staff to deliver the course.
2. The Consultant shall review and update the 40-hour course and all related student materials, train KSTU teaching staff, and support initial piloting of the course during the relevant academic year.

E. IMPLEMENTATION SCHEDULE

1. The Consultant shall carry out the activities described in the Scope of Work over a period of 18 months. The assignment is expected to commence in Q1 2027 and to cover the 2027 and 2028 road-survey seasons. Data collection will be undertaken mainly during the spring, summer and autumn periods (tentatively April–October), while winter periods will focus on data processing, analysis, system development and preparation of other deliverables.
2. The Consultant is required to provide a detailed implementation schedule as part of its technical proposal.
3. Expected commencement of the services: Q1 2027.
4. Initially, the focus will be on preparing the Inception Report and Capacity Building Plan, and on preparing and approving the procurement documents and technical specifications for the road surveying equipment, computer hardware and COTS GIS software.

F. DELIVERABLES

All deliverables listed below are strictly limited to and derived from the Scope of Work defined under Tasks D1–D11. No deliverable shall be construed as requiring services, outputs, or activities beyond those explicitly described in the Scope of Work.

F.1 Documents and Data

1. **Inception Report (month 1)** – The Inception Report shall be submitted within one month after commencement. It shall describe the Consultant’s approach, methodology, detailed 18-month work plan, baseline and acceptance methodology for the performance targets, and an initial Capacity-Building Plan for MOTC review and approval.
2. **Quarterly Progress Reports (months 3, 6, 9, 12 and 15)** – Each report shall describe activities completed, progress against the work plan and other deliverables, risks and issues, proposed mitigation measures, and a detailed plan for the next quarter.
3. **Gap Analysis and RAMS Phase II Assessment Report (months 2, 6 and 8)** – The D1 interim findings shall be submitted in month 2; the D2 and D3 findings shall be submitted in month 6; and the consolidated final report shall be submitted in month 8.
4. **Road Asset Management Policy and Strategy (initial version in month 5; updated version in month 16)** – The initial document shall reflect the preliminary institutional, business-process and RAMS Phase II assessment findings. It shall be updated before completion of the assignment to incorporate approved reforms and implementation experience.
5. **National Traffic Monitoring Strategy, Methodology and Action Plan (initial version in month 5; updated version in month 16)** – The deliverable shall include the Traffic Data Collection and Evaluation Methodology, technical and functional specifications, indicative cost estimates and a phased future action plan. It shall not include procurement of permanent traffic-counting stations, WIM systems or additional SDR counters.
6. **Bidding Documents and Technical Specifications for road-surveying equipment, computer hardware and COTS GIS software, and procurement support (months 3, 6 and 12)** – Initial technical requirements shall be submitted in month 3; final bidding documents and specifications shall be submitted in month 6; and the Consultant shall provide technical support through evaluation, delivery, commissioning, testing and acceptance, with a completion report by month 12.
7. **Multi-Year Planning Manual (initial version in month 5; final update in month 16)** – The Manual shall be submitted initially in month 5 and updated, where required, to reflect the approved RAMS, HDM4 and GIS workflows and the completed rolling programme.
8. **Five-Year Rolling Programme for 2028–2032 (months 6 and 16)** – An initial programme shall be submitted in month 6 and an updated programme shall be submitted in month 16 following the next roadsurvey season and incorporation of available updated data.
9. **HDM-4 and RAMS Integration Report for strategy-, programme- and project-level analysis (month 8)** – The report and associated module or workflow shall be submitted within eight months after commencement.
10. **GIS Dataset and Data-Acquisition Action Plan Report (months 7, 12 and 14)** – Interim reports shall be submitted in months 7 and 12 and the final report in month 14. The deliverable shall include available GIS datasets and metadata, identified data gaps, technical specifications, indicative costs and a phased action plan for future acquisition. Commercial geohazard or climate datasets shall not be purchased under the assignment.
11. **Road Data-Collection Support Reports (months 6 and 16)** – The reports shall describe survey planning, quality assurance, processing, data transfer to RAMS, progress achieved and next steps for the 2027–2028 survey seasons.
12. **Procurement Reports (months 5, 6, 13 and 14, as applicable)** – Interim reports shall be prepared at key procurement milestones and after completion of each procurement. The final consolidated report shall include the approved specifications, procurement records, clarifications, evaluation-support records, delivery, testing and acceptance information.

13. **Multimedia Training Packages (within one month after each training; final package in month 17)** – Packages shall be submitted in accordance with the Capacity-Building Plan and shall include the recordings, narrated screen captures, exercise files, presentations and supporting documentation for the relevant RAMS, GIS, HDM-4, road-surveying and traffic-data.
14. **Updated KSTU University Course on RAMS (initial package in month 9; final package in month 16)** – Course materials shall be submitted in stages for the relevant academic year. The final package shall incorporate the results of teacher training and initial piloting.
15. **Draft Final Report (month 16)** – The Draft Final Report shall summarize all activities and results and include an executive summary suitable for distribution to stakeholders.
16. **Final Report (month 18)** – The Final Report shall incorporate all consolidated comments received from MOTC and ADB and shall summarize completion of the assignment, outstanding actions and recommendations for sustainability.
17. The Consultant shall agree the reporting format with the Employer. Six printed copies and six electronic copies shall be submitted to MOTC: two copies each in English, Russian and Kyrgyz. One printed copy and one electronic copy in English shall be submitted to ADB.
18. ADB and MOTC may request additional copies. All data, schedules, drawings, models, source files and other documents shall be editable and reproducible.

G. SOFTWARE

1. COTS GIS Software shall be procured within four months of the commencement of services.
2. RAMS and HDM-4 Integration Module within eight months of the commencement of services.

G.1 Equipment

1. Computer Equipment shall be procured within four months of the commencement of services.
2. Road surveying equipment and its associated software, documentation, training materials and acceptance services shall be procured within twelve months after commencement of the services, including delivery, commissioning and acceptance testing.

G.2 Provisional sum for reimbursement of procured PC equipment and GIS software

1. For the procurement of computer equipment, a provisional sum of USD 25,000 will be included in the contract. The Consultant shall obtain sufficient market quotations in accordance with the procurement arrangements approved by MOTC and ADB. Upon MOTC approval, the Consultant shall proceed with procurement.
2. For COTS GIS software, a provisional sum of USD 20,000 will be included in the contract. If the approved solution requires paid licenses, the Consultant shall procure the required licenses following MOTC approval. Payment shall be made against MOTC receipt and acceptance of the equipment and software and the supporting documents. The provisional sums under this subsection are fixed amounts and shall not form part of the financial evaluation.

G.3 Provisional sum for road surveying equipment and associated services

1. A provisional sum of USD 1,000,000 will be included in the Contract for procurement of the vehiclebased road-surveying system and directly associated software licenses, documentation, video-based training materials, translation, pre-shipment inspection and acceptance-related costs.
2. Procurement shall be carried out in accordance with the applicable ADB procurement requirements and the arrangements approved by MOTC and ADB. Payment shall be made against MOTC acceptance of the procured goods and services and submission of supporting documents. The provisional sum is a fixed amount and shall not form part of the financial evaluation.

G.4 Provisional sum for reimbursement of seminars, workshops and trainings

1. A provisional sum of USD 40,000 will be included for approved seminars, workshops and training activities under the assignment.
2. Payment shall be made against MOTC approval and receipt of supporting documents for eligible expenditures. The provisional sum is a fixed amount and shall not form part of the financial evaluation.

H. STAFF INPUT REQUIREMENT

1. MOTC will select an eligible consulting firm using the Quality- and Cost-Based Selection method with a 90:10 quality–cost ratio and a Full Technical Proposal, in accordance with the applicable ADB procurement requirements. Firms may associate in the form of a joint venture or with subconsultants in accordance with the REOI and RFP.
2. All international and national key experts will be evaluated. National non-key experts will not be scored but shall meet the minimum qualification and experience requirements specified in the Terms of Reference. The consulting services require 38 person-months of international key experts, 45 person-months of national key experts and 18 person-months of national non-key experts, for a total of 101 person-months.

Table H1 – Staff Input

No.	Expert	Month
Key International Experts		38
IK-1	Team Leader/RAMS Specialist	12
IK-2	Road Data Collection Specialist	5
IK-3	Software Development Specialist	5
IK-4	Road Database/GIS Specialist	4
IK-5	Procurement Specialist	4
IK-6	Transport Economist/HDM-4 Specialist	4
IK-7	Organization Development and Business Processes Specialist	4
Key National Experts		45
NK-1	Deputy Team Leader/RAMS Specialist	18
NK-2	Road Data Collection Specialist	6
NK-3	Road Database/GIS Specialist	6
NK-4	Procurement Specialist	6
NK-5	Traffic Data Collection Specialist	5
NK-6	Organization Development and Business Processes Specialist	3
NK-7	Legal specialist	1
Non-Key National Experts		18
NKN-1	Office Manager / Interpreter	18
Total:		101

I. KEY EXPERTS' TASKS AND QUALIFICATION REQUIREMENT IK-1 Team Leader/RAMS Specialist (International Key Expert – 12 months)

The candidate shall have a master's or higher degree in civil engineering. The candidate shall have relevant experience in developing RAMS, and in road and bridge data collection. The candidate shall have at least 15 years of specific experience in similar projects in both developed and developing countries and shall preferably have at least 10 years of experience as a project manager or team leader. Regional experience in Central Asia and South Caucasus countries will be an advantage. The candidate shall be fluent in English and shall be skilled in report writing. Knowledge of Russian or Kyrgyz will be considered an advantage.

IK-2 Road Data Collection Specialist (International Key Expert – 5 months)

The candidate shall have a bachelor's or higher degree in civil engineering and shall specialize in road construction or maintenance management. The candidate shall have at least 10 years of experience as a road engineer, including substantial experience in road-condition and traffic-data collection, road and bridge surveys and road maintenance in developed and developing countries. At least 5 years of specific datacollection experience is preferred. Regional experience in Central Asia and the South Caucasus will be an advantage. The candidate shall be fluent in English and skilled in report writing. Knowledge of Russian or Kyrgyz will be an advantage.

IK-3 Software Development Specialist (International Key Expert – 5 months)

The candidate shall have a bachelor's degree or higher in information technology, specializing in software development including web technologies. The candidate must have experience in server programming and implementation of application programming interfaces (APIs) and road asset management systems. The candidate must have at least 3 years of relevant work experience and at least 3 years of experience in RAMS development. Regional experience in Central Asia and South Caucasus countries will be an advantage. The candidate shall be fluent in English and shall be skilled in report writing. Knowledge of Russian or Kyrgyz will be considered an advantage.

IK-4 Road Database/GIS Specialist (International Key Expert – 4 months)

The candidate shall have a master's or higher degree in information technology, preferably specialized in database technology. The candidate shall have relevant experience in developing road databases, including COTS GIS software, and GIS based road asset management systems. The candidate shall have at least 10 years of experience as GIS database specialist and at least 5 years of specific experience in similar projects. Regional experience in Central Asia and South Caucasus countries will be an advantage. The candidate shall be fluent in English and shall be skilled in report writing. Knowledge of Russian or Kyrgyz will be considered an advantage.

IK-5 Procurement Specialist (International Key Expert – 4 months)

The candidate shall have a degree in law, business management, public procurement or another relevant field. The candidate shall have at least 10 years of general public-procurement experience, including preparation of terms of reference, technical specifications and qualification requirements, and at least 5 years of specific experience in procurement of road-surveying equipment or similar specialized systems. Regional experience in Central Asia and the South Caucasus will be an advantage. The candidate shall be fluent in English and skilled in report writing. Knowledge of Russian or Kyrgyz will be an advantage.

IK-6 Transport Economist/HDM-4 Specialist (International Key Expert – 4 months)

The candidate shall have a master's degree or higher in civil engineering or transport economics. The candidate shall have at least 10 years of specific experience in using HDM-4 to carry out strategy and program analyses for road networks. Regional experience in Central Asia and South Caucasus countries will be an advantage. The candidate shall be fluent in English and shall be skilled in report writing. Knowledge of Russian or Kyrgyz will be considered an advantage.

IK-7 Organization Development and Business Processes Specialist (International Key Expert – 4 months)

The candidate shall have a master's degree or higher in business management, transport economics or another related field. The candidate shall have at least 10-year general experience and 5 years of specific experience in organizational structures, business processes improvement and performing organizational reforms related to transport infrastructure management. Regional experience in Central Asia and South Caucasus countries will be an advantage. The candidate shall be fluent in English and shall be skilled in report writing. Knowledge of Russian or Kyrgyz will be considered an advantage.

NK-1 Deputy Team Leader/RAMS Specialist (National Key Expert – 18 months)

The candidate shall have a master's or higher degree in civil engineering from an accredited university. The candidate shall have at least 10 years of experience as a road engineer. The candidate shall have relevant experience in road and bridge data collection and in road asset management systems. The candidate shall be fluent in English and shall be skilled in report writing.

NK-2 Road Data Collection Specialist (National Key Expert – 6 months)

The candidate shall have a bachelor's or higher degree in civil engineering, specialized in road engineering. The candidate shall have at least 10 years of experience as a road engineer including extensive experience of road and bridge maintenance and road safety and at least 5 years specific experience in road data collection. Experience in bridges and tunnels and international experience will be considered as an advantage. The candidate shall preferably be fluent in English and shall be skilled in report writing.

NK-3 Road Database/GIS Specialist (National Key Expert – 6 months)

The candidate shall have a bachelor's or higher degree in information technology, preferably specialized in GIS database. The candidate shall have at least 5 years of experience as a GIS specialist and shall have relevant experience in developing databases. The candidate shall preferably be fluent in English and shall be skilled in report writing.

NK-4 Procurement Specialist (National Key Expert – 6 months)

The candidate shall have a degree in law, business management, public procurement or another relevant field. The candidate shall have at least 5 years of general procurement experience and at least 2 years of specific experience in procurement of road-surveying equipment or similar specialized systems. The candidate shall preferably be fluent in English and skilled in report writing.

NK-5 Traffic Data Collection Specialist (National Key Expert – 5 months)

The candidate shall have a bachelor's or higher degree in transport economics or traffic engineering from an accredited university. The candidate shall have at least 10 years of experience as a transport economist or traffic engineer, preferably in the infrastructure sector. The candidate shall have at least 5 years of specific experience in the road transport sector. The candidate shall have relevant experience in road traffic surveys. The candidate shall preferably be fluent in English and shall be skilled in report writing.

NK-6 Organization Development and Business Processes Specialist (National Key Expert – 3 months)

The candidate shall have a bachelor's or higher degree in business management, transport economics or another related field from an accredited university. The candidate shall have at least 5 years of experience as a business processes analyst, organizational reforms or similar. The candidate shall have at least 3 years of specific experience in the road transport sector and relevant experience in road infrastructure management. The candidate shall preferably be fluent in English and shall be skilled in report writing.

NK-7 Legal specialist (National Key Expert – 1 month)

1. The candidate shall have a bachelor's or higher degree in legal or another related field from an accredited university. The candidate shall have at least 5 years of experience as a legal specialist. The candidate shall have at least 3 years of specific experience in the road transport sector legal documents preparation. The candidate shall preferably be fluent in English and shall be skilled in report writing.

J. COUNTERPART SUPPORT

2. MOTC will provide the Consultant with copies of all available Phase I and Phase II reports and full access to the RAMS software and database so that these resources can be reviewed and used as the basis for the Phase III deliverables.
3. MOTC will facilitate communication with the Road Fund, RMD, PIC and other relevant entities and will make available the existing MOTC/PIC tools and data required for the assignment. PIC will make available its existing TRASSA system installed on the PIC laboratory van (including the odometer, GPS, bump integrator, transverse-evenness sensor and forward-facing camera) and five SDR mobile traffic counters. Existing MOTC computer and IT equipment will be available for inspection and assessment by the Consultant.

4. The Consultant shall provide its own adequately equipped office, furniture, communications, internet access and other facilities required for the consulting team.