



Development of Low Volume Roads Research Capacity in Kenya

Inception Report

Ref: AFCAP/KEN/089/G

Prepared by: I.T. Transport Ltd

November 2012

This project was funded by the Africa Community Access Programme (AFCAP) which promotes safe and sustainable access to markets, healthcare, education, employment and social and political networks for rural communities in Africa.

Launched in June 2008 and managed by Crown Agents, the five year-long, UK government (DFID) funded project, supports research and knowledge sharing between participating countries to enhance the uptake of low cost, proven solutions for rural access that maximise the use of local resources.

The programme is currently active in Ethiopia, Kenya, Ghana, Malawi, Mozambique, Tanzania, Zambia, South Africa, Democratic Republic of Congo and South Sudan and is developing relationships with a number of other countries and regional organisations across Africa.

This material has been funded by UKaid from the Department for International Development, however the views expressed do not necessarily reflect the department's or the managing agent's official policies.

For further information visit <https://www.afcap.org>



TABLE OF CONTENTS

1. INTRODUCTION 1

1.1 BACKGROUND AND CONTEXT 1

1.2 INSTITUTIONAL SETTING AND REFORM..... 4

1.3 VISION AND MANDATE OF MTRD AND KERRA 9

1.3.1 MTRD MANDATE 10

1.3.2 KERRA MANDATE..... 12

1.3 DEVELOPMENT OF RESEARCH CAPACITY..... 13

1.4 TERMS OF REFERENCE TASKS 14

1.5 SUMMARY OF OBSERVATIONS FROM INITIAL RU CONSULTATION MEETINGS 15

2 PROGRESS AND PLANS 17

2.1 MEETINGS..... 17

2.2 SHORT AND LONG TERM ACTIVITIES 17

2.3 KNOWLEDGE MANAGEMENT 24

2.4 WORK PLAN AND MILESTONES..... 26

ANNEX A: NOTES AND AGREEMENTS OF DCP STAKEHOLDER MEETING 29

ANNEX B: ATTENDEES AT DCP DESIGN MANUAL STAKEHOLDER MEETING 32

ANNEX C: PROGRAMME FOR DCP STAKEHOLDERS’ MEETING 33

ANNEX D: NOTES AND AGREEMENTS OF DCP WORKING GROUP MEETING 34

ANNEX F: BIBLIOGRAPHY..... 37



1. INTRODUCTION

The Africa Community Access Programme (AFCAP) is a research programme funded by the UK government's Department for International Development (DFID), which is promoting safe and sustainable rural access in Africa. It is supporting the development of national research capacity in the rural transport sector funded from local revenues and has agreed to support the Ministry of Roads develop road research capacity for low volume roads.

The project team providing technical assistance comprises the Team Leader, Mike Head, a specialist in road and transport research; Mike Pinard, an international expert in low volume roads; and Sam Orwa, an information and knowledge management specialist.

The original Terms of Reference aim to build research capacity in the rural roads sector by focussing on Technical Assistance for the Kenya Rural Roads Authority (KeRRA). During the inception phase of the assignment to provide 'Consultancy Services for Technical Assistance for the Establishment of a Research Unit for KeRRA', it became apparent that the proposed functions of the Research Unit and a large proportion of the associated activities were outside KeRRA's mandate. The Materials, Testing and Research Department (MTRD) of the Ministry of Roads mandate is to carry out those functions and, as it closely collaborates with KeRRA, it has been agreed to maintain the broad TOR in order to achieve the original objectives.. To achieve this, it is intended to establish a Low Volume Road Research Centre at MTRD and to also to establish a complementary Low Volume Research Unit at KeRRA. It is expected that the outputs and outcomes of this variation and its alignments will be more sustainable. The new arrangement will have improved effectiveness and efficiency for Low Volume Roads, and therefore rural roads; and will have a broader impact on the economic development and prosperity of Kenya.

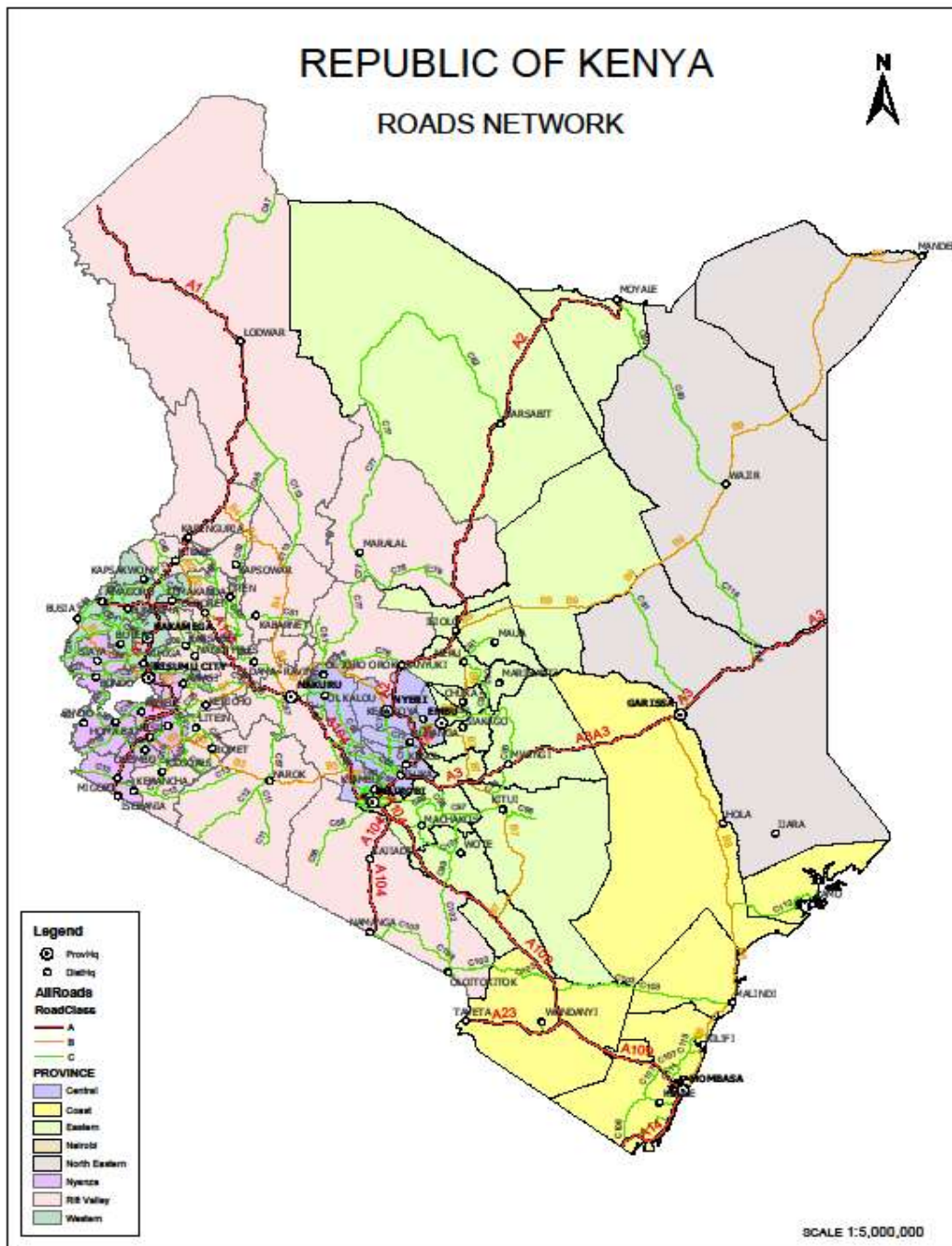
This Inception Report explains the original objectives and plans, the current and changing institutional dynamics, the observations leading to the proposed variation, subsequent decisions and agreements; and then briefly sets out the way forward. Because of the added complexity of working with two organisations with markedly differing mandates, the dual discussions on strategies and priorities; the new concept to be developed by MTRD; and the broader application of the research outputs, the inception report is general in its nature and the roadmap of plans and actions are of a shorter horizon. For these reasons this project aims to realign the research delivery functions and to establish appropriate research activities and skills that can be more fully developed beyond the period of this assignment.

1.1 Background and Context

Kenya Vision 2030 sets out the country's aims to become a newly industrialised country providing a high quality life for all citizens. The country's GDP is expected to grow at an annual rate of 10%. To underpin this growth an efficient road network is required for improved access o support the key sectors of the economy. The Ministry of Roads and its supporting Departments and Authorities, currently play a critical role in the development and maintenance of the road network.



At present, roads remain the dominant transport mode in Kenya. Road transport accounts for about 93% of all freight and passenger traffic in Kenya. Roads are key enablers for economic, social and political development. Kenya has a public road network of 160,886 km of which 61,946km is currently classified while 98,940 km is unclassified. The current Road Classification System, which was developed in the 1970s, has six road classes i.e. Classes A to E and Special Purpose Road class. Each class is defined by the functional criteria related to administrative level of centres the roads connect. The category and classification are dynamic and will evolve over the years. The road network is presented in Figure 1.



It has been recognised that research has an increased role in the development and management of the road infrastructure and particularly for Low Volume roads. It is expected that more focussed activities will provide the basis for improving the long term capacity to undertake relevant, high quality, research that will assist Government develop evidence-based policy and

programmes and also assist in the process of evaluation and monitoring to provide continual improvement in the transport sector.

The long term outcomes of implementation of research findings is expected to deliver more durable roads, lower vehicle operating costs, shorter travel times, lower accident and fatality levels, improved designs and standards for construction and maintenance, and more efficient and cost effective operations of the Authority.

1.2 Institutional Setting and Reform

The current broad functions of the Authorities reporting to the Permanent Secretary of the Ministry of Roads are as follows:

- **Kenya Roads Board (KRB)**
 - Manage and allocate funds from the Road Maintenance Levy Fund (RMLF) in line with Kenya Roads Act 2007. .
 - Coordinate development, rehabilitation and maintenance of the road network.
 - Coordinate implementation of policies relating to the development, rehabilitation and maintenance of the road network;
 - Monitor the utilisation of the RMLF by road agencies by conducting technical and financial audits.
- **Kenya National Highways Authority (KeNHA)**

KeNHA is responsible for management, development, rehabilitation and maintenance of national roads (class A, B, and C roads).
- **Kenya Rural Roads Authority (KeRRA)**

KeRRA is responsible for construction, upgrading, rehabilitation and maintenance of rural roads (Class D and below), special purpose roads and all unclassified roads.
- **Kenya Urban Roads Authority (KURA)**

KURA is responsible for management, development, rehabilitation and maintenance of all public roads in cities and municipalities except where those roads are national roads

Through the Roads Secretary, the Ministry's main objective is to facilitate adequate provision of physical infrastructure through policy formulation, research, design, supervision and regulation of standards in roads development and maintenance in the country.

The main functions are currently carried out by the five (5) Departments as follows:

- **Materials Testing and Research Department (MTRD)**

The MTRD is charged with the responsibility of research and testing materials for quality and standard compliance both for Government and Private sector construction and Industry. Specifically, MTRD's mandate is testing and research on roads and building construction materials, road pavement design and construction specifications, construction quality control and assurance, and post construction evaluation of roads and other infrastructure.

- **Roads Department**
Policy formulation and oversight of road construction and maintenance.
- **Quality Assurance Department (QAD)**
Performance and technical auditing to ensure that resources allocated for road construction and maintenance are used efficiently, transparently and for the intended purpose.
- **Mechanical and Transport Department (MTD)**
Provision and management of mechanical, transport and plant services in the country. These services include provision of equipment for development and maintenance of infrastructure, technical consultancy and a wide range of mechanical services to the public and private sectors.
- **Kenya Institute of Highways and Buildings Technology (KIHBT)**
To provide training i.e. carry out skills improvement to in-service and pre-service trainees especially for the infrastructural sector.

Reforms envisaged are transformation of MTRD, KIBHT and MTD into Semi-Autonomous Government Agencies in order to efficiently provide services to all Road Agencies and private sector. The current institutional framework of the roads subsector is presented in Figure 2.

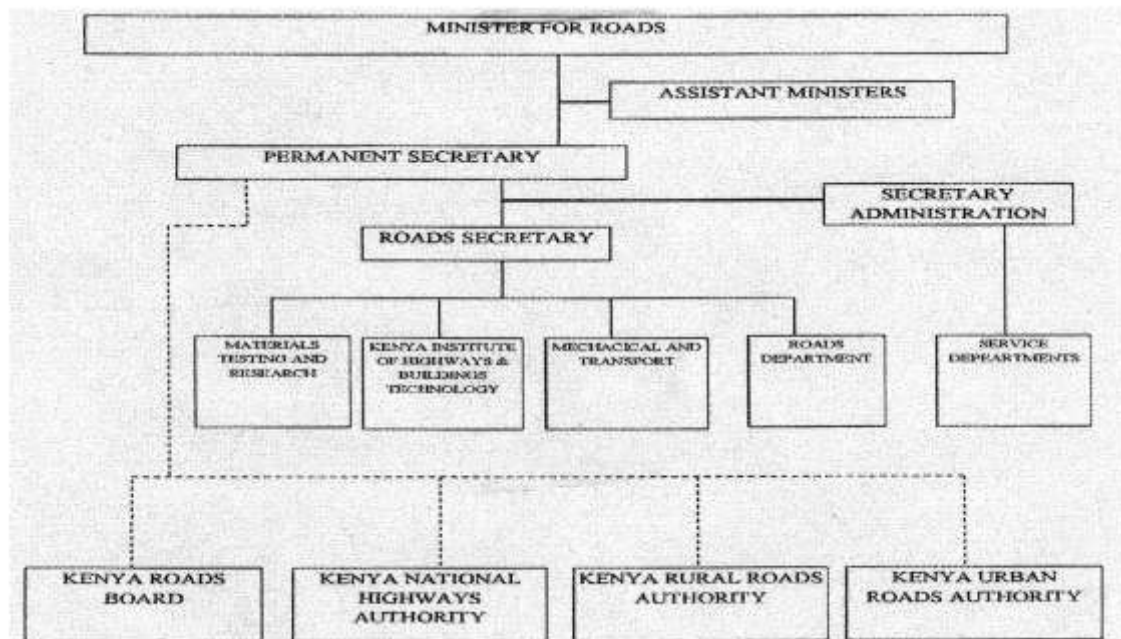


Figure 2 – Current institutional framework of the roads subsector

A new Draft Policy on Aligning the Roads Sub-Sector with the Constitution (September 2012) seeks to align the current roads sub-sector to the constitution of Kenya for an efficient and effective road network. It provides for a legal, institutional and administrative framework for the management of roads at the National and County level. The policy builds on Sessional paper No.

5 of 2006 on the Development and Management of the Roads Sub-Sector for Sustainable Economic Growth.

The specific objectives of this Policy are:

- (i) To align the legal and institutional framework governing the roads sub-sector to the provisions of the Constitution;
- (ii) To set out criteria for road classification consistent with the mandates of the two levels of government as stipulated in the Fourth Schedule of the constitution;
- (iii) To reduce transport costs and travel time by improving the condition of national trunk roads and county roads;
- (iv) To optimize use of available resources by the two levels of government in the development, rehabilitation and maintenance of roads;
- (v) To enhance capacity for local contractors;
- (vi) To enhance connectivity throughout the country consistent with the country's Vision 2030;
- (vii) To promote role clarity and accountability for all actors in the road sub-sector;
- (viii) To create a conducive environment for increased public-private partnerships and intergovernmental relations;
- (ix) To enhance road safety and cater for the needs of non-motorized traffic.

It is proposed that the current institutional framework will be restructured to reflect clear institutional mandates and autonomy. The State Department will be responsible for road policy formulation. State organs with distinct mandates will be established. The institutions will be managed by a Board of Directors and have clear line of relationship between the National and County Governments. The current institutional structure is set out below.

Under the reforms the new definition of Road Categories is:

- **National Trunk Roads**

National Trunk Roads are the main roads linking Kenya to her neighbours, connecting various County headquarters and interconnecting the entire Country in an equitable and well distributed manner.

The National Trunk Roads shall be gazetted by the Cabinet Secretary with approval by Parliament.

- **County Roads**

County Roads are all other roads within County boundaries that have not been defined as National Trunk Roads.

The government will align the roads sub-sector institutional framework by establishing various institutions to replace the existing ones in the sub-sector as follows:-

- (i) The **State Department** responsible for policy and setting of standards and specifications for construction and maintenance of roads, registration of engineers, research in road transportation, mechanical function in support of road-related matters, training and certification of road transportation-relation accreditation and

courses, monitoring and evaluation function and asset management. The state department will also be responsible for collection, analysis and forecasting of road traffic data for national trunk and county roads. Master planning for road sub-sector management will remain with the state department.

- (ii) A body of the National Government responsible for the design, construction, operation and maintenance of National Trunk Roads, capacity building and technical assistance to counties to be known as the **Kenya National Trunk Roads Authority (KENTRA)**.
- (iii) A body responsible for sourcing and management of construction, operation and maintenance funds for the roads sub-sector except funds from the exchequer to serve both levels of government, to be known as **the Roads Fund (RF)**.
- (iv) **County Roads** will be transferred to the county governments to be constructed, operated and maintained in line with the provisions of the relevant laws on devolved government and the laws governing the urban areas and cities, as well as approved standards as set by the state department responsible for roads. The County Roads establishment shall be headed by a person who's a Registered Roads Engineer with a minimum of seven (7) years post-registration experience.

To ensure a smooth process and continued service delivery to the public during transition, alignment to the constitution will be achieved, as far as practicable, through restructuring of the existing roads institutions and redefining their functions in line with the new institutional framework.

The proposed institutional framework is as follows:

- **State Department responsible for Roads**
 - a) The State Department shall be under the administration of the Principal Secretary who shall report to the Cabinet secretary
 - b) It is recommended that the services provided by the State Department shall also be accessible at the counties.
- **Kenya National Trunk Roads Authority**
 - a) The Kenya National Trunk Roads Authority (KENTRA) shall be governed by a board of directors.
 - b) KENTRA shall be managed by well qualified and adequate staffing in the areas of highway engineering, electrical engineering, land surveying, transport economics, procurement, finance & administration, human resource, legal services, corporate relations, planning and environment, technical and financial audit and information & communications technology (ICT).

It is proposed that the structure of KENTRA shall have a headquarter office and presence in the forty seven (47) counties specified in the First Schedule to the Constitution, responsible for the national trunk roads network traversing the county.

- **Roads Fund**
 - a) The Roads Fund Board (RF) shall be governed by a board of directors.
 - b) There shall be established a RF headquarter office, which will have well qualified and adequate staffing in the areas of highway engineering, transport economics, procurement, finance (including business development), administration, human resource, legal services, corporate relations, planning, technical and financial audit and information and communications technology (ICT).
 - c) It is recommended that the services provided by the Board shall also be accessible at the counties.

Proposed functions under the **State Department** are:

Roads

- a) Roads Policy formulation and coordination
 - b) Setting standards and specifications for construction and maintenance of roads
 - c) Road safety
 - d) Capacity building and Technical assistance to Counties.
 - e) Master planning for road sub-sector management
- **Engineers Registration Board**
 - **Materials Testing and Research**
 - a) Materials testing and research in road transportation
 - b) Foundations and Geotechnical investigations for bridge/culvert/building sites, road construction materials sources and slope stability
 - **Mechanical and Transport**
 - a) Provision of equipment for road construction, road maintenance and other infrastructural works.
 - b) Set and enforce standards and specifications for registration of vehicles, plant and equipment
 - c) Set and enforcing of standards for maintenance and repair of Government vehicles plant and equipment
 - d) Motor vehicle inspection for road worthiness and conformity to manufactures specifications, environmental standards and promotion of energy efficiency.
 - e) Testing of drivers/motorcyclists for purposes of licensing.
 - **Kenya Institute of Highways and Building Technology**
 - a) Training and certification of road transportation-related accreditation and courses
 - b) training of professionals, technicians, craftsmen and artisans in the roads and building sub-sectors
 - c) skill upgrading for professionals in the fields of roads and building sub-sectors
 - d) training of local and international contractors on technologies of road construction and maintenance.
 - e) Training of motor vehicles and plant operators.

- f) Capacity building within the road subsector
- **Kenya National Trunk Roads Authority (KENTRA)**
The Kenya National Trunk Roads Authority will be a body corporate with the following functions:
 - a) Design, Construction and management of national trunk roads
 - b) Maintenance, rehabilitation of national trunk roads
 - c) Axle load control on national trunk roads
 - d) Road traffic management on the National Trunk Roads.
 - e) Promote participation of the private sector in the financing and management of national trunk roads.
 - f) Acquisition of land for roads expansion and drainage way leaves in liaison with the National Land Commission

 - **Roads Fund**
The Roads Fund will be a body corporate with the following functions:
 - a) Management of road maintenance funds.
 - b) To identify and source for alternative financing for the development and maintenance of roads.
 - c) Coordinating and compilation of road work plans for national and county governments and coming up with a national roads work plan.
 - d) Undertake technical and financial audit of road works.

1.3 Vision and Mandate of MTRD and KeRRA

The vision of MTRD is ***“To be a world class institution for testing and research on roads and other infrastructure”*** while the mission is ***“To facilitate development of quality roads and other infrastructure through testing, research and advise on construction materials, methods and delivery options”***. It is responsible to the Roads Secretary.

The MTRD Strategic Plan (2011/2012 – 2015/2016) has been developed in line with Kenya’s Vision 2030, Millennium Development Goals, and the Strategic Plans of the Ministry of Roads. The implementation of this strategic plan is based on the philosophy of customer and stakeholder participation, good governance and a professional approach to doing business. It provides oversight and regulatory role to all road agencies and players in the Roads subsector and to some extent the broader infrastructure sector.

In support of national plans, KeRRA’s vision is to provide ***“An adequate, quality, safe and efficient rural road network”*** and its mission is ***“To construct, maintain and manage the rural road network for sustainable socio-economic development”***.

Kenya Rural Roads Authority (KeRRA) is responsible for the rural road network (Classes D, E and Unclassified Roads) totalling about 136,375 km. The Authority was operationalized in 2008. Between 2009 and 2012, the Authority was implementing a strategic plan that has taken it through the transitional phase. During this period, there was significant improvement on the quality and number of kilometres of roads maintained and rehabilitated. Changes in the legal and operating environment including the Constitution of Kenya 2010 and the expiry of the first

Medium Term Plan have necessitated the Authority to develop a new strategic plan that will take the Authority through the second Medium Term Plan 2013-2018.

1.3.1 MTRD Mandate

The MTRD is charged with the responsibility of research and testing materials for quality and standard compliance both for Government and Private sector construction and Industry.

Specifically, MTRD's mandate is testing and research on roads and building construction materials, road pavement design and construction specifications, construction quality control and assurance, and post construction evaluation of roads and other infrastructure.

The mandate of the Department is delivered through the following core functions:

- a) Provision of laboratory and testing facilities for:
 - (i) Geological and geotechnical investigations;
 - (ii) Geospatial surveys;
 - (iii) Hydrological surveys and hydraulic studies;
 - (iv) Traffic surveys and studies;
 - (v) Prospecting, examination and testing of construction materials;
 - (vi) Construction quality control; and
 - (vii) Post-construction monitoring and evaluation of roads, bridges, buildings and other connected civil works including Non-Destructive Testing;
- b) Testing, calibration, and verification of precision instruments, gauges, scientific apparatus, and other laboratory and field measurement equipment to ensure compliance with the provisions of both the Standards Act and the Weights and Measures Act;
- c) Certifying civil engineering laboratory technicians;
- d) Vetting of pavement designs for road upgrading, reconstruction, rehabilitation and strengthening works by roads authorities;
- e) Construction quality control oversight on public roads including post construction evaluation of completed works;
- f) Monitoring functional and structural performance of road pavements including axle load and pavement condition surveys on all public roads to facilitate preparation of public investment and annual works programmes by other road agencies;
- g) Maintenance of pavement construction and maintenance data base for public roads;
- h) Research on road development, maintenance, and operations including research on new construction materials, construction methods and road safety studies;
- i) Undertake collaborative research activities in liaison with other local and international organizations;
- j) Disseminate research undertakings and findings;

- k) Development and review of materials testing standards, road design manuals and standard specifications for construction and maintenance of roads in conjunction with other roads authorities and stakeholders;
- l) Provide materials testing and consultancy services at nominal charges to other government Departments, roads authorities and the public; and
- m) Advise the government on road construction, maintenance and operation standards, on physical, chemical and engineering characteristics of materials and on materials usage.

Its strategic goals are:

- 1 Quality Assurance
- 2 Research and Consultancy
- 3 Institutional Capacity
- 4 Financial Sustainability

Its strategic objectives are:

- Ensure prolonged road pavement life
- Ensure compliance with Structural integrity of buildings and bridges
- Enforce value for money in construction of roads and bridges
- Identify areas of research and innovations methods
- Establish a resource centre for technical knowledge.
- Provide consultancy services to the building and construction industry
- Expand and upgrade material testing facilities
- Expand and upgrade ICT systems
- Attain and retain optimum HR levels
- Transform the Department into SAGA
- Establish Materials Testing and Research Fund
- Establish resource mobilization mechanisms

The following are the main stakeholders:

- Roads Department
- Kenya Roads Board
- KeNHA
- KeRRA
- KURA
- National Council for Science and Technology
- Universities and other institutions of higher learning
- IAEA
- JICA
- World Bank
- NORAD
- European Commission (E.C)
- African Development Bank (ADB)
- French Development Agency (AFD)
- Kreditanstalt Für Wiederaufbau (KfW)
- Kenya Bureau of Standards (KEBS)

The MTRD is to become a semi-autonomous Agency as part of the government transformation proposals and has a draft Legal Notice to this effect. It expects to make plans to initiate this transformation in the next few months. The current proposed functions of the RU in the TOR are in conflict with those mandated by the MTRD.

1.3.2 KeRRA Mandate

Three Authorities currently have a legal mandate to manage, develop, rehabilitate and maintain the road network in Kenya as follows:

- a. Kenya National Highways Authority (KeNHA) responsible for the national road network (Class A, B and C roads) with a total length of about 14,000 km
- b. Kenya Rural Roads Authority (KeRRA) responsible for the rural road networks (Class D, E and unclassified roads) totalling about 136,375 km.
- c. Kenya Urban Roads Authority (KURA) responsible for road networks in cities and municipalities (Class UA, UC and UL), with a total length of about 15,000km.

KeRRA is mandated to construct, maintain and manage the rural road network. In order for the country to attain its development targets, good roads are a pre-requisite. In 2008, out of an estimated 136,375km of rural roads, only 2,200 km (less than 2%) were of all-weather bitumen standard. In keeping with KeRRA's Vision and Mission, long term plans have been prepared to upgrade more than 98% of the network that is of earth/gravel standard, to all-weather bitumen standard.

Key challenges to be addressed in the strategic plan (2013-2018) include improved funding, alignment with the Constitution of Kenya 2010 and increased capacity. If these challenges are addressed, the Authority will be able to deliver on its mandate of management, development, rehabilitation and maintenance of rural roads.

Key strategic objectives critical for successful implementation of the strategy are as follows:

- Development of an alignment strategy with the Constitution of Kenya, 2010.
- Planning for design, construction, maintenance and management of the Rural Road Network for sustainable socio-economic development
- Design, construct and rehabilitate rural roads to reduce transport cost and journey time for faster socio-economic development
- Maintenance of entire Rural Road Network to support accessibility to all production, market and social centres for enhanced economic growth
- Build and strengthen institutional capacity
- Provide adequate financing for the execution of the Authority's strategic plan
- Ensure all cross-cutting issues are mainstreamed in the Authority's operations.

In the development of rural roads sector, the main challenges during the strategic plan period are:-

- a) Inadequate funds for maintenance, construction and rehabilitation of the current road network.

- b) Reducing overloading on roads to cut on cost of maintenance and repair
- c) Attracting Private Sector funding to supplement Government resources
- d) Management of the increasing number of motorcycles and non – motorized transport.

1.3 Development of Research Capacity

KeRRA has prepared a Research Policy (2010) which is being used to develop research strategies and programmes. The Research Policy provides a framework for the implementation of a research agenda, dissemination of viable findings, and thereafter mainstreaming of research outcomes in the Authority's operations. The objective is to improve service delivery to the Kenyan people in the rural transport sector. The research will cover road planning and design, construction, rehabilitation, maintenance, road safety and environmental sustainability. Also to be addressed are the areas of staff development and utilization and cross cutting issues such as gender, employment, poverty alleviation and HIV-AIDS.

KeRRA was required to develop the research policy in the first two years of its operations as a means to adding value to the delivery of these functions and responsibilities by increasing management and staff efficiency and effectiveness. This is summarised in KeRRA's mission statement for research below:

Rural road research should focus on gaining knowledge and developing systems that increase KeRRA's efficiency and effectiveness in managing the construction, upgrading, rehabilitation and maintenance of Kenya's rural roads.

To this end, KeRRA intends to establish a Research Unit (RU) within the Department of Special Projects under the responsibility of the General Manager (Special Projects).

The original TOR set out the following functions of the RU:

- Establish a modern and comprehensive materials laboratory for the testing of materials used in road works
- Establish in-house capacity for comprehensive materials investigations and geotechnical investigations required for road works, road condition investigations and analysis of pavement and surfacing failures
- Become a leading institution dedicated to research on matters related to rural roads in Kenya, including road policy, road transport, road asset management, road design, construction, maintenance and operation. Such research will be carried out in a number of ways, including:
 - Outsourced to academic institutions
 - Through local and international consultants
 - In collaboration with other national, regional and international research centres
 - In-house
- Provide services for quality control of construction projects
- Undertake independent Technical Audits of selected road projects where quality is suspected to have been compromised

- Develop and verify new design and operational standards for the use of materials, maintenance systems, road transport sector regulations etc.

As a result of consultations during the Inception Phase of the assignment it is now acknowledged that these functions are the responsibility of MRTD.

1.4 Terms of Reference Tasks

The objectives of the assignment are to be delivered through four distinct sets of activities:

1. Confirming commitment to the RU and the focus and scope of TA support.
2. The Development a robust Road Research Strategic Plan.
3. The Preparation of Job Descriptions and training needs.
4. The Customisation of the Malawi DCP Design Manual for Low Volume Roads.

These are presented in the Figure 3 below as a sequence of inter-related outcomes that are needed if the establishment of a successful Research capability is to be achieved.

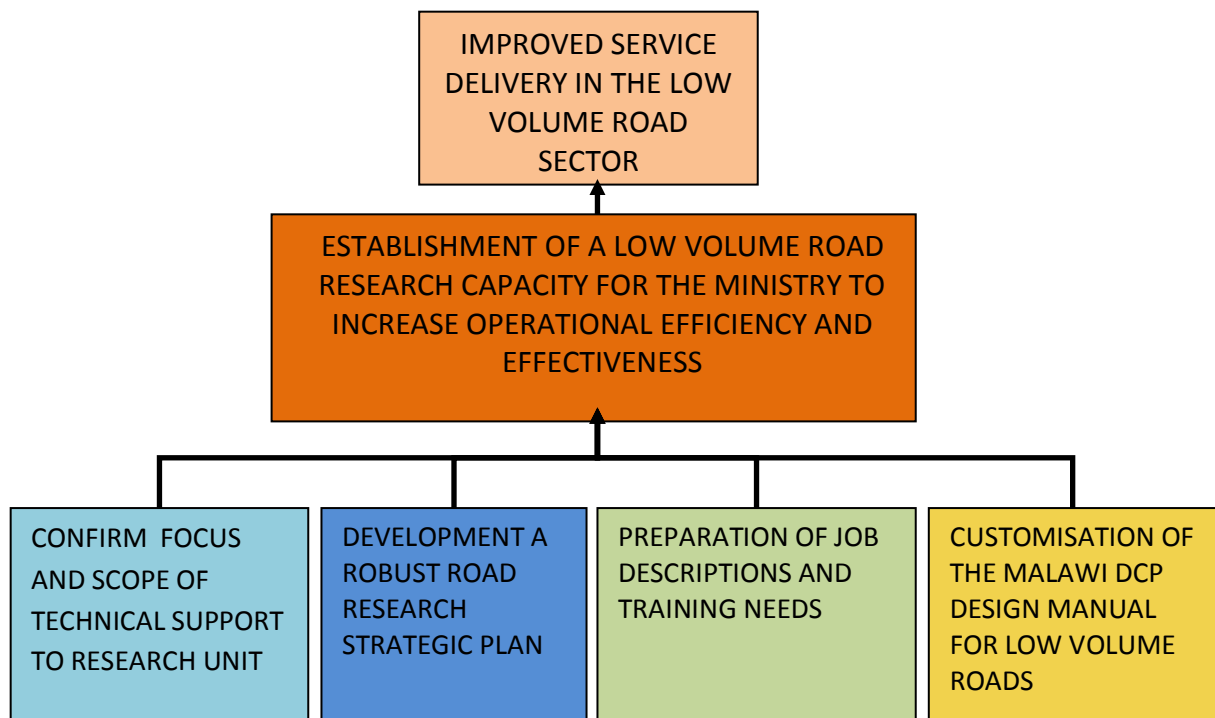


Figure 3: The Objective and Tasks for Establishing a Low Volume Road Research capability

Work has commenced on the first activity and has resulted in recognition of the need for realignment. The second activity will be developed through engagement with KeRRA and MRTD. The third will be part of a longer term plan and the fourth will continue as originally planned.

The following key milestones below, as set out in the TOR, will be realigned:

- Commencement of project
- Identification of premises and physical establishment of RU
- Appointment of all permanent and temporary staff
- Monthly Reports capturing activities and progress on
 - Establishment of RU including physical premises, equipment, staffing, etc.
 - Establishment and functioning of the Research Committee
 - Establishment of knowledge management and data storage systems and a web site
 - Establishment and growth of local, regional and international networks
 - Participation in existing rural transport research projects under AFCAP and other initiatives
 - Support, attendance and presentation to local workshops and events
 - Training of research officers in the use of the established systems
- Draft research strategic plan by month 5
- Final research strategic plan, endorsed by RC, by month 7.

1.5 Summary of Observations from Initial RU Consultation Meetings

Preliminary meetings have been held with both KeRRA and the Materials Testing and Research Department (MTRD) to review the TOR and proposals to establish a Research Unit for KeRRA. This section summarises the initial observations from those meetings.

The assignment TOR was prepared in response to a request by KeRRA to AFCAP for assistance in operationalising their RU. Early meetings once the assignment had begun discovered a clear conflict of proposed functions and associated activities with related mandates, which was not apparent at the time of the initial consultations by AFCAP. It was agreed that changes would be necessary so that the deliverables are in line with what the beneficiary institution intends to achieve, and that the objectives are aligned to the operational framework in Kenya (mandates, Constitution, etc) which the stakeholders would need to agree.

Reaffirming of general objectives:

- KeRRA wish to improve their efficiency and effectiveness through the appropriate establishment of a Research Unit
- KeRRA wish to cooperate and collaborate with the Materials Testing and Research Department in line with their mandated functions
- MTRD wishes to cooperate with KeRRA, is very supportive of the establishment of the Research Unit for Low Volume Roads within KeRRA and would be enthusiastic to cooperate in its development and operations
- MTRD believe there are many synergies and overlaps between the research objectives of the two organisations.

1.6 Recommended Way Forward

In view of both KeRRA's and MTRD's interest in developing research capability and implementation, their clear institutional setting requirements and their enthusiasm to come to a good cooperative agreement, discussions have taken place to explore options for going forward with the Consultancy Services for Technical Assistance assignment.

The options were:

1. Continue with the assignment but tailor the TOR to those areas within KeRRA's remit to establish a RU and hold collaborative discussions with MTRD to request their assistance.
2. If MTRD are agreeable, continue with the assignment with a revised TOR but with MTRD being the instigator of the RU within their organization
3. Maintain the broad TOR with MTRD establishing a Low Volume Roads Research Centre within its structure and establishing a complimentary Low Volume Research Unit within KeRRA
4. Reconsider the scope and implementation of the assignment.

On the basis of initial discussions, institutional protocols and AFCAP's stated priorities, it was agreed by KeRRA and AFCAP that Option 3 was preferred.

AFCAP wished to find a way to deliver to KeRRA the desired outputs in line with the spirit of the existing ToR and requires that the outputs, as stated, should not suffer wholesale revision. To that end, AFCAP

agreed for further exploring of Option 3 with a need to have explicit agreement by the stakeholders on the way forward and how to get there, taking into consideration the AFCAP timeframe and budgetary limitations. Discussions with KeRRA and MTRD led to an agreement to take forward Option 3. It is AFCAP's expectation that the outputs of the revised ToR will lay the foundation for future conduct of research and knowledge management in the most effective way possible under Kenyan conditions, taking due cognisance of the key roles that KeRRA and MTRD are mandated to play.

It was envisaged that the Inception Report would then set out the broad TOR and preliminary arrangements and that the details would be developed further during the programme to produce a new draft and final research strategy; establishment of a Research Centre for Low Volume Roads and collaborative arrangements with KeRRA for the establishment of a Low Volume Roads Research Unit.

2 PROGRESS AND PLANS

The assignment started with introductions and Kick-off Meetings with KeRRA and the project team on 7th November, followed by the DCP Design Manual Workshop on 8th November, 2012.

2.1 Meetings

Meetings have been held with the following organisations and staff to discuss the research assignment and the DCP Manual:

KeRRA

- Eng Mwangi Maingi, Director General
- Eng FD Karanja, General Manager, P&R 2000
- Eng Abraham Korir, Research Unit Officer
- King'ori Samual, ICT Officer
-

MTRD

- Eng SK Kogi, Chief Engineer (Materials)
- Eng MO Ndeda (Research)
- Eng DW Wanyiri, Project Engineer, DCP Design
- Eng JW Kiragu, Coordinator, Labour-Based Programme

AFCAP

- Jon Hongve, Consultant

Egis International

- Eric Goss, Team Leader, AFD Roads 2000 Central, Phase II

Attendees to the DCP Design Manual Stakeholder meeting are listed as ANNEX B.

2.2 Short and Long Term Activities

The following sections summarise progress and plans for the 4 main Activity Groups:

Activity Group 1. CONFIRM THE FOCUS AND SCOPE OF RESEARCH UNIT

Activities will be re-evaluated for relevance and scope for the LVR Research Centre and the Unit, and will be reported in the Draft Strategy Report:

Administration and Financial

Setting Thematic Priorities

Confirmation, or otherwise, of initial focus and priority fields as:

- Road maintenance
- Road planning, operation and management
- Road user and pedestrian safety
- Road traffic management
- Road engineering, geotechnics, materials and slope management
- Design and provision of low-volume roads taking climate change into account
- Economics, financing and planning of road provision
- Policy, regulatory and reform-related issues
- Travel behaviour
- Transport services and road user needs
- Social, environmental aspects of transport provision
- Sector statistics and data

National and Regional Partnerships

Investigate linkages and determine working arrangements for supporting technology transfer with:

- Central government agencies – KENHA, KURA, Materials Testing and Research Department, Road Fund, etc
- Regional government and its agencies such as the KeRRA Regional Managers
- Tertiary education system – Universities, technical training colleges, etc
- Local organisations such as Institute of Engineers Kenya, IEK
- Private Sector – Consultant and Contractor Groups

Strengthen International Linkages

Develop effective linkages with:

- International organisations housing knowledge centres such as GRSP, GRSF, PIARC-WIN, IRF
- Reputable external organisations such as SSATP, SANRAL, AustRoads, Road Research Centres, and State Road Authorities in other Countries
- Specialist centres of excellence such as ARRB, CSIR, NPRA, TRB, TRL, CRRI, and academic institutions and other renowned Universities
- Donor fraternity and their knowledge sources e.g. World Bank; ADB, EU, DFID, NORAD, SIDA, AFD and others.

Information Capture & Dissemination Opportunities

- Determine requirements with regards copyright and other governing legal instruments
- Determine type, location and relevance of existing knowledge (Manuals, books, reports, electronic media, maps, relevant regulatory, legal and policy documents etc) relevant to thematic sub-sectors
- Capture and catalogue this knowledge (or links) to enable easy interrogation, location and access (in hard copy and electronic)
- Identify opportunities for the RU to become recipient of information generated through commissioned on-going and planned rural road projects in the country
- Identify relevant statistical sources and where necessary establish database and record holding facilities

- Develop a knowledge dissemination strategy, including dissemination opportunities provided by electronic and other media
- Provide visibility for the RU by maximising attendance at national and regional events, representation at workshops, seminars and the like
- Provide updated information to stakeholders base through publication of regular RU newsletter
- Determination of means of procurement of information, where needed
- Establishment of web site.

Future Planning – Towards Sustainable Operation and Management

Logistical, Staffing and other Arrangements

In addition, the following tasks will be reviewed for applicability:

- i. Preparation of job descriptions for Research Unit staff
- ii. Training and orientation of Research Unit staff
- iii. Establishment of Research Committee (RC)
- iv. Inventory of existing research projects linked to rural road transport
- v. Prioritisation of new research topics
- vi. Identification of researchers (individuals and organisations)
- vii. Preparation of Terms of Reference for prioritised research projects
- viii. Procurement procedures for selection of researchers
- ix. Establishment of data management systems for research projects
- x. Collection and analysis of research data from research sites in Nyanza, Central, Northern and Coastal Regions
- xi. Organisation of first Annual Rural Road Research Seminar and other dissemination activities
- xii. Establishment of linkages with regional and international research organisations.

Transfer of Knowledge/Training

Activity has started to align the assignment with both KeRRA's and MTRD's knowledge management, library documents and archiving. A list of relevant documents, projects and publications is being compiled.

Knowledge transfer and support to training is a central theme of this assignment. The project acts in support of knowledge transfer to the rural roads sector. The new arrangements will provide an important technology transfer role for all other AFCAP actions in Kenya, and is thus highly complementary to these and other programmes in the country.

The project provides and strengthens opportunities for uptake of national, regional and international best practice. The Centre and RU will provide the conduit for collecting, sorting, archiving and tailoring knowledge to suit local needs. It will investigate mechanisms to break language barriers and provide access to disseminate key knowledge into the industry.

As a central portal, the Centre and RU will provide access to information and best practices in rural road provision in general, and low-volume roads in particular. It will encourage access to this information, coordinate and widen dissemination opportunities

and importantly, will act in support of training, education, technical assistance, research and development opportunities in the rural road sub-sector.

The Centre will be expected to provide an important link to inter-related AFCAP projects across Africa.

Activity Group 2. DEVELOP A ROBUST ROAD RESEARCH STRATEGIC PLAN

This group of activities is designed to address the achievement of two outcomes:

- i. A robust road research strategic plan will have been agreed that expands the work across the various regions of the country.
- ii. The existing technical knowledge will be catalogued and available to practitioners (hard copy and electronic documents).

This will be achieved by:

Assessing the appropriateness of the Research Priorities identified in KeRRA’s research policy

These are summarised in the Table below:

Research Topic	Priority Ranking	Possible Sources of Research Expertise and Funding
Construction Research		
Labour-based technology	1 st priority	ILO, SIDA, KIHBT
Alternative Surfacing and low cost seals	2 nd priority	CSIR, AFD, AFCAP, MT&RD, JKUAT, UoN
Use and field testing of local materials	3 rd priority	EU,SIDA,AFD, MT&RD, JKUAT, UoN
Chemical treatments	4 th priority	CSIR, MT&RD, JKUAT, UoN
Maintenance Research		
Road Maintenance Management System (RMMS) development	1 st priority	SIDA, EU,WB,KRB,SSATP
Maintenance for basic access	2 nd priority	WB, AFCAP, SSATP
Earth road maintenance	3 rd priority	SIDA, EU,WB, KRB,SSATP
Management Research		
Management of contracts	1 st priority	EU, SIDA, WB,SSATP
Accessibility Planning	2 nd priority	ILO, AFCAP
Project management	3 rd priority	EU, SIDA, WB, SSATP
Contracting procedures	4 th priority	EU, SIDA, WB,SSATP
Human Resource Development	5 th priority	EU, KIHBT
Socio-economic Development Research		
Non-motorised intermediate means of transport	1 st priority	AFCAP,IFRTD, M&TD
Socio-economic impacts	2 nd equal priority	AFD, EU, KfW, AfDB, WB
Interaction between transport and health	2 nd equal priority	DPs, NACC, AFCAP
Environmentally friendly rural road works	2 nd equal priority	SIDA, NEMA
Road safety	3 rd priority	NRSC, IPAR, KIPPRRA, DFID
Planning and Design Research		
Geographical Information Systems	1 st priority	CSIR, SIDA, AFCAP, JKUAT, UoN
Modelling	2 nd priority	CSIR, SIDA, AFCAP, JKUAT, UoN, WB
Socially Sensitive Alignment	3 rd priority	SIDA, AFCAP, JKUAT, UoN, SSATP
Drainage	4 th priority	SIDA, AFCAP, JKUAT, UoN

- Amend the above prioritised list to a shortlist of critical research and incorporate findings and technology transfer initiated by other AFCAP actions in Kenya.

Development of Research Priorities from activities identified in MTRD's Strategic Plan

Short and long term research programmes for consideration, discussion and prioritization includes:

- Improved technologies and methodologies for investigation, surveys, testing, modeling, monitoring and evaluating performance of roads
- Improved pavement designs for road upgrading, reconstruction, rehabilitation and strengthening works by roads authorities for prolonged life
- Construction and maintenance quality control systems including post construction evaluation
- Maintenance of asset management, pavement construction and maintenance data base
- Research on more economic road development, maintenance, and operations including research on new construction materials, construction methods and road safety studies
- Development and review of materials testing standards, road design manuals and standard specifications for construction and maintenance of roads in conjunction with other roads authorities and stakeholders
- Establishment and maintenance of a national materials inventory and database
- Database on behaviour and properties of national soils and rocks, including difficult and problematic
- Collection, management and analysis of comprehensive databases on all aspects of transportation and roads
- Training and capacity building in research and innovation
- Publication and dissemination of research findings.

The TA is also expected to help develop appropriate data management systems for research projects.

It is envisaged that the development of the research strategy will involve the transfer of knowledge and the establishment of the Centre and Unit as the central portal of knowledge transfer to the rural roads sector. Consideration should be given to holding a Workshop at the end of the project for dissemination and implementation purposes.

Activity Group 3. PREPARE JOB DESCRIPTIONS, TRAINING AND ORIENTATION OF RESEARCH STAFF

This Task Group will be developed at the latter stage of the assignment. It is designed to support the achievement of the first outcome and provide for the long term sustainability of the RU and its staff. Support to training and knowledge transfer is an important focus of the TA's effort and there are a number of activities identified by the TOR that enable the TA to achieve this:

- Draft and agree an organisational structure and organogram.

- Each post identified in the organogram will need a job description, which sets out the competencies and skills required to staff the position.
- If appropriate, the TA will also undertake Training Needs Assessment and propose a draft training programme to address any training gaps.
- The TA will also develop a staff development plan to promote the use of research methods and results.

Activity Group 4. CUSTOMISE THE DCP DESIGN MANUAL

This group of tasks is designed to achieve the fourth outcome i.e. The DCP pavement design manual will be customised for use in Kenya. Good progress has been made on this activity and the following steps are underway:

- 1 Examine the existing road standards and design process to identify local norms and practises.**
- 2 Identify the areas where DCP design is appropriate and identify its benefits and requirements in order to justify its adoption by KeRRA and other Authorities.**

The DCP is a simple yet robust piece of equipment that can characterise the ground conditions in and beneath an unsealed road quickly and with an accuracy appropriate to the requirements of the design of a low volume sealed road. This device is now used extensively in the region for the design of the upgrading of gravel roads to a sealed standard following the procedure shown in Figure 4 below.

Figure 4: Flow chart of DCP pavement design process

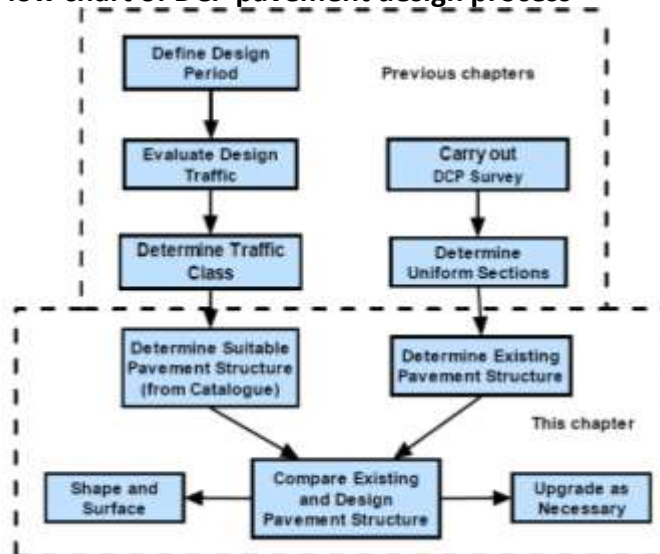
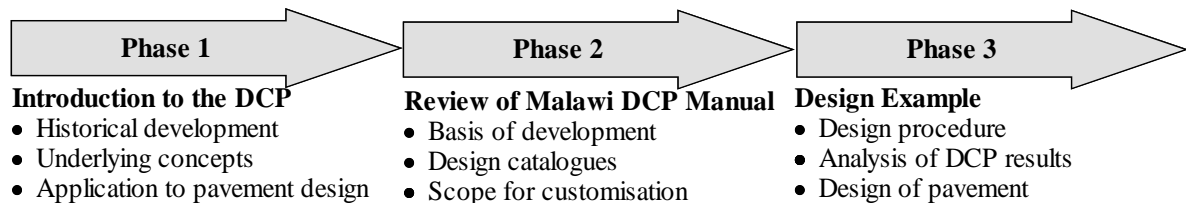


Figure 4: Flow chart of DCP pavement design process

3 Agree the level of customisation

The customisation of the Malawi DCP design Manual for Kenyan conditions has a structured procedure as outlined in Figure 5 below:

Figure 5: General approach to be adopted for customisation of the Malawi DCP manual to the Kenyan environment



This agreement will enable Mike Pinard to **adapt the Malawi approach and draft a DCP Design Manual** following the three phases above as follows:

Phase 1: Introduction to the DCP

This phase is complete. All relevant Stakeholders have been given a presentation at a meeting on the to familiarise them with the historical development and underlying concepts behind the development of DCP and the manner of its application to the design of low volume sealed road pavements, See Appendix A: Notes and Agreements of DCP Stakeholder Meeting on 8th November.

The output of this phase will be participants who are well informed about the DCP so that they fully appreciate the basis on which it is used for design road pavements.

Phase 2: Review of Malawi DCP Design Manual

This phase is complete. At the Stakeholder meeting on 8th November, discussions were held on the factors which influenced the development of the Malawi DCP Design Manual as a basis for exploring the scope for its customisation to the Kenyan environment. The output of this phase will provide the inputs for customising the Malawi manual for use in Kenya. At a follow-up meeting that was held with key stakeholders in the afternoon of 8th November the scope for customisation of the Malawi DCP manual to the Kenyan environment was discussed and the agreements reached are presented in Appendix D: Notes and Agreements of DCP Working Group meeting held on 8th November 2012.

Phase 3: Design example

The objective of this phase is to provide participants with hands-on experience in all aspects of the upgrading of a gravel road to a sealed standard. This exercise will be based on actual DCP measurements undertaken on a local gravel road earmarked for upgrading. The output of this phase will be

participants who are well versed in all the procedures required to upgrade a gravel road to a sealed standard using the DCP Design Methodology.

- 4 The Draft Design Manual will be presented at a Workshop for senior managers and other stakeholders in February. This workshop will provide a forum for comments and discussion on the merits of this approach.
- 5 If the DCP Manual is adopted by the Ministry of Roads as a suitable design approach, the DCP expert will develop a longer term training programme for its adoption.

2.3 Knowledge Management

Knowledge Management activities will adopt an integrated approach to identifying, managing and sharing all relevant information. These information assets may include databases, documents, policies and procedures, as well as previously unarticulated expertise and experience within existing Human Resources.

The TOR states that “Knowledge transfer and support to training is a central theme of the RU. The project acts in support of knowledge transfer to rural roads sector under the ambit of KeRRA”. This activity will also now be extended to MRTD. Discussions will be held to integrate both components and to link knowledge, where appropriate between MRTD and KeRRA.

Information Collection

- To create a sense of ownership by KeRRA, an email address has been opened so that various Section Heads and other stakeholders can directly email the documents. That address is AFCAP@Kerra.go.ke

Website Development

- KERRA has an existing website which can be developed further by including the objective and role of the Low Volume Road Research Unit. Publications open to the public can also be included here as reference material. Other restricted material can be published in the KeRRA intranet.

Road Management Information system

- The ICT department is currently developing a Road Management Information System that will capture key data of all roads under KeRRA throughout Kenya. A section can be dedicated to research roads too.

Physical Library

- The KeRRA library is not fully operational or staffed. Many documents/reports are in various offices and have not been collected in a central library.

2.3.1 Key Documents, Reports and Programmes

Collection of relevant key Government, MDA's, MTRD, KeRRA, national and International documents has commenced and will continue throughout the assignment. These currently comprise:

Government

- **Vision 2030**, Government of the Republic of Kenya, 2007
This publication is a summary of Kenya's new long-term national planning strategy, officially known as Kenya Vision 2030. The publication briefly states the main goals of the Economic, Social and Political pillars that underpin Vision 2030. It also summarises the major (or flagship) projects to be embarked upon in the medium-term period of the Vision i.e. from 2008-2012.
- **Political Vision 2030**, Moving to the Future as One Nation, Government of the Republic of Kenya, 2007
- **Integrated National Transport Policy**, Ministry of Transport, May 2009
- Draft Policy on Aligning the Roads Sub-Sector with the Constitution, Ministry of Roads, September 2012
- **Third Annual Progress Report 2010-2011**, On the Implementation of the First Medium Term Plan (2008-2012) of Kenya Vision 2030, Ministry of State for Planning, National Development and Vision 2030, April 2012
- **Examination Report into the Systems, Policies, Procedures and Practices of the Roads Sub-Sector**, Kenya Anti-Corruption Commission, July 2007
- **The Medium Term Plan (MTP) 2008 – 2012**, Government of Kenya
- **Joint Statement of Intent, GoK and Development Partners, 2010 – 2013**

MRTD

- **MTRD Draft Strategic Plan 2012 – 2016**, Ministry of Roads, 2012

KeRRA

- **KeRRA Strategic Plan 2013 – 2018**, Ministry of Roads, June 2012
- **KeRRA Research Policy**, Ministry of Roads, June 2010

International

- **ASANTRA's Five Year Strategic and Business Plan, 2004 – 2000**
- **Country Programme Document (CPD)**, UNDP, 2009 - 2012
- **Kenya Poverty and Inequality Assessment, Vol 1**, World Bank, June 2008
- **Kenya Joint Assistance Strategy (KJAS)**, 2007 – 2012
- **Project Review of ILO Technical Assistance to Roads 2000**, June 2011

Technical Publications

- **Design Manual for Low Volume Sealed Roads**, Ministry of Public Works, Malawi, October 2012
- **Malawi DCP Design Manual**, 2012
- **Pavement Design Standards**, Ministry of Roads
- **Road Design Manuals**, Ministry of Roads
- **AFCAP Design Manuals for Low Volume Roads, Ethiopia, Parts A to G**, 2011 to 2012

- **AFCAP/KEN/89 Research Project for Establishment of Appropriate Design Standards for Low Volume Sealed Roads in Kenya. Design Report, July 2012**

Research Projects

- Finalisation of Ken42 Study on Low Volume Roads, MTRD, for NORAD/GoK
- Trials on Labour Based Sealed Low Volume Pavements on Makenzie – Kandara Road (D415), Murang’a County, AFD Roads 2000 Project, Phase I, MTRD, for AFD/KeRRA
- Trials on Labour Based Sealed Low Volume Pavements in Meru, Tharake/Nithi, Embu, Machakos and Makenzie Counties under EU/GoK Roads 2000 Programme, Phase III, MTRD, for EU/KeRRA
- Trials on Labour Based Sealed Low Volume Pavements in Kiambu,, Nyandarua, Nyeri, Kirinyaga, Muranga, and Liakipia Counties under AfD/GoK Roads 2000 Programme, Phase II, MTRD, for AfD/KeRRA
- Trials on DCP Design Method in Kiambu, Nyandarua, Nyeri, Kirinyaga, Muranga and Laikipia Counties, MTRD, for AFCAP/KeRRA
- Trials on Sealed Single Layer Pavements for Low Volume Roads, MTRD, for KeRRA/KeNHA
- Study on GCS Stabilisation using Cement, Lime & Hydraulic Binders, MTRD, for IDA/KeRRA
- Study on Hand Packed Stone Pavement and Cobble Stone Surfacing, MTRD, for KeRRA/KURA/KenHA
- Study on Fibreglass Reinforced Polyester For Road Sign Base plates, Posts and Guard Rails, MTRD, for KeRRA/KeNHA/KURA
- Development of Design guidelines for Axle Loads Exceeding 130KN (13 tonnes), MTRD, for KenHA
- Design Manual on LV Roads, BCOM

2.4 Work Plan and Milestones

The following Work Plan sets out the key milestones:

REPORTING MILESTONES	
Inception Report	after 4 weeks
This will contain a detailed plan for project delivery, updated reporting and staffing schedules and details of project logistics.	
Monthly Progress Reports	Within 1 week after each month of the assignment
These reports will summarise the inputs and progress of the team members and KeRRA in a) the establishment of the research capability, b) development of knowledge management and data storage systems and a web site and c) other relevant information.	
Draft Research Strategic Plan	Within 4 months

This draft report will be outlined within four months of the commencement of services. It will report on all services carried out by the consultant to set out its research strategy for the short term and the next three years, the expertise needed to undertake this research and the likely funding sources.

Final Research Strategic Plan

By 5 months

This report will consolidate comments received on the Draft Strategy and be endorsed by both MTRD and KeRRA.

The following programme and outputs is proposed:

- Initial visit by experts, 6th November for 2 weeks. The draft Inception Report will be issued at the end of the visit and circulated to AFCAP, MRTD and KeRRA. Comments will be invited within 2 weeks and then Report will be finalised and circulated (5 days input by both Pavement Specialist and Knowledge Management Experts).
- Strategy and forward planning visit by Team Leader, 4th December for 10 days (5 days input by Knowledge Management Expert).
- Draft Strategy Stakeholder meeting and Draft DCP Design Manual assessment visit by experts, 11th February 2013, for 10 days. Draft documents will be pre-circulated (5 days input by both Pavement Specialist and Knowledge Management Experts). Comments will be invited within 3 weeks.
- Final Strategy Report and DCP Design Manual visit by Team Leader, 18th March for 5 days and final submission. The final report will set out a short and long term plan for both MRTD and KeRRA.

It is expected that by the end of March 2013 the following outcomes will be achieved:

- i. The Research Centre and the KeRRA RU will have been established and will be functional.
- ii. A robust road research strategic plan will have been agreed that expands the impact across the various regions of the country. The plan will identify:
 - o Critical areas of rural road research
 - o Financial, other support structures and partnerships.
- iii. The existing technical knowledge will be catalogued and available to practitioners (hard copy and electronic documents)
- iv. The DCP pavement design manual will be customised for use in Kenya



ANNEXES

ANNEX A: NOTES AND AGREEMENTS OF DCP STAKEHOLDER MEETING

HELD ON 8th November 2012

1. PRESENT

- A wide range of stakeholders from KeRRA, Ministry of Roads, Materials Testing and Research Department and other public and private sector organisations. The attendance list is attached as Annex B.
- The meeting was chaired by the Director General of KeRRA, Eng Maingi.

2. OBJECTIVES OF MEETING

The main objectives of the meeting were to:

- Provide stakeholders with an overview of the AFCAP supported project ref. AFCAP/KEN/089/G which was being carried out by IT Transport and which involved the establishment of a Research Unit for KeRRA as well as the customisation of the Malawi DCP Manual for Kenya.
- Introduce stakeholders to the DCP Design Method including its background development, application to the design of low volume sealed roads (LVSRs) and the benefits of its introduction to Kenya.

3. PROGRAMME

- The programme for the meeting is attached as Annex C.

4. PRESENTATION OF DCP DESIGN METHOD

- The main topics covered during the Consultant's presentation included:
 - Introduction to the DCP
 - Design options for upgrading low volume roads
 - Background to the DCP design method
 - Background to the development of Malawi DCP Manual
 - Overview of the scope of the Malawi DCP manual
 - Scope for customization of the Malawi DCP Manual for KeRRA
 - Way forward
- The main points emerging from the presentation were:
 - Extensive research has been carried out on LVSRs in the Southern African region over the last 20-30 years which has challenged the traditional paradigms for designing such roads.

- Evidence that LVSRs constructed with naturally occurring materials that fall outside conventional specifications have performed well as exemplified by back analysis of trial sections constructed in many Southern African countries including Kenya, Malawi, Botswana and South Africa.
- Little correlation between conventional design criteria such as CBR, PI and Grading with actual performance of LVSRs.
- Back analysis of LVSR in Malawi has shown that the DCP Design Method and Catalogue is adequate or fit-for-purpose for LVSRs.
- Need for a DCP manual before the method can be widely applied for design of LVSRs and to ensure that such roads are designed in a consistent and standardised manner.

5. DISCUSSION POINTS

- The following points emerged from discussions following the PowerPoint presentation:
 - Many LVSRs with light one-layer pavements have previously been constructed in Kenya without any formal design criteria. Most of these have performed well. Failures are invariably due to lack of maintenance.
 - The current KRDM is from 1987 and does not cater adequately for LVSRs. The lowest traffic class is T5 (MESA 0.25-1.0), hence consultants have a tendency of “cooking” traffic figures for all LVSRs to fit into this category resulting in overdesigns and unnecessary high construction costs.
 - Under the project KEN042 Material Testing and Research Department (MTRD) is currently analyzing data from three different roads with the aim of providing inputs to the ongoing revision of the KRDM for LVSRs.
 - The Demo Road D415 in Muranga and test sections being designed using the DCP Design Method and constructed under AFCAP/KEN/089 will give more performance related evidence for appropriate LVSR design.

6. MAIN OUTCOMES OF MEETING

- The main outcomes of the meeting were:
 - It was acknowledged that there is abundant experience and data from Kenya to underpin a change in the design philosophy, methods and specifications for LVSRs.

- The participants agreed that the Malawi DCP Design Method should be adapted for Kenya and that the ITT Consultants should go ahead and produce a Draft Manual for consideration by stakeholders.
- It will be necessary to scope a recommended future training programme in the application of the design method and computer software used to analyze the data.
- A Working Group should be established comprising members from KeRRA, MoR and MTRD. The Working Group should meet at KeRRA HQ in the afternoon to discuss and agree the way forward for the customization of the Malawi DCP Manual for Kenya.

7. CLOSURE OF MEETING

- In his closing remarks, the Director General of KeRRA:
 - Acknowledged the support provided by AFCAP through their project AFCAP/KEN/089/G which would be of great benefit to KeRRA and relevant stakeholders.
 - Thanked participants for their constructive comments on the Consultant's presentation.
 - Thanked the Consultants for their comprehensive presentation on various aspects of the DCP design method.

ANNEX B: ATTENDEES AT DCP DESIGN MANUAL STAKEHOLDER MEETING

HELD ON 8th November, 2012

NO	NAME	ORGANIZATION
1.	Eng. Mwangi Maingi	DG – KeRRA
2.	Eng. J. O. Ogango	KeRRA, GM (D&C)
3.	Eng. F. D. Karanja	KeRRA, GM (P&R2000)
4.	Eng. S. M. Osiro	KeRRA, GM (M)
5.	Samuel Orwa	Itt Information Management Specialist
6.	Henry Orwa	AFD Roads 2000
7.	Eng. N. N. Nganga	KeRRA M (R2000)
8.	Eng. J. Kago	KeRRA M (R2000)
9.	Eng. J. K. Murage	KeRRA, RM (Kiambu)
10.	Eng. P. Amiani	KeRRA M(M-E)
11.	Eng. P. Githere	KeRRA, RM (Laikipia)
12.	Eng. S. Kathindai	KeRRA (HQ)
13.	Eng. A. Korir	KeRRA, M(P)
14.	Ms. Esther E. O. Amimo	Materials Dept
15.	Mr. Eric Goss	Egis/R2000 Central
16.	Eng. J. W. Kiragu	M.O.R (Materials Dept)
17.	Eng. G. W. Chiaji	KeRRA, M (C-E)
18.	Eng. J. K. Magondu	KeRRA, M (C-W)
19.	Eng. P. P. Gichohi	KeRRA, M (M-C)
20.	Eng. C. T. Wanjohi	KeRRA, M (P)
21.	Eng. E. K. Kariuki	KeRRA Eng. (R2000)
22.	Eng. J. K. Gakubia	KeRRA M (M-W)
23.	Eng. J. Ndiritu	KeRRA Eng. (D)
24.	Eng. K. O. Nyakuti	KeRRA, M (D)
25.	Eng. Joseph Mbugua	KeRRA Muranga – RM (Muranga)
26.	Eng. J. N. Kabiru	KeRRA, RM (Nyeri)
27.	Eng. P. Methu	CAS Consultant
28.	Eng. W. N. Omari	MAX Partners
29.	Eng. W. K. Mburu	KeRRA, RM (Kirinyaga)
30.	Samuel King'ori	KeRRA, Ag. M (ICT)
31.	Mike Head	Itt – Team Leader
32.	Mike Pinard	Itt – DCP Design Expert
33.	Jon Hongve	AFCAP - Consultant

ANNEX C: PROGRAMME FOR DCP STAKEHOLDERS' MEETING

HELD ON 8TH NOVEMBER 2012

Programme

09.00 - 09.05	Welcome <i>KeRRA Management</i>
09.05 – 09.15	Project Overview <i>Mike Head – Team Leader</i>
09.15 – 10.20	Customization of Malawi DCP Manual for LVRs in Kenya <i>Mike Pinard – Low Volume Road Specialist</i>
10.20 – 10.40	Coffee/Tea Break
10.40 – 11.45	Discussion: Degree of Customisation of Malawi DCP Manual Appropriate to KeRRA's needs
11.45 – 12.15	Summary and Way Forward <i>Mike Pinard – Low Volume Road Specialist</i>
12.15 – 12.20	Closing Remarks <i>Mike Head – Team Leader</i> <i>KeRRA Management</i>

ANNEX D: NOTES AND AGREEMENTS OF DCP WORKING GROUP MEETING

HELD ON 8TH NOVEMBER 2012

1. PRESENT

Eng. F.D. Karanja	-General Manager (P & R 2000), KeRRA
Eng. S.M kathindai	- KeRRA HQ
Eng. J.W. Kiragu	- MoR (Materials)
E. Goss	- Team Leader GOK/AFD Roads 2000 Central, Phase 2 Project
J. Hongwe	- AFCAP Consultant (AFCAP/KEN/089)
M. Head	- Team Leader (AFCAP/KEN/089/G), ITT
M. Pinard	- Pavement Specialist (AFCAP/KEN/089/G), ITT

2. OBJECTIVE OF MEETING

Following the stakeholder meeting held on the morning of Thursday 8th November 2012, to agree the way forward concerning the DCP customisation component of the project for which the following activities were envisaged:

- **Phase 1**
 - Examine existing KeRRA road standards and design process
 - Present outline of benefits and requirements of DCP design process to KeRRA
 - Agree the degree of customisation appropriate to KeRRA's needs
- **Phase 2**
 - Draft DCP Design manual for KeRRA
- **Phase 3**
 - Present Draft Manual for KeRRA
 - Undertake training programme
- **Phase 4**
 - Finalise DCP manual and submit to KeRRA

3. OUTCOMES OF MEETING

- **Phase 1**
 - **Examine existing KeRRA road standards and design process**

- KeRRA and CML would provide relevant documentation to enable the Consultant to examine KeRRA's road standards and design processes. These would include electronic or hard copies of the following documents or reports which would be sent as soon as possible:
 - Kenya Materials and Pavement Design Manual
 - Kenya Geometric Design Manual
 - Traffic counting manual
 - KEN 042 (NORAD) evaluation reports

- **Present outline of benefits and requirements of DCP design process to KeRRA**
 - This task had been completed earlier in the day at a stakeholder meeting held at KeRRA HQ that was chaired by the DG at which a PowerPoint presentation was made by the Consultant to a wide range of stakeholders.

 - The broad consensus emerging from the stakeholder meeting was that the DCP Design Method would be suitable for Kenya and that the consultant should go ahead with the customization of the Malawi Manual as the basis for producing a Draft Manual for Kenya.

- **Agree the degree of customisation appropriate to KeRRA's needs**
 - Part A of the Malawi Manual would need to be customised to the Kenya environment.
 - Part B of the Malawi Manual, which comprised the principles of DCP design, would remain largely applicable to Kenya.
 - Part C of the Malawi manual would need to be customised to the Kenya environment. This Part would be informed largely by the outcome of the KEN 042 project which aims to provide new standards and specifications for low volume roads based on the monitoring of trial sections that were constructed in the mid-1980s under a NORAD project.
 - Stakeholders from KeRRA and CML agreed to make comments on the Malawi manual by end November 2012 which would be taken into account by the Consultant in customising that manual for Kenya.

- **Phase 2**
 - **Draft DCP Design Manual for KeRRA**
 - The drafting of the DCP manual would be undertaken by the Consultant based on the information gathered from Phase 1 of the project.
 - The Draft Manual would be submitted to KeRRA by the end of January 2013.

- **Phase 3**
 - **Present Draft Manual for KeRRA**
 - The draft Manual would be presented to KeRRA and other stakeholders by the Consultant around mid-February 2013 as a basis for obtaining comments and feedback for producing the Final Manual.

 - **Undertake training programme**
 - The Consultant is required to provide some training to KeRRA HQ staff in the process of presenting the Draft Final manual in mid-February 2013.
 - KeRRA would like training to be also provided to provincial staff which numbered about 47 persons. However, such an undertaking is outside the scope of the project and the Consultant's Team Leader will flag this to KeRRA as soon as possible.
 - Consideration will be given to using DCP survey data from Project D415 which is earmarked for upgrading as part of the training for KeRRA HQ staff that will be undertaken by the Consultant in mid-February 2013. J. Hongve to assist with this exercise.
 - There is need for KeRRA to plan for a longer term training programme to enable both public and private sector stakeholders to become proficient in the use of the DCP design.

- **Phase 4**
 - **Finalise DCP manual and submit to KeRRA**
 - The comments and feedback obtained from the presentation of the Draft Manual in mid-February 2013 will be taken into account by the Consultant in producing the Final Manual by mid-March 2013.



ANNEX F: BIBLIOGRAPHY
