Baseline survey of past and current road sector research undertakings in Uganda and establishment of electronic document management system (EDMS)

Inception Report: Institutional review and study methodology

Aurecon AMEI Limited

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Abstract

The purpose of this project is to carry out a baseline survey of past and current research that has been undertaken on the roads sector in Uganda, and to establish a databank that enables access to such research. This document presents the Draft Inception Report: Institutional review and study methodology for the study. The study commenced on 22 November 2016. The report documents the methodology; initial feedback from key stakeholders; best practices for establishing an electronic document management system and initial comments on the proposed framework for evaluating historic and current road research.

Key words

Baseline survey, road sector research, electronic document management system

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Acronyms, Units and Currencies

AfCAP	Africa Community Access Programme
BCRRA	Bearing Capacity for Roads, Rail and Airfields
CAR	Community Access Roads
CEDAT	College of Engineering, Design, Art and Technology
DFID	Department for International Development
EDMS	Electronic document management system
ISAP	International Society for Asphalt Pavements
ISCP	International Society for Concrete Pavements
KCCA	Kampala Capital City Authority
MEAC	Ministry of East African Community
MELTEC	Mt. Elgon Labour Based Training Centre
MEMD	Ministry of Energy and Mineral Development
MoFPED	Ministry of Finance, Planning and Economic Development
MoLG	Ministry of Local Government
MoWT	Ministry of Works and Transport
MWE	Ministry of Water and Environment
NEMA	National Environmental Authority
NRSC	National Road Safety Council
PIARC	World Road Association
ReCAP	Research for Community Access partnership
ROI	Return on Investment
RPF	Road Pavements Forum
Sabita	South African Bitumen Association
SANRAL	South African National Roads Agency SOC Ltd
SARF	South African Road Federation
SATC	Southern African Transportation Conference
SEO	Search Engine Optimisation
TLB	Transport Licensing Board
TOR	Terms of Reference
TRB	Transportation Research Board
UNCST	Uganda National Council for Science and Technology
UNRA	Uganda National Roads Authority
URF	Uganda Road Fund
US	United States

Contents

1   Executive summary

The purpose of this project is to carry out a baseline survey of past and current research that has been undertaken on the roads sector in Uganda, and to establish a databank that enables access to such research. The study commenced on 22 November 2016.

This document presents the Draft Inception Report: Institutional review and study methodology for the study. The report documents the methodology; initial feedback from key stakeholders; best practices for establishing an electronic document management system and initial comments on the proposed framework for evaluating historic and current road research.

This document also presents a questionnaire that was developed to assist in the investigation of the current status and structure of road research in Uganda and of the parties involved, as well as the requirements of stakeholders to assist in the drawing up of specifications for the databank.

2 Background

2.1 Introduction

One of the challenges facing the roads sector in Uganda is the absence of consistent, continuous and coordinated research. Various national institutions and agencies have undertaken research in the road sector, including Makerere University, the Uganda National Roads Authority (UNRA), Mt. Elgon Labour Based Training Centre (MELTEC), the Central Materials Laboratory, and individual researchers. However, there is currently no databank where research is consolidated and indexed, and made available to all stakeholders.

The Africa Community Access Programme (AfCAP) is a programme of research and knowledge dissemination funded by the UK government through the Department for International Development (DFID). Cardno Emerging Markets (UK) Ltd has been contracted to do the management of the AFCAP2 (under the Research for Community Access partnership (ReCAP) umbrella). The AfCAP National Steering Committee has placed high priority on knowledge management as a tool to coordinate road research undertakings, and to avoid duplication of research. AfCAP has accepted a request from UNRA for support to carry out a baseline survey of past and current road sector research undertakings in Uganda.

Cardno has now appointed Aurecon AMEI Limited to carry out the baseline survey of past and current road sector research undertakings in Uganda and to establish an electronic document management system ("databank"). The study commenced on 22 November 2016.

This document presents the **Inception Report: Institutional review and study methodology** for the study.

2.2 Structure of the report

The rest of the report is structured as follows:

- Chapter 3 presents the objectives of this project;
- Chapter 4 presents our team's methodology for carrying out this study. The methodology is based on the submission in our Technical Proposal, but incorporates some clarifications as per our written communication (letter dated 28 October 2016) and as discussed during the Inception meetings (22 and 24 November 2016). The chapter also presents the updated study programme;
- Chapter 5 identifies local and international institutions and agencies involved in past and current road related research on Uganda. The chapter investigates the mandates of these stakeholders, their need for research and their role in performing and managing research in Uganda;
- Chapter 6 considers best practices from other countries, in terms of institutional frameworks, factors that promote successful uptake of research findings, etc.;
- Chapter 7 presents a framework for evaluating recent and historic road research.

3   Project objectives

The purpose of this project is to carry out a baseline survey of past and current research that has been undertaken on the roads sector in Uganda, and to establish a databank that enables access to such research.

To achieve this purpose, the study comprises of the following main tasks:

1. Review and compile a listing of past and current research that has been undertaken on the roads sector in Uganda;
2. Analyse and categorise past and current research undertakings to outline items such as:
   a. Methodology/ approach followed;
   b. Controls exercised;
   c. Institutions involved;
   d. Competence of researchers;
   e. Research findings.
3. Comment on the reliability of research undertakings;
4. Undertake a gap analysis to identify and prioritise research knowledge gaps;
5. Assess the prevailing modes of knowledge management;
6. Develop an implementation plan for the establishment of a centralized knowledge base (databank) of research undertakings within the road sub-sector;
7. The target audience is a broad range of stakeholders including current and future researchers, practitioners, academia, road policy and decision makers, and the general public.

The scope of the study has been agreed to focus on the following (also see Terms of Reference (TOR) and clarifications provided on the scope and methodology in Annexure A):

- The study focuses on research in the road sector. The study is therefore not concerned with research in other modes (e.g. rail, airports, pipelines, ports). The focus of this study is also more on infrastructure, and not on the services (e.g. public transport, freight flow);
- The study includes research on all types of road;
- The study focuses on research undertakings in Uganda. The study therefore does not focus on road research outside of Uganda;
- "Research" includes the following:
  - Papers presented at conferences;
  - Articles published in scientific journals;
  - Research conducted as part of post-graduate studies (local, but also international related to Uganda in as far as they can be obtained from key stakeholders);
  - Applied research (trial sections) carried out by research organisations and other international consulting firms in the past years;
  - Other relevant research, including grey literature and other documented research efforts. (As the research items in this bullet have not necessarily been published or widely distributed, it may be difficult for the team to identify and obtain such research. The consultation process is considered as a proper platform to request and identify such research items).

4   Methodology

4.1   Introduction

The methodology was structured around the objectives and specific tasks stipulated in the Terms of Reference (TOR) (attached as Annexure A). Note that some clarifications on the methodology was provided, which is also attached in Annexure A.

The study consists of three main components, namely:

1. A process of identifying and consulting with research institutions, organisations or individuals;
2. A process of gathering research material, ordering/ categorising it, evaluating it on the basis of a predetermined set of criteria, and drawing some conclusions;
3. Designing and implementing a databank.

Our broad approach for conducting this study is illustrated in the diagram below, and discussed in more details in the next sections.
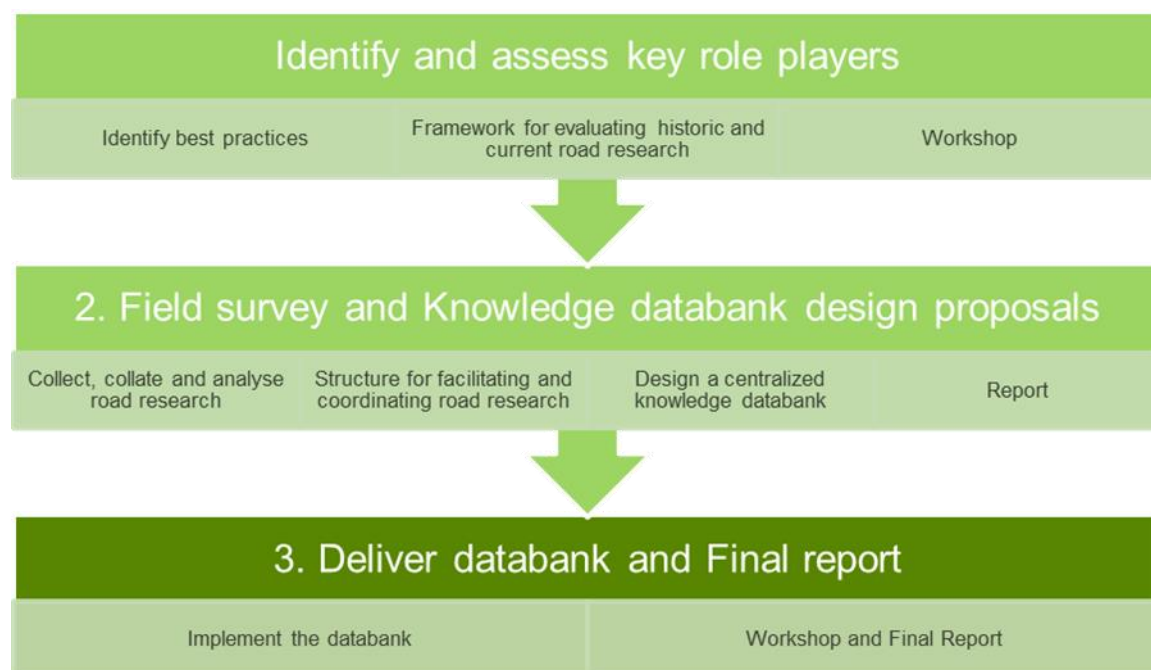

Figure 1: Broad approach to the study

4.2   Task 1: Institutional review and study methodology

Activities in this task can be summarised as the following:

1. Identify and assess key role players;
2. Identify best practices;
3. Framework for evaluating historic and current road research;
4. Workshop.

4.2.1   Identify and assess key role players

The Team will commence with a listing of all institutions, agencies and individual researchers, that is or has been involved in road related research in Uganda. This will be done through the Team's network of contacts (local personnel, colleagues that have worked in the country before, academic contacts), and through discussions with the Client and Universities. We envisage that role players will include at least the following:

- Uganda National Roads Authority (UNRA);
- Uganda National Council for Science and Technology (UNCST);
- Universities;
- Mt. Elgon Labour Based Training Centre (MELTEC);
- Central Materials Laboratory.

The aim of identifying these entities will be twofold, namely to obtain past and current research, and to allow an assessment of the current capacities and responsibilities for regulating research in the country.

Once the role players have been identified, the Team will assess (through a desktop exercise, as well as meetings) the following in order to obtain an understanding of the existing frameworks in the country for regulating road research:

- Mandate of institution;
- Historic and current involvement in road research;
- Key resources;
- Existing platforms for interaction and coordination with other key role players, including any attempts at formalisation of this;
- Issues and challenges preventing coordination of research (this may be of institutional, organisational, technical, logistical or financial nature);
- The level of dissemination and uptake of research recommendations by relevant stakeholders in Uganda;
- The institutions' recommendations with regards to a centralized road research databank (e.g. the categorisation of research, and key data for profiles).

4.2.2   Identify best practices

The Team will consider examples elsewhere in the continent, and abroad, where role players succeeded in combining forces to maximise research outcomes, and to share their knowledge base. The focus will be on issues such as the following:

- Platform for storing and sharing of research;
- Handling of issues related to intellectual property;
- Institutional responsibilities;
- Supporting platforms for sharing knowledge, e.g. forums, conferences etc.

4.2.3   Framework for evaluating historic and current road research

The collation and analysis of road research will take place during Task 2. However, during Task 1 the team will contact all key stakeholders to ensure their cooperation in availing research, and to assess the extent of available research. The Team will also distribute a questionnaire to key stakeholders, and follow up with discussions where relevant, to obtain their input on specific needs and requirements for a research databank. A questionnaire

was developed for this purpose, and was distributed to key stakeholders. The questionnaire is attached in Annexure B.

The Team will then apply this background to draw up a framework for evaluating road research. The purpose of the framework will be to evaluate research ("gap analysis") in order to identify gaps or shortcomings in research pieces. The framework will address aspects such as:

- An appropriate structure for categorising research;
- Assessment of items such as:
    - Methodology/ approach followed;
    - Controls exercised, and reliability of outcomes;
    - Institutions involved;
    - Competence of researchers;
    - Research findings;
    - Examples of where the findings have been taken up in practice (i.e. implemented).
- Implementation programme.

4.2.4   Workshop

The findings of Task 1 of the study is captured in this report. The report will be distributed for comments to the AFCAP National Steering Committee, UNRA and other key stakeholders (as determined by the Client).

The findings of the report, as well as the feedback received in the form of questionnaires and consultations with key stakeholders, will then be presented and discussed at a workshop to be attended by UNRA, road sector stakeholders and research institutions. A Workshop Report will be compiled to present the outcome of the workshop.

4.3   Task 2: Field survey and knowledge databank design proposals

Activities in this Task can be summarised as the following:

1. Collect, collate and analyse road research;
2. Structure for facilitating and coordinating road research;
3. Design a centralized knowledge databank;
4. Report.

4.3.1   Collect, collate and evaluate road research

The Team will, through the network of role players developed during Task 1, collect available road research in Uganda. It is expected that most of the research will come from universities, and it is understood that universities are currently in the process of collating research. The Team will therefore liaise with universities and use any existing databases/ lists of research as a base for this study.

In order to address the issue of intellectual property, full research pieces will not be collected and stored in the database. The database will rather only keep certain aspects of the work e.g. title, author, date, abstract and the evaluation, with further details on where the full research piece can be obtained (institution, contact person).

Once collected, the Team will go through the exercise of organising and doing a high level evaluation of road research, using the framework that was developed in Task 1. The evaluation will also include a gap analysis. The Team will identify the recurring themes and problems experienced in research in order to have a clear understanding of the main issues to address in a future arrangement for Uganda. The evaluation will typically identify the degree to which certain gaps exist, such as:

- Categories where very limited research has been done to date, or where the quality of research to date has been lacking;
- Methodology being inadequate (e.g. scientific basis lacking);
- Researcher not suitably qualified, or work not suitably reviewed;
- Inadequate controls exercised;
- Conclusions and findings not matching the result of research;
- Research not being taken up in practice.

Flowing from the above gap analysis, the major research gaps will be highlighted and prioritised, and recommendations given on how to address them.

The TOR proposes that the Team also conduct field visits. The purpose of field visits was further discussed and clarified during the Project Inception Meetings (draft minutes attached in Annexure C). It was agreed that field visits should be relevant and should contribute to a better understanding of why research was done, how it was done and what the findings were. It was proposed that field visits focus on trial sections carried out by research organisations and other international consulting firms in the past years, and on laboratories.

Once all research has been categorized and evaluated based on the framework, the Team will identify the recurring themes and problems in order to have a clear understanding of the main issues to address in a future arrangement for Uganda.

4.3.2   Structure for facilitating and coordinating road research

The main inputs to this sub-task will be the following:

- Evaluation of findings of research undertakings (sub-tasks above);
- Assessment of current institutions and research protocols (Task 1);
- Assessment of best practices (Task 1).

Flowing from the above, the Team will propose a future structure and institutional arrangement to better facilitate and coordinate road research in the country. We envisage that this solution will be described in terms of the following:

- Institutional setup, i.e. the different organisations involved (which may include government, academic institutions and private sector) and their respective responsibilities towards a coordinated road research effort;
- A proposal will be made on where the databank need to be hosted, and who will take ownership of and responsibility for updating and maintenance of the databank;
- Broad recommendations on technical resource requirements;
- Communication channels, and platforms for sharing knowledge. This may include technical conferences, circulars/ bulletins, workshops;
- Platforms to interact with and share knowledge with the technical fraternity outside of Uganda.

4.3.3   Design a centralized knowledge databank

At this stage of the project, the team will have a clear understanding of the type of data and of the specific requirements of the Client, and other role players.

The Team will draw up specifications (design) to describe the functions to be performed by the databank. The specifications will typically consider the following aspects:

- Consolidation architecture. We envisage that a Data catalogue will be used, i.e. a type of linkage where the raw dataset is imported without any transformation into the central databank (i.e. data is kept in native format). This raw data can then be downloaded from its central location, for further assessment and analysis outside of the databank. This type of system is referred to as a data catalogue, and it works similar to a library where searches can only be done on the metadata (description of the dataset that has been imported) but not within the dataset itself (as it has not been structured to enable this functionality);
- Data integrity;
- Ways of viewing data;
- High-level physical architecture of the databank solution;
- Stakeholders and access control (ranging from full access, to controlled access and temporary restricted access);
- Public access consideration;
- Search Engine Optimisation (SEO);
- Commercial solutions, open-source solutions or customised application;
- Interoperability;
- Web services;
- Redundancy;
- Storage design aspects;
- Database design;
- System security;
- Meta data standards;
- Operational and hosting considerations.

A questionnaire was developed to be completed by stakeholders, to understand the status quo with regards to road research in Uganda, but also to understand the needs of stakeholders with regards to the EDMS (databank). The questionnaire that will be used is attached in Annexure B.

4.3.4   Report

The findings of Task 2 of the study will be consolidated in a Draft Final Report, incorporating survey outcomes, proposals and recommendations.

The report will be distributed for comments to the AFCAP National Steering Committee, UNRA and other key stakeholders (as determined by the Client).

4.4   Task 3: Deliver databank and Final Report

Activities in this Task can be summarised as the following:

1. Implement the databank;
2. Workshop and Final Report.

4.4.1   Implement the databank

Once the specifications of the centralised knowledge databank have been workshopped with the Client and stakeholders, and agreed on, the Team will commence with the development and implementation of the databank, following the approach set out in Task 2.

4.5   Demonstration and Final Report

As soon as a working version of the databank is available, we propose to have a demonstration workshop to key stakeholders in order to get their feedback, and make some minor adjustments. A Workshop Report will be compiled to discuss the outcome of the workshop.

All comments received to date will be worked into the Task 2 report in order to deliver the Final Report for this study.

The final deliverable of this Task will be the databank for road research in Uganda.

4.6   Timetable of work

The proposed timing, sequence and duration of the different Tasks and sub-tasks are indicated in Table 1. The project has been structured into three main tasks (in line with the TOR) and is expected to have a duration of 8 months.

A work plan indicating the major milestones (deliverables) of the project, is indicated in Table 1. There will be a total of five deliverables throughout the project, consisting of Technical Reports, Workshop Reports and the databank.

Table 1: Work plan indicating major milestones

Task	Milestones (Deliverables)	Envisaged submission date
Task 1: Institutional review and study methodology	Task 1 report on institutional review and study methodology Workshop 1 Report	31 Jan 2017 20 Feb 2017
Task 2: Field survey and knowledge databank design proposals	Task 2 Draft Final Report, incorporating survey outcomes, proposals and recommendations	22 Mar 2017
Task 3: Deliver databank and Final Report	EDMS databank Final Workshop Report Final Project Report	22 May 2017 22 Jun 2017 29 Jul 2017

5   Assessments of key role players

5.1   Brief review of institutional setup in road sector in Uganda

5.1.1   Introduction

There are three "functional" ministries overseeing transport outputs in the Ugandan Government, namely the Ministry of Works and Transport (MoWT), the Ministry of Local Government (MoLG), and the Ministry of Energy and Mineral Development (MEMD) (pipelines).

There are various cross-cutting ministries that play a role in approving aspects of transport, but are not responsible for transport outputs. These include the Ministry of Finance, Planning and Economic Development, Ministry of Water and Environment, and the Ministry of East African Community.

5.1.2   National cross-sectoral Ministries and Institutions

The Ministry of Finance, Planning and Economic Development (MoFPED)

As indicated in the NTMP, MoFPED is responsible for mobilising and making available the funding as per the approved transport sector investment plan. MoFPED also provides oversight to the URF Board.

Ministry of Water and Environment (MWE)

The MWE, through the National Environmental Authority (NEMA), is responsible for issuing guidelines for carrying out environmental impact assessments and executing environmental mitigation measures with respect to road and transport projects. This ministry furthermore outlines the procedures for acquisition of land for road reserves and other transport reserves rights administration, as well as the exploitation of road making materials.

The Ministry of East African Community (MEAC)

This ministry is the focal point for coordinating Uganda's political commitments and responses flowing from the Treaty for the Establishment of the East African Community, to which Uganda is a party. This ministry should work closely with the MoWT regarding transport actions required in this regard.

This ministry sees to promoting co-operation and collaboration in the transport sector in respect of policy formulation, standards, quality assurance, joint infrastructure development and management which requires the MEAC to work in close co-operation with the MoWT. The MEAC is to ensure harmonisation of decisions and actions required within the EAC Treaty and the various East African Development frameworks.

5.1.3   The road sub-sector in Uganda

The oversight and service delivery of roads across their classification types are undertaken by different institutions or governmental levels, as indicated in Figure 2. A brief discussion on the institutional functions follows.

			National Corridors	National Connectors & Urban Corridors	National Collectors and Urban Collectors	Other Collectors (Community Access Roads)
Oversight	Policy, Sector Planning and Performance Management		MoWT	MoWT MoLG KCCA	MWT & MoLG KCCA	MoLG
	Regulation	Safety & Technical	Infrastructure: MoWT Services: TLB		MoWT TLB	MoWT TLB
		Economic	MoFPED approves toll rates	Not required	Not required	Not required
Service Delivery	Infra-structure	Planning Monopoly	UNRA	UNRA MoLG KCCA	MoLG MoWT	MoLG MoWT
		Risk-Based Contracting	No toll concession in place			
	Services	Monopoly	Various private service providers			
		Risk-Based Contracting	Private			

Funding	Infrastructure	URF, development partners, KCCA
	Services	Private
Research and training		Mt. Elgon Labour Based Training Centre (MELTEC)
		Central Materials Laboratory
		Uganda National Council for Science and Technology (UNCST)
		Universities

Figure 2: Ugandan Road Transport Institutions

The Ministry of Works and Transport (MoWT)

Besides being responsible for roads policy, planning and performance management, the MoWT also sees to safety and technical regulation, which should be undertaken by an arm's length institution, namely the National Road Safety Council (NRSC). It is our understanding that the NRSC is currently not in a position to fulfil this function.

The MoWT currently also assists the MoLG in their role of planning for national, urban and other collectors.

The Ministry of Finance, Planning and Economic Development (MoFPED)

This ministry gives final approval of toll rates. There is no formal economic regulator.

Ministry of Local Government (MoLG) – including KCCA

The operation and maintenance of district roads (national collectors and urban corridors) is the responsibility of the Ugandan District Councils. In practice however, the MoWT assists the MoLG with this.

Urban roads (national connectors and urban corridors) are the responsibility of the Town Councils, Municipal Councils and KCCA (in the case of Kampala). UNRA however currently assists them with this. The Community Access Roads (CARs) are the responsibility of the Local Councils; however the MoWT in practice assists them with this.

Uganda National Roads Authority (UNRA)

Generally speaking, UNRA's mandate is to plan, develop and maintain the national roads network, and undertake axle load control. UNRA was established by the Uganda National Roads Authority Act of 2006, and became fully operational in mid-2008

Transport Licensing Board (TLB)

This board regulates the use of public transport vehicles, private omnibuses and a goods transport vehicles throughout Uganda, and is furthermore responsible for the inspection and licensing of road vehicles as well as Inland Water Transport Vessels. These vehicles and vessels are also meant to be registered with and inspected by the TLB.

Private Sector Service Providers

There are various private sector road transport service providers. Organised road transport users include the Uganda Private Road Users Association, the Uganda Taxi Owners and Drivers Association, the Uganda Bus Owners Association, the Uganda Commercial Truckers Association, as well as the Uganda Pick-up Transporters' Association.

Uganda Road Fund (URF)

The URF was established by Act of Parliament in August 2008 with a mandate to finance road maintenance of public roads through the principle of road user charges. Included in this is the collecting of road user charges (RUCs) and management of the funds to finance road maintenance programmes.

Research and Training Institutions

There are a number of institutions that contribute to research and training activities in the transport sector (including roads) in Uganda. This includes:

- Mt. Elgon Labour Based Training Centre (MELTEC);
- Central Materials Laboratory;
- Uganda National Council for Science and Technology (UNCST);
- Universities (Ndejje, Makerere, Kyambogo and Mukono).

5.1.4   Assessment of stakeholders' interest in road research

The stakeholders listed above generally have an interest in one or more of the following functions related to the roads sector:

1. Policy;
2. Regulation;
3. Planning (infrastructure, services);
4. Provision of infrastructure;
5. Provision of services;

6. Funding;
7. Research and training.

It is envisaged that institutions involved in policy, regulation and the provision of services (1, 2 and 5 above) will not have direct interest in road research, and will not currently contribute to performing such research, or managing road research.

Institutions involved in planning and funding (3 and 6 above) may have some interest in road research, as their functions sometimes require an understanding of technical principles. It is however expected that their contribution to performing such research, or managing road research is limited.

Institutions involved in the provision of infrastructure, and in research and training (4 and 7 above) will have a high interest in road research, and will most probably actively participate in current research.

Applying this filter to the institutions discussed in the previous sections, the table below highlights those institutions (considered as key stakeholders for this study) that is expected to have a high interest in road related research, and that is expected to currently participate in the performing of road research.

Table 2: Assessment of road sector institutions/parties' interest in road research

Institution	Main function (1 to 7)	Perceived participation in (and interest in) road research in Uganda
Ministry of Finance, Planning and Economic Development (MoFPED)	1, 3, 6	Some interest
Ministry of Water and Environment (MWE)	1, 4	Some interest from an environmental point of view (e.g. type of material)
Ministry of East African Community (MEAC)	1, 3	Some interest (e.g. standards)
Ministry of Works and Transport (MoWT)	1, 2, 3, 4	**High interest** (due to their involvement on maintenance of district roads and community access roads)
Ministry of Local Government (MoLG) (district councils, town councils, municipal councils)	3, 4	**High interest** (due to their involvement on maintenance of district, urban and community access roads)
Ministry of Local Government (MoLG) (KCCA)	3, 4	**High interest** (due to their involvement on maintenance of urban roads in Kampala)
Uganda National Roads Authority	3, 4	**High interest** (due to their

Institution	Main function (1 to 7)	Perceived participation in (and interest in) road research in Uganda
(UNRA)		involvement in development, upgrading and maintenance of national roads)
Transport Licensing Board (TLB)	2	No interest
Transport service providers	5	No interest
Uganda Road Fund (URF)	6	Some interest (due to their review of maintenance programmes, and their interest in cost of road improvements and alternative solutions).
Research and training institutions	7	**High interest**
Private sector (consultants, contractors)	3, 4, 7	**High interest**

5.2 Assessment of key stakeholders

The key stakeholders identified in the previous section will now be assessed based on the following criteria:

- Mandate of institution;
- Historic and current involvement in road research;
- Key resources;
- Existing platforms for interaction and coordination with other key role players, including any attempts at formalization of this;
- Issues and challenges preventing coordination of research (this may be of institutional, organizational, technical, logistical or financial nature);
- The level of dissemination and uptake of research recommendations by relevant stakeholders in Uganda; and
- The institution's recommendations with regards to a centralized road research databank (e.g. the categorization of research, and key data for profiles).

5.2.1 Ministry of Works and Transport (MoWT)

MoWT exists to formulate policies, plans, set standards, build capacity carry out advocacy, regulate, monitor and evaluate the Works and Transport Sector. The Ministry also provides policy and strategic guidance to parastatal bodies under its supervision namely, Uganda National Roads Authority (UNRA), Civil Aviation Authority (CAA) and Uganda Railways Corporation (URC). In regard to Uganda Road Fund (URF), MoWT provides political and operational oversight in collaboration with the Ministry of Finance, Planning and Economic Development.

Mandate: MoWT is mandated to:

- Plan, develop and maintain an economic, efficient and effective transport infrastructure;
- Plan, develop and maintain economic, efficient and effective transport services by road, rail, water air and pipeline;
- Manage Public works including government structures; and
- Promote good standards in the construction industry.

Key resources: MoWT has two centres used for road research namely:

- Mt. Elgon Labour Based Training Centre - a project under the Ministry of Works and Transport; and
- Central Materials Laboratory - a branch of the Ministry of Works and Transport that is headed by the Chief Materials Engineer, responsible for Materials Testing and Research.

5.2.2   Ministry of Local Government (MoLG)

The Ministry of Local Government is a Government Ministry responsible for guidance and overall vision of Government in local Governments. The Ministry oversees the Government structures and operations at local levels in Uganda such that they are harmonized and supported to bring about socio-economic transformation of the whole country.

The Ministry composes of two Directorates, namely Local Government Administration and Inspection. They work towards sustainable, efficient and effective service delivery in the decentralized system of governance.

The Ministry of Local Government (through district councils, town councils, municipal councils) is responsible for the operation and maintenance of district roads, urban roads and community access roads.

Mandate: Ministry of Local Government is empowered to do the following:

- To inspect, monitor, and where necessary offer technical advice/assistance, support supervision and training to all Local Governments.
- To coordinate and advise Local Governments for purposes of harmonization and advocacy;
- To act as Liaison/Linkage Ministry with respect to other Central Government Ministries and Departments, Agencies, Private Sector, Regional and International Organizations;
- To research, analyze, develop and formulate national policies on all taxes, fees, levies, rates for Local Governments.

5.2.3   Kampala Capital City Authority (KCCA)

The operation and maintenance of roads within Kampala city is the responsibility of KCCA. This responsibility is managed by KCCA under the Directorate of Engineering and Technical Services.

Mandate of the Directorate of Engineering and Technical Services: The Directorate is responsible for designing, implementation and maintenance of infrastructure, giving technical support and controlling infrastructure developments in the City, in terms of defining structural designs, carrying out road works and maintenance of City infrastructure.

The Directorate guides the Authority on the urban structural design, infrastructure improvement and road network development in the City.

Strategic Direction: The directorate of Engineering and Technical Services has defined its strategic direction as to review the functional designs and contract professional firms to revamp the City infrastructure, road network, and manage transport for a modern and easily accessible City.

Core Functions of the Engineering and Technical Service Directorate include the following:

- Plan, design and manage the construction, rehabilitation, upgrading and periodic maintenance of the City Roads including the Road marking and signage;
- Plan, design and manage the construction, rehabilitation and maintenance of the City drainage systems;
- Plan, design and manage the provision of traffic and street lighting for the City;
- Plan, design and manage the construction and maintenance of the City Authority Building Infrastructure;
- Monitor and propose areas for improvement of city traffic;
- Plan, design and manage street parking space and other facilities in the City;
- Plan, design and manage public transportation in the City.

5.2.4   Uganda National Roads Authority (UNRA)

Mandate: UNRA's mandate is to develop and maintain the national roads network, advise Government on general roads policy and contribute to addressing of transport concerns, among others.

Historic and current involvement in road research: UNRA in the past has not actively been involved in road research but has collaborated with other roads related research institutions. There have also been trial sections conducted on certain portions of the network in the past, although it needs to be confirmed whether this was under the auspices of UNRA or other institutions.

UNRA has recently set up a research unit within the Directorate of Planning.

5.2.5   Uganda National Council for Science and Technology (UNCST)

UNCST is a clearing house for research and experimental development taking place in scientific centres and other enterprises, and potential application of their results. It was instituted to implement the provisions of the UNCST Act 1990, CAP 2009.

Mandate: UNCST is mandated to register and issue research permits. This is done to ease research coordination and ensure integrity, and compliance with the set rule and regulations, to protect the environment and humans as research participants. Its primary goal is to develop and implement ways of incorporating science and technology in the national development process. UNCST also advises government on relevant policy matters, and coordinates research and development activities in Uganda.

Historic and current involvement in road research: UNCST has been involved in research in the past years but not specifically into road research.

Existing platforms for interaction & coordination with other key role players: UNCST provides advice on all matters of science and technology policy. It also promotes and develops indigenous Science & Technology (S&T) capacity by encouraging local innovation and protects local Intellectual Property (IP). UNCST provides IP support services to organizations, researchers, and innovators. This is done through technical assistance and monthly IP clinics held at UNCST.

Information is a major component for the coordination of the Science & Technology (S&T) agenda. The UNCST secretariat is the national focal point for all information on STI in the country. This information is widely disseminated through different media and outreach activities. UNCST also boasts of a modern well-stocked library/resource centre with over 3500 volumes to refer to.

5.2.6   Uganda Road Fund

Uganda Road Fund (URF) was established by an Act of Parliament in 2008. The objective of setting up this fund was to enable steady and reliable funding for routine and periodic maintenance of public roads mainly from road user charges. It became operational in January 2010. The fund derives its mandate from section 6 of the URF Act 2008.

Mandate: To Collect Road User Charges (RUCs) and manage the funds so collected to finance road maintenance programmes.

The Road Fund Act provides for a political and operational oversight over the fund by the Ministries of Finance, Planning and Economic Development, Works and Transport, and Local Government. The fund is functionally supervised by the Minister of Finance, Planning and Economic Development (MoFPED). It reports to Parliament through the Minister.

5.2.7   Ndejje University

Mandate: Ndejje University is dedicated to pursue and facilitate research that can improve the quality of life for all sectors of the population

Key resources: Ndejje's research programs reflect the expertise, creativity and initiative of their dedicated faculties, who set the research agenda and have a long tradition of engaging with their colleagues and students to work across the disciplines. Faculty, staff and students from business, engineering, science and information technology, from the arts, social sciences, and from environment and agricultural science combine to create a diverse and unique research environment.

The Office of the Director (Research) is responsible for research integrity and compliance and plays a central role in research relationships with the government, industry, foundations, international sponsors and, increasingly, alumni.

5.2.8   Makerere University

Makerere University in Kampala is Uganda's largest institution of higher learning, first established as a technical school in 1922. In 1963, it became the University of East Africa, offering courses leading to general degrees from the University of London. It became an independent national university in 1970 when the University of East Africa was split into three independent universities: University of Nairobi (Kenya), University of Dar es Salaam (Tanzania), and Makerere University.

Mandate: To provide innovative teaching, learning, research and services responsive to National and Global needs.

Key resources: Makerere University is composed of nine colleges and one school offering programmes for about 36,000 undergraduates and 4,000 postgraduate students.

The College of Engineering, Design, Art and Technology (CEDAT) is very much involved in studies around roads and pavements. Key resources within CEDAT include Eng. Dr. Umaru Bagampadde and Dr. Godfrey Mwesige.

Dr. Bagampadde is a qualified Professional Civil Engineer with 21 years of experience in Highway Engineering and research. He holds a PhD degree in Highway Pavement Materials, a Masters degree in Highway Engineering and a Bachelors degree in Civil Engineering. Dr. Mwesige is a Civil Engineer with a PhD degree in Highway safety, a Masters degree in Highway Engineering and a Bachelors degree in Civil Engineering.

5.2.9   Kyambogo University

Kyambogo University (KyU) is Uganda's Second largest Public University, established by the Universities and Other Tertiary Institutions Act 2001 and the Universities and Other Tertiary Institutions (Establishment of Kyambogo University) instruments of 2003. It is a merger of the former Uganda Polytechnic Kyambogo (UPK), the Institute of Teacher Education, Kyambogo (ITEK), and the Uganda National Institute of Special Education (UNISE).
Mandate: to promote and advance knowledge and development of skills in Science, Technology and Education and such other fields having regard to quality, equity, progress and transformation of society.

Historic and current involvement in research: Kyambogo University has a rich history that dates as far back as 1928. UPK started in 1928 as a small technical school on the Makerere Hill and was transferred to Kyambogo Hill in 1958 as Kampala Technical Institute. It was renamed Uganda Technical College and finally UPK. ITEK started as a Government Teacher Training College in 1948 in Nyakasura, Fort Portal and transferred to Ruharo and then Ntare Hill all in Mbarara, western Uganda. It transformed into a National Teachers College and later ITEK as per the statue of Parliament in 1989. UNISE on the other hand started as a Department of Special Education at ITEK in 1988, and later became an autonomous institution by Act of Parliament in 1998.

Key resources: Kyambogo University is one of the eight Government Universities and degree awarding institutions that have benefited from the African Development Bank (AfDB) Higher Education Science and Technology (HEST) Project. The total project funding for Kyambogo University was is UA18.15 million. With the exchange rate 1UA to US$1.40, it implies that the total project funding for Kyambogo University was about USD 25.41 million.

6   Best practices

6.1   Introduction

The process of managing transportation and specifically roads research needs to focus on ensuring that appropriate and cost-effective research is conducted to support the economic development of a country or region.

Research planning needs to identify appropriate areas of research where the envisaged research outcomes will address current and expected challenges. This needs to be accomplished with the aim of ensuring that the road network can support economic and social growth and development.

This identified research should be conducted in such a way that the benefits can be quantified and expressed in terms of the costs and larger investment and asset value of the network, to demonstrate that a positive Return On Investment (ROI) is obtained. This positive ROI need not always be in terms of direct currency terms, but should be expressed in a way that can demonstrate that the country or region is better off economically and socially than without the research being conducted.

Various approaches exist to identify and manage research in general. These can include the Development stage models, market-pull models, Activity stage models, Systems frameworks etc. Each model typically focuses on aspects that are of importance to the industry where it has been developed. This report does not go into an in-depth evaluation of approaches, but rather focuses on a specific approach that has been applied successfully in South Africa, specifically in the roads sector over the last decade or so. Rust (2009) developed a systems approach for managing research and development in the road infrastructure area in South Africa, which in this document will be termed the Technology Tree (TT) model. Specific aspects of this TT model are proposed for use in this project.

It is the objective of this project to review and compile a listing of past and current research that has been undertaken on the roads sector in Uganda. In order to do this in an objective way, a specific evaluation approach needs to be followed. The TT model discussed in Section 6.2 is proposed as such an approach. The TT model needs detail in terms of the focus areas in which research will be classified, and the focus areas identified in Section 6.3 are proposed to be used as the basis for inclusion of conducted and required research. In Section 7 the recommended Framework that will be used in the analyses is briefly summarized, based on the Section 6 background.

6.2   Technology tree model

The technology tree consists of the following aspects provided in Figure 3:

- Key focus areas and their related identified needs;
- Key solutions to address the identified needs;
- A technology platform;
- Applied technologies or capabilities;
- Base technologies, and
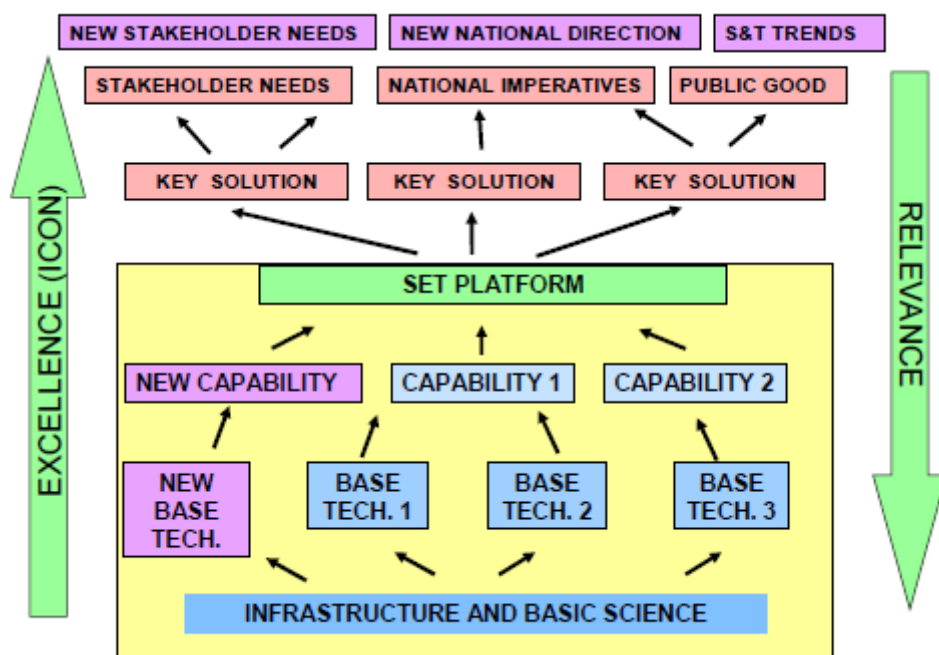- Basic science and infrastructure.

Figure 3: Schematic technology tree (Rust, 2009)

Key focus areas (e.g. Stakeholder Needs and National Imperatives in Figure 3) are developed from a needs-determination process (such as the one conducted in this project) and should address the strategic issues facing the roads industry. Key solutions are technology packages that address the identified needs. The technology platform forms the centre of the technology tree and is defined as an innovative process, methodology or product that facilitates the development of a family of solutions to fulfil identified needs. Technology platforms focus the research effort on significant developments that will have a significant impact on the industry. The technology platform therefore integrates the research activity at lower levels of the tree (Base Technology) and add commercialisation and delivery processes and systems to these activities to ensure effective solution development, technology transfer and impact. It is thus a conduit through which several key solutions can be delivered from the same science, engineering and technology base in a cost-effective manner.

An applied technology or capability consists of the compilation of a number of base technologies in order to form a certain capability or competency in an organisation. Development of applied technologies requires significant human resources critical mass with specialised expertise and knowledge. Base technologies comprise the basic tools and techniques that support the applied technologies. Infrastructure and basic science includes research infrastructure such as equipment, software, models, databanks and basic science.

In order to keep the research and development process functional and operational, it is important to also view the research as one aspect of the larger roads infrastructure management process. In Figure 4 an indication is provided of the typical elements of a research management model that can also be applicable to roads research (Rust, 2009). It indicates that the research management is a continuous process that takes cognisance of strategic focus areas and the evaluation of previous research and its effectiveness to drive the process for new research. New research supports the development and implementation of new knowledge and technologies that needs to be conveyed to the users (roads engineers, technologists and technicians) after which the evaluation again identifies new areas of required refinement of research.
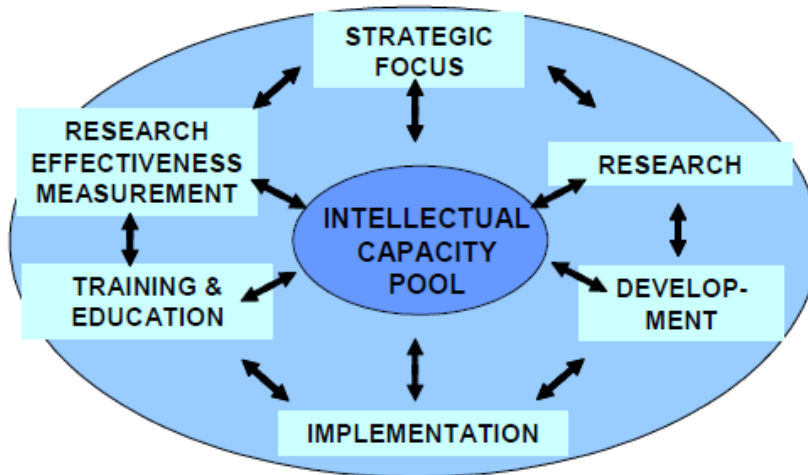
Figure 4: Main elements of the conceptual R&D management model

Important aspects of this model are the continuous engagement between parties to evaluate current technologies and identified gaps in the knowledge that leads to focused planning of new research. This is done in conjunction with all stakeholders to ensure that it is not only an academic exercise, but that practical field experiences and information from long term road studies and actual construction experience forms a major part of the inputs into new research development and management.

Implementation, training and education focuses on the important aspect of ensuring that the research do not remain academic outputs, but are actually put into practice and evaluated to ensure that the resultant ROI can be quantified. This is an important closing in the research management process, as it is the only time that the real benefit of the research can be determined and placed into context. If only the research cost is evaluated without this last important step, no research will be cost effective.

Du Plessis (2016) recently developed a system that evaluates the benefit cost evaluation of research in the roads environment (specifically focused on Accelerated Pavement Testing (APT)). This describes an engaged process of quantifying not only short-term benefits of research but also the medium and longer term benefits. Information on this system will be incorporated into the analysis procedures for this project to enable the client to develop an appropriate in-house system for such analysis.

6.3   Research focus areas

The objective of this project is to review and compile a listing of past and current research that has been undertaken on the roads sector in Uganda. In this regard, the scope of the research focus areas needs to be defined to prevent the project just looking at a broad number of areas, or ignoring significant information.

Road or pavement engineering typically focus on the following components:

- Traffic – states the overall demand for the road and places all other decisions in context. Research should focus on development of appropriate quantification methods;
- Material – indicates the available resources to respond to the stated demand. Research should focus on a detailed understanding of the availability, properties and

performance of available materials under the traffic demand, functioning in a specific environment in combination with other materials (structure);

- Environment – states the overall context under which the road has to function. Research should focus on a detailed understanding of the historic, current and future environmental weather patterns and the potential effect of these on the materials and structures provided;
- Pavement structure – ultimately states the combination of materials in a specific environment to address the specific traffic demand. Research should focus on optimal combinations of material types and thicknesses to ensure optimal lives and maintainability of the facility at an acceptable service level;

Further, the areas of interest may be defined as:

- Design – overall evaluation of all the relevant inputs (previous bullets) in a standardised and acceptable framework to enable objective outcomes for all input scenarios;
- Construction – application of the design with a major research focus on quality control;
- Management – long-term management of the life of the facility with detailed attention on options to extend the life under changing conditions to ensure increased ROI for the roads agency through prevention of premature failures, and
- Maintenance and Rehabilitation – options for keeping the facility in a serviceable condition and extending the life of the facility through appropriate measures.

It is proposed that these 8 areas be the focus areas for the scope of this project. In the development of the TT model, these aspects will be used as the basis for inclusion of conducted and required research. The outcomes of the workshop will be incorporated to fine-tune the focus areas to ensure that only appropriate aspects are covered in the project.

6.4   Institutional responsibility for research planning

The models discussed in section 4.2 assume a central responsibility for managing and coordinating research in the country to ensure that scarce resources (human capacity, funding, materials and equipment) are used in a most effective manner. Attempts at such central management of research have been made in various countries, with varying levels of success. Most researchers and research organizations value their independence in terms of research areas and focus, and also the ability to make independent findings based purely on the research outcomes and not the needs of specific funders that may seek for specific answers from research that will benefit their agendas. However, a managed approach in order to focus the national research effort on issues that are most pressing is of importance, and most rational researchers will take part in a process where research funding and efforts are managed in a responsible way.

The role of an institutional responsible body for guiding and managing research is played by various organizations in various countries to different levels. In South Africa the South African National Roads Agency Ltd SOC (SANRAL) typically takes the lead in this process, while organizations such as the Transportation Research Board (TRB) in the United States (US) and the various national roads departments / ministries in some European and Asian countries take the lead in this process. It is important to ensure that the institution taking on this role is trusted and viewed as being transparent and knowledgeable to be able to do this type of management, and that it is done with the inputs of all relevant stakeholders.

6.5   Consolidation, storage and dissemination of research outputs

Research outputs only become relevant and useful when it is disseminated to potential users that can implement the new knowledge into daily activities. In this regard it is important to have both a consolidation and storage, and a dissemination approach for the completed research.

6.5.1   Consolidation and storage

Consolidation and storage of research outputs has traditionally been one of the most important challenges in the research cycle. As indicated in Figure 4, the Intellectual Capacity pool sits at the centre of the Research and Development management model, and contains not only the human resource capacity but also the collective of research outputs. Typical issues with consolidation and storage of research outputs include:

- Intellectual property rights of the authors / funders;
- Output format (hard copy, electronic, software source, etc.);
- Long term commitment to storage, and
- Perceived cost of keeping and managing the database.

The traditional model for research output consolidation and storage is that the researchers will have a database (hard copy or electronic) of the raw data as well as the analysed and synthesized data and reports, while the research institution and funder's libraries will typically hold copies of the finally approved research reports and maybe publications. Further, reports that were published as dissertations and theses will be kept at a university library, and those reports that were published as conference or journal papers will be held in the final format as part of the repository of the specific conference or journal. Typically, the funder of the research will have copies of final reports in a central database, but this will only cover that research conducted for the specific funder. No country sampled for this investigation has one centralized databank for all research in the roads area.

Many attempts have been made over the years to develop such a central database of research outputs in various countries, but it typically runs into issues regarding storage space, budgets for human resources to manage the collection, the motivation for researchers to submit the outputs to the central repository, intellectual property rights regarding copies of the research outputs, etc.

Some of the specific issues experienced with keeping such a central repository in hard copy format includes the space requirements and the management and upkeep of the collection over a number of years. For an electronic repository the issue is typically around the software used for the storage of the information (updates in licences, improvements in software, Human Resources to manage the process, replacement of computers and hard drives, backups etc.), the software used for producing the outputs (especially backward compatibility of software versions), etc.

An issue around the storage of original data and analyses is that old data are often discarded once the researcher leaves an organization due to space requirements. Therefore, it is important to have a system where such information can be effectively archived.

Overall, the one factor that typically prevents the operation of a centralized research output database is the cost and affordability of the process in times of austerity, where apparent unfruitful costs such as merely storing outputs is often viewed as a cost that can be saved. This line of reasoning overlooks the cost of originally collecting the data and collating it into

valuable research outputs, as well as the beneficial effect that continued implementation of the outputs will have on the country.

Recent developments such as Researchgate® has to an extent become an important repository of research outputs as the benefits to researchers of posting research outputs on this international database forces them to keep their records up to date, thereby improving the availability of a public repository of research outputs without an additional cost.

In terms of best practices for consolidation and storage of research outputs it can thus be stated that no one operational model really exists that can be copied and implemented. The consolidation and storage will need to happen at different levels in the country, and the important issue is to define the system to be used in such a way that important data and findings are not lost due to an inadequate system. It is probably an economical solution to keep track of the topics of research conducted and a summary of research output references (in a simplified database) with full datasets kept at the source of the research. The possibility of linking the repositories of respective institutions to a central database and enabling automatic synchronisation could also be investigated, depending on the sophistication of such repositories.

6.5.2   Dissemination

Dissemination of research outputs is important to ensure that the research funding was not used in vain. Often good research is conducted, but due to a lack of dissemination channels for the outputs, the information remains closed to most of the potential users (new researchers and implementers of the findings alike).

Typical research finding dissemination channels include academic dissertations and theses, conference proceedings and journal papers, and short courses and lectures. Due to the nature of road research and the possible implementers of the research outputs a combination of these channels are required.

Researchers and academic users typically focus on the information disseminated through conferences, journals and academic publications, while the engineers and technologists that need to implement the research depend on short courses and interventions to gain access to this information.

Examples of dissemination channels that are used in the road research area internationally are the following:

- Transportation Research Board Annual meeting – the TRB annual meeting in Washington DC is seen as a primary dissemination point for new research, through a combination of conferences, journals, committee meetings and webinars. This focuses on US processes, although in recent years the internationalization of research findings has received major attention;
- A range of other international road research organizations and conferences organized such as the International Society for Asphalt Pavements (ISAP), International Society for Concrete Pavements (ISCP), Bearing Capacity for Roads, World Road Association (PIARC), Rail and Airfields (BCRRA) conference and the likes;
- Organizations such as the Research for Community Access Partnership (ReCAP);
- The annual Southern African Transportation Conference (SATC), and Conference on Asphalt Pavements for southern Africa;

- Discussion forums such as the Road Pavements Forum (RPF) and Transport Forum, and
- Short courses and information sessions arranged by organizations such as the South African Road Federation (SARF), Southern African Bitumen Association (Sabita) and the likes.

It can be seen that a host of different options exists and are being used actively for dissemination of research outputs. The important factor is that most organizations do not have a specific policy on the use of these and related avenues for research output dissemination, and it often happens haphazardly as decided and planned by the individual researcher.

It is recommended that as part of the outputs of the project, a recommendation be made that the client develop a focused policy on the active and managed dissemination of research outputs to gain the most value for the investment made. This should consist of a combination of academic and practical dissemination that is open to all stakeholders and that can also expose the research done in the country to international scrutiny and visibility.

7 Framework for evaluating historic and current road research

The framework for evaluating historic and current road research will be based on the TT model and the eight identified focus areas in Section 6. The TT model will be applied to categorize the research to enable the client to identify areas where a lack of basic research hinders progress in applied research, while the combination and evaluation of basic research will enable identification of areas of applied research for which the basic research has been conducted and resources are available to take this to an implementation and problem solution level.

Through the anticipated workshop an initial picture will be developed of the state of research in Uganda and also a framework for the assessment of the various resources and competences (HR and equipment). This information will be used to finalise the strategy for identification and collation of available research into a structure where the research can be categorized in terms of the TT model and focus areas.

The implementation programme will then state the required steps to enable research managers to identify those areas of concern where potentially high ROI can be obtained (in terms of both economic and social investment) for the country as a whole.

Annex A: Terms of Reference

TERMS OF REFERENCE

Baseline survey of past and current road sector research undertakings in Uganda and establishment of electronic document management system (EDMS)

Project Reference: UGA2096A

1. Background information

The Africa Community Access Programme (AFCAP) is a programme of research and knowledge dissemination funded by the UK government through the Department for International Development (DFID). AFCAP is promoting safe and sustainable rural access in Africa through research and knowledge sharing between participating countries and the wider community. The first phase of AFCAP commenced in June 2008 and ended in July 2014. The second phase, which will also run for 6 years, commenced on the 1st August 2014. The management of AFCAP2 is contracted by DFID to Cardno Emerging Markets (UK) Ltd under the overall Research for Community Access partnership (ReCAP) umbrella

One of the challenges facing the roads sector in Uganda is the absence of consistent, continuous, and coordinated research work. Transport and road related research is fragmented and the sector does not have a clear road research policy, although this is being developed. Various national and international institutions and agencies have undertaken research in the road sector. Examples of these include Makerere University, the Uganda National Roads Authority (UNRA), Mt. Elgon Labour Based Training Centre (MELTEC), the Central Materials Laboratory, and individual researchers. It is known that numerous road related research studies have been undertaken by institutions outside Uganda. At present the road research linkages between industry and academia is negligible. A contributing factor to this is the absence of a centralised knowledge database on roads research that is accessible online by all stakeholders. Such a database would contain an analysed compilation of all past and present research undertakings. Another contributing factor is the inadequate funding of road research programmes in the country.

The Uganda National Council for Science and Technology (UNCST) is the government agency mandated to facilitate and coordinate the development and implementation of policies and strategies for integrating Science and Technology into the national development process. At present UNCST does not have a road research policy and has not been involved with any previous research undertaking in the road sector.

The AFCAP National Steering Committee has placed high priority on knowledge management as a research topic as it will provide the foundation upon which to plan and undertake consistent and coordinated road research undertakings, and will help to avoid repetition or duplication of research undertakings.

AfCAP has accepted a request from the Uganda National Roads Authority (UNRA) for support to carry out a baseline survey of past and current road sector research undertakings in Uganda as outlined below.

2. Objective of the assignment

The purpose of this project is to review, analyse, and compile a comprehensive listing of all past and current research that has been undertaken on the roads sector in Uganda. The project will categorise past and current research undertakings to explicitly outline methodology, controls, institutions involved, competence of researchers, research findings. The project will comment and/or make recommendations on the validity and reliability of the outcomes of each research undertaking. The project will then undertake a gap analysis to identify and prioritise research knowledge gaps.

The project will assess the prevailing modes of knowledge management and will develop an implementation plan for the establishment of a centralized knowledge base of research undertakings within the road sub-sector. The project outcome will be an indispensable source of information to a broad range of stakeholders including current and future researchers, practitioners, academia, road policy and decision makers, and the general public.

3. Scope of the work

The study will be carried out continuously over a period of 8 months but the key tasks are scheduled to coincide with envisaged in-country visits by international experts. The 3 tasks are sub-divided into respective sub-activities as indicated below. However, the service provider may present an alternative implementation methodology in their proposal during the tendering stage. This will then be finalised during execution of Task 1 of the assignment for approval by UNRA and AfCAP.

Task 1: Institutional review and study methodology

1. Identify key local and international institutions and agencies involved in past and current road related research on Uganda.

2. Review the institutional frameworks (mandates) of the key institutions and agencies currently undertaking road related research in Uganda.

3. Identify and review the current institutional, organizational and technical issues and challenges to undertaking road related research in Uganda.

4. Review the institutional frameworks of key international institutions and agencies that undertake road related research in other countries to identify research best practices, including review of lessons learned that have promoted successful uptake of knowledge generated from research projects.

5. Evaluate the level of dissemination and uptake of research recommendations by relevant stakeholders in Uganda.

6. Develop survey tools and methodologies for use in the research baseline survey, including a proposed study implementation programme.

7. Prepare a report on institutional review and study methodology, including study implementation programme for review and endorsement by National Steering Committee and other key stakeholders.

8. Prepare reviewed report incorporating stakeholder comments for presentation at workshop.

Task 2: Field Survey and Knowledge Database Design Proposals

1. Conduct a one-day workshop to present the reviewed Phase 1 report to road sector stakeholders incorporating approved study methodology and implementation programme as well as any additional inputs.

2. Based on information from desk study, conduct field visits to selected current and past research sites to assess the validity of the activities as research undertakings. Compile, analyse, and collate past and current road related research on Uganda.

3. Propose appropriate design of a centralized knowledge database (metadata structure, assessment of software options) for capturing, storage and dissemination of findings and knowledge of research undertakings within the road sector.

4. Propose a structure and institutional arrangement to better facilitate and coordinate road research in the country, including recommendations for management and maintenance of the electronic document management system (EDMS) to enhance local ownership and sustainability

5. Prepare draft final report, incorporating survey outcomes, proposals and recommendations and submit to stakeholders for review and additional inputs.

Task 3: Final Workshop and Report

1. Conduct final one-day stakeholders' workshop to present draft final report incorporating review comments.

2. Establish and implement the database as an electronic document management system (EDMS). Carry out digitisation of paper documents where these are not available in electronic form.

3. Prepare final report

4. Reporting and deliverables

The following reports will be submitted by the consultant:
- Task 1 report on institutional review and study methodology.
- Workshop 1 Report
- Task 2 Draft final report, incorporating survey outcomes, proposals and recommendations
- Workshop 2 Report
- Final Report
- A fully operationalised EDMS for road research in Uganda.

The reports must be submitted in electronic format (MS Word) in English.

5. Minimum Experience Requirements

The assignment will be carried out by an international engineering organisation who will provide a team of two (2) international experts consisting of a Research Specialist/Team Leader and a Knowledge Management expert. Interested organisations shall include additional local experts on their team to ensure that the local context and knowledge is fully incorporated in proposals and recommendations.

The CVs of these additional experts will not be included in the proposal during the tendering stage for evaluation but UNRA and AfCAP will approve the proposed candidates prior to contracting them during the inception phase. However, the tenderer is required to provide costs (fees and allowance) for the local consultants in their financial proposal. An allowance for 20 days' input of additional local expertise will be provided.

The project team must possess the following skills and experience:
  i.   Management and reporting of research projects in the Africa region.
  ii.   The design and implementation of research programmes for low volume rural roads in Africa.
  iii. Research skills including data collection, analysis and documentation.
  iv.   Setting up of electronic document management systems (EDMS) in a research environment
  v.   Field experience in the collection of materials samples. Expertise in the field and laboratory testing of road construction materials.
  vi.   Knowledge, experience and understanding of the use of local resources for the construction and maintenance of rural roads
  vii. Pavement design for low volume rural roads.
  viii. Design of bituminous surfacings
  ix.   Good communication, report writing and presentation skills.
  x.   Fluency in the English language.

In addition to this the key experts must fulfil the following requirements:

Team Leader/Research Specialist
Qualification and skills - the Team Leader should have an in-depth knowledge of road engineering and must have not less than 15 years of relevant experience. He/she must have a proven record of undertaking road research studies to an international standard and a proven background in team leadership, capacity building and knowledge transfer. Proven relevant experience of working with government departments and agencies in developing countries and a thorough understanding of institutional aspects related to conducting research activities in these environments, particularly in Africa, is essential. Work experience in East Africa would be a significant advantage.

Education – MSc or higher qualification, in civil engineering or a related field. Alternatively, a BSc degree in civil engineering with not less than 25 years of experience in road engineering of which at least 10 years must be in road research.

Senior Knowledge Management Specialist
Qualification and Skills: The specialist should have not less than 10 years' experience in cataloguing, management and dissemination of knowledge and information for a public or private sector research organisation, and should be fully conversant with the latest technological developments in the field. Experience with establishment and operation of data and knowledge management systems (EDMS) and facilities, as well as in-depth knowledge of developing institutional knowledge capacity, particularly in Africa, is essential.

Education: MSc, MA in Computer Science or equivalent, and professional experience in relevant discipline.

6. Consultant's Inputs

The following are estimated time inputs (in working days) by the Consultant team for the assignment (up to the submission of the Final Report).

A total of 20 days' inputs has been allowed for engagement of local experts for various tasks as proposed in the table below. The Consultant will identify, and justify selection of, these experts during execution of Task 1 and submit their CVs for approval by UNRA and AfCAP. The local experts are intended to provide local context in terms of knowledge of research activities carried out previously in Uganda. In addition, this forms part of a capacity building exercise for local researchers and is also aimed at engendering a sense of ownership among the research community in Uganda.

Table 1. Estimated time inputs for the consultant team

Activities	Team Leader	Knowledge Management Expert	Ad hoc local experts
Task 1: Institutional Review and Study methodology			
Identification and Review of Institutional frameworks for conducting research in Uganda.	10	5	5
Development of survey tools and methodologies for conducting baseline survey	2	1	2
Reporting (home base)	3	2	
Task 2: Field Survey			
Stakeholder Workshop to present reviewed Phase 1 report incorporating endorsed study methodology and programme	2	2	
Field Survey. Compilation, analysis, and collation of past and current road related research on Uganda	17	10	10
Design of structure of a centralized knowledge database and management system (EDMS)	2	4	3
Draft final report (home base)	4	2	
Task 3: Final Workshop and Report			
Set up and operationalize the EDMS for road research in Uganda (To be demonstrated using existing metadata)		15	
Hold final stakeholder workshop	2	2	
Preparation and submission of Final Report (home base)	3	2	
Total	**45.0**	**45.0**	**20**

7. Assignment Period and Milestone Deliverables

It is envisaged that the project will be completed within 8 months from contract start date, with 3 in-country visits by the international experts. The consultant is expected to achieve key milestones shown in Table 2 below.

Table 2: Milestone Deliverables and Payment Schedule

Milestone	Content	Timing (weeks from start of project)	Payment (%)
Task 1 Report	Identification and Review of Institutional frameworks for conducting research in Uganda. Development of survey tools and methodologies for conducting baseline survey.	4	20%
First Workshop Report	Outcomes and recommendations of first stakeholder workshop to present reviewed Task 1 report.	8	10%
Task 2: Draft Final Report	Compilation, analysis, and collation of past and current road related research on Uganda. Outcomes, proposals and recommendations based on desk study and field surveys. Proposal for structure of a centralized knowledge database	16	25%
EDMS database	Operationalised centralized knowledge database with metadata of research undertakings within the road sector.	22	15%
Final Workshop Report	To present final draft report for final comments, including demonstration of EDMS.	26	10%
Final Project Report	Final report after incorporating final stakeholder comments	32	20%

All reports must be submitted in electronic form in MS Word format. No hard copies of reports are required.

8. Facilities, services and resources to be provided

By Service Provider

The appointed organisation will be responsible for all of the following:
- Office accommodation at home base. In Kampala, this will be provided by UNRA.
- International travel to and from Kampala
- Accommodation and subsistence in Kampala for the international experts.
- Accommodation in the field (outside Kampala) during surveys for the project team; fees and allowances for local expert(s) accompanying the team.

By UNRA

UNRA will be responsible for the following**:**
- Transport and logistics for field visits will be provided by UNRA.
- Transport in Kampala for the project team
- The cost of the workshops in Kampala including hire of the venue, lunch and refreshments for participants will be covered by UNRA. Participants from key stakeholders are expected to cover their own costs for travel and accommodation in Kampala during the workshops.
- Counterpart staff to accompany the consultant team during their in-country missions.

1. *Not all research has been considered in the proposal. Wrongly assumes that all road research in Uganda gets published in conferences, scientific journals, dissertations. As such, there seems to be a focus on papers presented at conferences; articles published in journals as well post graduate studies. All relevant research, including grey literature and other documented research efforts, must be considered.*

   Aurecon response to Question 1:

   We take note of the request for "all relevant research, including grey literature and other documented research efforts" to be considered.

   Our view was that research should at least have a minimum level of quality and relevance (e.g. routine test done in laboratories in roads departments does not necessarily constitute research). We would still like to recommend that published work (papers, dissertations, technical reports, technical magazine articles etc.) form the basis of the project.

   We do however accept the expanded definition of "Research", and will incorporate this into our methodology. We will request inputs as widely as possible to ensure that small pockets of research are not neglected. We do foresee that the "grey literature and other documented research efforts" may not always have been widely distributed, which may cause some difficulty in identifying such sources. We view the consultation process to be an ideal platform to request and identify such research items, and we will structure our methodology accordingly.

2. *The proposal appears to downplay field surveys. No details about an approach to field surveys/studies.*

   Aurecon response to Question 2:

   We understand that the purpose of the field visits is to assist in the evaluation of the research pieces. We further understand that field visits will be to selected sites, i.e. a sample of the sites covered in the research pieces.

   We foresee that the selection of sites for field surveys will be undertaken by the Consultant Team and the Client collectively, and may be determined by specific preferences from the Client or other role players, or purely be based on covering a sample of the different research categories. The field visits will allow the Team to understand the site specific conditions and challenges, to better assess the approach followed in the research and the validity of the findings. The Team will typically approach the field visits as follows:

   i. Map the geographic areas where the collected research focus on;

   ii. Read through the research items, and identify specific aspects which should be checked on site to allow a better understanding of the research, and of the findings and conclusions made. Note that the main aim of the visits to selected sites will be to support the evaluation of the research (the "office work") and to clarify aspects that is not clear from the research documents itself;

   iii. Based on above, agree with the Client on selected sites to visit. Prepare an inspection list for each site;

   iv. Conduct the field visits and work through the inspection list;

   v. Take the inspection lists back to the office and finalise evaluations of research pieces.

3. *Does not mention the requirement to undertake gap analysis and research prioritisation. The proposal requires more details about the approach to undertake validation of research efforts, gap analysis, and research prioritisation.*

   Aurecon response to Question 3:

   The TOR stated, as part of the objective of the assignment, to "undertake a gap analysis and to identify and prioritise research knowledge gaps".

   Although the words "gap analysis" were not used per se in our methodology (or in the discussion on Scope of work in the TOR), this task was covered in Task 1, sub-task 3 (Framework for evaluating historic and current road research) and in Task 2, sub-task 1 (Collect, collate and evaluate road research).

   In line with the task items above, the gap analysis and prioritisation of research knowledge gaps will be carried out as follows:

   i. After the identification and assessment of key role players, and the research into best practices, the Team will have accessed some examples of research, and will have had discussions with a variety of role players on their specific requirements for a research database, and for the extent and focus of

research in a country of Uganda's status (size, development level, roads needs and network, etc.). The Team will apply this background to draw up a framework for evaluating road research. The purpose of the framework will be to evaluate research ("gap analysis") in order to identify gaps or shortcomings in research pieces.

    ii.   The framework will address aspects such as the following:

        a.   An appropriate structure for categorising research;

        b.   Assessment of:

- Methodology/ approach followed;
- Controls exercised;
- Institutions involved;
- Competence of researchers;
- Research findings.
- Validity and reliability of the outcomes;
- Examples of where the findings have been taken up in practice.

        c.   Implementation programme.

    iii.   During Task 2, the Team will then, through the network of role players developed during Task 1, collect all available road research in Uganda. Once collected, the Team will go through the exercise of organising and evaluating road research ("gap analysis"), using the framework that was developed in Task 1. The Team will identify the recurring themes and problems in order to have a clear understanding of the main issues to address in a future arrangement for Uganda. The evaluation will typically identify the degree to which certain gaps exist, such as:

        a.   Categories where very limited research has been done to date, or where the quality of research to date has been lacking;

        b.   Methodology being inadequate (e.g. scientific basis lacking);

        c.   Researcher not suitably qualified, or work not suitably reviewed;

        d.   Inadequate controls exercised;

        e.   Conclusions and findings not matching the result of research;

        f.   Research not being taken up in practice.

    iv.   Flowing from the above gap analysis, the major research gaps will be highlighted and prioritise, and recommendations given on how to address them.

4. *No specific risk analysis included in the proposal, particularly to deal with the unique challenges of research in Uganda.*

Aurecon response to Question 4:

We have considered the risks specific to this project and Uganda. The list below provide the main risks from our evaluation, as well as typical mitigation actions to follow:

    i.   Risk of not being able to obtain road sector research from the key stakeholders and agencies (due to not being able to identify the key persons that keeps research; due to non-availability of stakeholders). We propose to mitigate this action by:

        a.   Identifying key stakeholders with the client early on in the project;

        b.   Contacting and consulting with such stakeholders early on in the project;

        c.   The local expert providing the necessary footwork where required, to locate the right persons and obtaining the research pieces;

        d.   Constant engagement with the stakeholders.

    ii.   Risk related to the identification of "grey literature". As discussed earlier, we will focus on the stakeholder consultations, workshops and the assistance from the local experts, to identify the right

persons to target, and collect such research;

iii. Risk related to performing work in Uganda. This risk is considered low, as Aurecon has a local office in Kampala and is well acquainted with the transport setup, problems and conditions in Uganda. The Project Leader has also recently conducted a major project in Uganda, and has built up a good network of contacts in UNRA, the Ministry of Transport etc.

iv. Risk related to the evaluation and categorisation of the research pieces. Risk is considered low, as our Research Specialist has vast experience in the field of road related research, and in best practices internationally.

v. Risk related to the spread of research pieces that will be collected (e.g. most pieces focussing on a specific topic). This however is not considered as a risk, as the project will then indicate this as a gap to be addressed in future years by focussing research on a wider spectrum of road related topics.

vi. Risk related to the availability of resources. This risk is also considered low, as the project only requires 3 resources (plus the local expert(s)), of which all has indicated their availability. The project will also not require full-time involvement, and a large portion of the work can be done in office (not requiring full time presence in the country).

vii. Risk related to the development of the databank, and for the databank to fulfil the expectations of stakeholders. We will mitigate this risk by clarifying early on in the project the key objectives and specifications (functional and technical) of the system. Aurecon has recent experience of drawing up databanks for clients, and has therefore a good base from which new databanks can be developed.

5. *Unclear how local experts will be identified and what specific role they will have.*

Aurecon response to Question 5:

The TOR specified that "The CVs of these additional [local] experts will not be included in the proposal during the tendering stage for evaluation but UNRA and AfCAP will approve the proposed candidates prior to contracting them during the inception phase".

The involvement of local expert(s) will be as follows:

Local Experts			
NAME	**POSITION**		**TASK**
To be named once appointed	Local Expert(s)	**A.** A.1 A.3 **B.** B.1 B.2 B.3	**Institutional review and study methodology** Identify and assess key role players Framework for evaluating historic and current road research **Field survey and knowledge database design proposals** Collect, collate and evaluate road research Structure for facilitating and coordinating road research Design a centralised knowledge database

The local expert(s) will therefore be involved in Task 1 and Task 2 of the study.

In **Task 1** they will assist the Team to identify and understand the key role players involved in road research in the country. They will then also assist the Team, through their own experience of pavement related work in Uganda and of academic research in the country, to draw up the framework for evaluation (based on which the gap analysis is performed).

In **Task 2** the local expert(s) will provide a key role in collecting road research (including "grey literature"), and will also assist in evaluating the research based on the framework developed in Task 1. Based on their evaluation of research and based on their understanding of the specific conditions in Uganda, they will contribute to the recommended structure for facilitating and coordinating road research in future.

The local expert(s) will also provide input into the functional specification of the centralised knowledge database.

6. *Capacity building not factored in for in-country time allocations.*

Aurecon response to Question 6:

The TOR specifies the following with regards to the need for capacity building:

"The local experts are intended to provide local context in terms of knowledge of research activities carried

out previously in Uganda. In addition, this forms part of a <u>capacity building</u> exercise for local researchers and is also aimed at engendering a sense of ownership among the research community in Uganda."

We see the opportunity for capacity building as follows:

i.   Assisting the local specialist team to take the roadmap further and develop and initiate an active road research plan in Uganda;

ii. Knowledge transfer to the local expert(s) can also take place, during the site visits and continued direct or indirect communication during the course of the study;

iii. Capacity building and knowledge transfer to researchers at tertiary institutions, practitioners, academia, road policy and decision makers, that will take place during stakeholder consultation and workshops.

We see capacity building to take place during the following specific tasks of the project:

i.   For the local experts:

   a. Task 1, sub-task 4 (Workshop, during which aspects such as best practices and the framework for evaluating road research will be presented);

   b. Task 2, sub-task 1 (Collect, collate and evaluate road research, including the field surveys);

   c. Task 3, sub-task 2 (Workshop, during which aspects such as the recommend structure for facilitating and coordinating road research, and the draft knowledge database will be presented).

   d. Throughout the rest of the project, as the team work together on identifying research, categorising and evaluating research, making conclusions and working towards a recommended structure for Uganda. This will typically take place through electronic communication, such as emails, telephone, lync/skype etc.

ii. For the other researchers, practitioners, adademia, road policy and decision makers:

   a. The two workshops (in Task 1 and Task 3)

7. *Wrongly assumes that research databases already exist and this project is about centralising them. This is not the case. No research database currently exists.*

   Aurecon response to Question 7:

   We take note of the above. It was also our interpretation from the TOR that currently no formal research database exists, and we apologise for the misconception created by our bullet on "centralised database" in our proposal.

   We do however expect that some "informal" databases may exist (e.g. a register of research projects in a roads department, or a register of research conducted at a university or a list of post graduate topics completed). What we wanted to highlight however in our proposal is that we understand that the database will be the single source of storing road related research, and will not e.g. just read and summarise from other, separate systems.

Annex B – Questionnaire

Background

Cardno Emerging Markets (UK) Ltd has been contracted by DFID to do the management of the Africa Community Access Programme (AFCAP2) (under the Research for Community Access partnership (ReCAP) umbrella).

As part of this programme, Cardno has appointed Aurecon AMEI Limited to undertake the study "Baseline survey of past and current road sector research undertakings in Uganda and establishment of electronic document management system (EDMS)". The study commenced on 22 November 2016.

The objectives of the study are as follows:

1. Review and compile a listing of past and current research that has been undertaken on the roads sector in Uganda;

2. Analyse and categorise past and current research undertakings to outline items such as methodology/ approach followed; controls exercised; institutions involved; competence of researchers; research findings.

3. Conclude and/or make recommendations on the validity and reliability of the outcomes of each research undertaking;

4. Undertake a gap analysis to identify and prioritise research knowledge gaps;

5. Assess the prevailing modes of knowledge management;

6. Develop an implementation plan for the establishment of a centralized knowledge base of research undertakings within the road sub-sector;

7. The target audience is a broad range of stakeholders including current and future researchers, practitioners, academia, road policy and decision makers, and the general public.

During Phase 1 of the study, Aurecon wants to obtain information from stakeholders to understand the status quo with regards to Research in Uganda, but also to understand the needs of stakeholders with regards to such an EDMS (or database).

This document contains a questionnaire to assist Aurecon in obtaining the required information. As a valuable stakeholder, we would appreciate if you can complete this questionnaire and send back to altus.moolman@aurecongroup.com, before **10 January 2017**. If you feel some questions do not relate to you, you're welcome to skip them and answer the rest. But your honest feedback will be highly appreciated.

User requirements research questions

For purpose of this study, "Research" refers to the following:

- Papers presented at conferences;
- Articles published in scientific journals;
- Research conducted as part of post-graduate studies;
- Applied research (trial sections) carried out by research organisations and other international consulting firms in the past years;
- Other relevant research, including grey literature and other documented research efforts.

The study focuses on research in the road sector. The study is therefore not concerned with research in other modes (e.g. rail, airports, pipelines, ports). The focus of this study is also more on infrastructure, than on services (e.g. public transport, freight flow).

The study will include research on all types of road.

The study will focus on research undertakings in Uganda.

This study will also yield the design and implementation of a centralised knowledge database. Data centralisation refers to the process whereby data sources that are in separate physical instances are integrated into a central location and the separate physical instances are decommissioned. The central location takes over the responsibility for data management from the separate physical locations. The database would serve as the single source (at least formal source) of storing road related research.

Please answer the following questions. Your responses will be kept confidential and utilised solely for the purposes of this study.

1. Please name your organization. How would you describe your role and responsibilities in your organisation?

2. Does your organisation generate any road related research? Select your answer with a tick or 'X'

Yes	No	

a. Who?

[ ]

b. What type of research?

[ ]

c. Is it published?

Yes	No

[ ]

d. How is research verified?

[ ]

e. Where is it kept?

[ ]

f. How is it accessed?

[ ]

g. How often is your research accessed?

[ ]

h. What meta-road data/research is available with your research?

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i. Is your data / research geo-tagged? (locations)

Yes	No

j. Is your data/research confidential?

Yes	No

k. Would you be interested in uploading your data/research to a centralised databank? Why?

Yes	No

l. Do you access your research on-site? Please describe your answer.

Yes	No

3. How would you describe your interest in road related research?

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a. What specific type of research, or topics are you interested in?

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b. How can you use it?

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c. What do you use at the moment (in the absence of a consolidated database)?

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d. To what extent does the research contribute to your work? (in terms of outcomes)

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4. What is your view on road research in the country, currently?

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a. Do you have access to any road research? If yes, where and how?

Yes	No

b. Do you know who generates research, and how to get it?

Yes	No

c. Who do you normally partner with, if you need research?

d. Do you have any existing platforms/ communication channels for interaction and coordination with other key role players, related to road research?

Yes	No

e. Are you aware of any attempts in the past to formalise this? Can you provide details?

Yes	No

f. What is your view on the level of dissemination of research recommendations currently, in Uganda?

g. What is your view on the level of uptake of research recommendations currently, in Uganda?

h. How would you describe the overall quality of road research in Uganda?

5. Can you list any issues or challenges preventing coordination of research (e.g. institutional, organisational, technical, logistical or financial issues);

a. What, if any, frustrations do you have with the available road data / research? (e.g. relevance, reliability, accuracy, completeness, complicated filters)

b. Have you ever utilised a centralised knowledge database. If so, please describe your general experience with centralised knowledge databases. What works well and what does not?

Yes	No

6. How should a centralised knowledge database enable your work?

a. When retrieving data from the system what would you like to see?

b. How do you envisage using a centralised knowledge database? (e.g. remembering previous searches)

c. What fields would you be interested in for searching data/research (e.g. author, organisation)

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d. Would you be interested in viewing a quality/trust rating for data/research? Why?

Yes	No

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a. How do you typically access the internet? (desktop, mobile, tablet)?

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b. On what type of platform would you access a database (desktop, mobile, tablet)?

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c. How often do you use Facebook, Twitter, or other social media applications? And how do you access these?

d. Would you be interested in a single sign on to the database?

Yes	No

Annex C – Minutes of Inception Meeting

UGANDA NATIONAL ROADS AUTHORITY

SUBJECT	KICK-OFF MEETING FOR AfCAP/UNRA RESEARCH PROJECT NO. UGA2096A "Baseline survey of past and current road sector research undertakings in Uganda and establishment of electronic data management system (EDMS)"		
Meeting	Meeting No. 1	**Venue**	UNRA Headquarters
Date	Tuesday 22 November 2016	**Time**	10:15HRS –12:00 HRS

Agenda

1. Communication from the Chairperson
2. Word from acting Director, Network Planning and Engineering.
3. Communication from AfCAP.
4. Communication from AURECON.
5. Remarks and reactions from attending members.
6. Closing remarks from the Chairperson.

Attendance List

	NAME	COMPANY	EMAIL	PHONE CONTACT
1	Mark Henry Rubarenzya (MHR)	UNRA	mark.rubarenzya@UNRA.go.ug	0782163508
2	Richard Akuze (RA)	UNRA	richard.akuze@UNRA.go.ug	0772508426
3	Nkululeko Leta (NL)	AFCAP	nkululeko.leta@cardno.uk.com	+27769956241
4	Altus Moolman (AM)	AURECON	altus.moolman@Aurecongroup.com	+27124272732
5	Eduard Kruger (EK)	AURECON	edward.kruger@Aurecongroup.com	+27996791567
6	Albert J. Rugumayo (AJR)	NDEJJE UNIVERSITY	airugumayo@gmail.com	0772428763
7	Umaru Bagampadde (UB)	MAKERERE UNIVERSITY	ubagampadde@gmail.com	0772605495

	NAME	COMPANY	EMAIL	PHONE CONTACT
8	Rosemary Kisembo (RK)	UNRA	rosemary.kisembo@UNRA.go.ug	0717440064
9	Jane Gatare (JG)	UNRA	jane.gatare@UNRA.go.ug	0712520323
10	Immaculate Katutsi (IK)	UNRA	immaculate.katutsi@UNRA.go.ug	0785938305

Members absent with apology.

    i.   Dr. Maxwell Otim - Uganda National Council of Science and Technology (UNCST)

    ii.   Andrew Kagoda - Uganda Road Fund (URF)

    iii.   Eng. Dr. John Mbadwe - Ministry of Works and Transport (MOWT)

    iv.   Dr. Moses Matovu -Makerere University (CEDAT)

    v.   Dr. Micheal Kizza - Kampala Capital City Authority (KCCA)

Item	Remarks	Action by
1.	**Communication from the Chair (Dr. Mark Henry Rubarenzya)**	**All to note**
	The Chairperson welcomed members to the meeting and apologised for kicking off the meeting late. He noted that there would be no formal agenda and called upon members to introduce themselves as most of the members had had no prior interaction. He mentioned that AfCAP is the one partnering with Uganda on the project that will be under discussion. This meeting is to discuss about the approach and clarification about the various aspects of the project.	
2.	**Communication from Acting director (Mr. Akuze Richard).**	All to note
	He welcomed us again to the meeting and apologized for the state of the venue mentioning that UNRA has only recently moved into the current premises hence still setting up. He conveyed apologies from the director who was out for other duties.	
3.	**Communication from AfCAP (The regional manager East and Southern African, Eng. Nkululeko Leta).** He gave a brief overview about AfCAP (Africa Community Access Program) as follows. AfCAP is a research programme funded by DFID through UK-AID.	All to note

The first phase started in 2008 to July 2014 and was later extended for another 6 years, second phase starting from 2014 to July 2020. Due to the success of the first phase, DFID extended a similar program to Asia as AsCAP (Asia Community Access Program) which together with AfCAP is contained under the umbrella body of ReCAP (Research for Community Access Partnership).

Management of program is handled by Program Director, Technical team leader, team leaders for infrastructure research, transport services and knowledge management and communication. The programs are managed by three Regional technical managers in Asia, West Africa and East and Southern Africa respectively. There are 12 partner countries in Africa and 3 in Asia.

AfCAP interacts with its partner countries to provide solutions for rural access, assistance in terms of research for specific needs through providing technical assistance, capacity building and specialized equipment. AfCAP doesn't provide funding for construction works, this is provided by the partner countries in collaboration with their development partners.

Key issue at this stage of the program is ensuring sustainability of all the activities including institutionalization of processes and outputs. Countries should be able to carry on by themselves and it is expected that Research centers set up should be able to function by themselves within the next 3 years.

It is a demand driven program and projects are formulated from discussions between partner countries and AfCAP where needs and problems are identified. This in turn leads to drawing up the Terms Of Reference (TORs) and procurement of the services.

UNRA sought AfCAP to establish the current situation in terms of research and work previously done. AfCAP contracted **Aurecon** to provide these services. TORs were approved by the steering committee.

During tendering, the partner country is represented on the evaluation commission and is intensively involved in the process of drawing up the TORs and in choosing the service provider.

This kick off meeting is to give the service provider a platform to present the proposal that was accepted by the commission. Members are to deliberate on issues that arise and to clarify if the approach is indeed appropriate for Uganda.

4.	**Communication from AURECON (Eng. Altus Moolman)**	All to note
	A brief description was given on how the study will be carried out. The approach is as follows;	
	1. Gather research items; evaluate it.	
	2. Have a database; this should be easily accessed by users.	
	3. Institutional process; Identify who is responsible for research, look at the current method of communication and identify existing gaps	
	Timeline will be as follows;	
	1. Preparation ; Current communication and interaction in institutions	
	2. Field survey and knowledge database design process	
	3. In 8 months, carry out implementation and workshop for final database.	
	The TORs include Research on all types of roads.	
	The research sources will include;	
	i. Papers presented at conferences.	
	ii. Articles published in journals.	
	iii. From post graduate studies.	
	iv. Results from specific institutions and companies dealing in road works.	
	He noted that they were requested to consider grey articles i.e. those that haven't been published. However there is an underlying issue about credibility of some of this material hence their reluctance to include it.	
	He noted the mention about field visits and required clarity what the focus here would be. He also inquired if trial sections are still ongoing or if they are a thing of the past.	
5.	**Remarks and reactions from attending members.**	
	AJR wondered if is it appropriate at this stage to think of research themes such as geometrics, materials, road safety and traffic as this would make it easier to identify the gaps.	

AM remarked that it would ease the process and they have indeed narrowed it down in the methodology. However as defined in the TORs, in phase one emphasis would be put on those related to road design. Some suggested themes such as road safety and traffic would only be incorporated later as they are outside the core definition of the project.

UB mentioned that categories of database can be divided and determined in phase one. Themes such as design inherently incorporate road safety. It hasn't been defined how far back is the past, however for present research, there is research from lab based work, desk work and ongoing projects.

Some trial section are also in process. For example, stabilizers, low volume roads and low cost seal trials are currently in monitoring. Results from this should be able to be entered into the system.

AM said that according to TORs, field visit time was reduced to cater for the office time required.

MHR agreed that visiting all trial sections in the country such as those set up by DFID would indeed take up a lot of time. However trial sections need to be monitored and controlled otherwise they will not qualify to be trials, only designs. The fundamental principles of research need to be followed.

The issue about field visits is a matter on how **Aurecon** will allocate time on the project. A certain level of in-county collaboration is required to identify location of sites whose data is being entered as well as the time for knowledge transfer among participating experts.

However meetings don't have to be carried out on site, they may be done through electronic communication or office setting.

RK noted that the functional specifications of the ESDM have not been included. The technical specification should be preceded by functional specifications which are also termed as user specifications. This will clearly show what the system will do for the users. This in turn will bring agreement between the designers and users when the system is finally presented.

AM & EK mentioned that they will include the Functional specifications in later documents. However they need clarity on;

1. Who they are designing the system for
2. Will UNRA host a server or have the data on the cloud. The answer to this isn't required right away but at the hand over period.

3. What do the different stakeholders want from the database?

RK replied that UNRA has the capability to host and manage the ESDM after hand over and resources for storage will be available in 2 months' time. However this will depend on the needs of the various stakeholders. Security, accessibility and mode of operation of the system will depend on this.

EK inquired if there will be issue about hosting the database on the cloud as most governments have reservations on this security wise.

RK replied that about cloud security, the nation is in process of putting up a Data Management Act but from jurisdiction perspective, a Cyber Act is in place which allows UNRA to choose the cloud which it considers safe to use.

MHR mentioned that the project is being housed by UNRA on behalf of the entire country. **RK** is the Head, Information Technology in UNRA and would be a good resource person. He emphasized that there is a need to agree on some aspects like metadata standards, open source, guidance on policies, etc. In addition, there will be a need to address the various aspects of the Knowledge Life Cycle.

On the question of user specifications his perspective was that this process will require the use of questionnaires and stake holder meeting.

UB informed the meeting that there is a wealth of outcome form research and the government is interested in using these results to provide solution in the project works. However defragmentation of this research makes this difficult. Having this database will solve the problem and will also eliminate replication of research by academic institutions.

Through the databank research solutions can be found which could solve problems being faced by the stakeholders and therefore the databank should be in positon to fit all the requirements of the various stakeholders.

RK mentioned that Questionnaires and interviews will be carried out to identify the user requirements for each of the stakeholders. Understanding these requirements is fundamental to the EDMS design. If the scope is too large it will be separated into phases where later modifications will be incorporated by those that require them.

AJR asked how the assignment is going to be undertaken because the team currently comprises international and local experts i.e. If the international expert will be coming into the country or if tele-conferencing will be used.

AM noted that this is in the operational proposal; it will be a combination of communication with all stakeholders directly and also electronically through media such as skype, email, documents as this will facilitate more frequent interaction.

NL mentioned that **Aurecon** needs to present the project implementation approach and also explain who the local experts are that have been selected and what their contribution will be to the project.

AM mentioned that they have contracted one local expert, **UB**. He explained that having one expert is a measure against losing continuity as would be the case if many are used. The proposed expert also has a team that works with him. UNRA will be accompanying on field visits.

NL noted that there needs to be expertise from various fields i.e. academia as well as applied research.

MHR mentioned that UNRA will escort **Aurecon** on field visits that **Aurecon** have identified. However, **Aurecon** needs to have field experts of its own who are knowledgeable and will support in the field study. He also mentioned that capacity building has been suggested only for **Aurecon** staff and that they should consider including the other participating experts.

NL mentioned that capacity building will be continuous and depending on the need identified. It can't be organized for specific areas. **Aurecon** has the right to decide on this as there are contractual obligations implied. AfCAP will support these areas identified for further capacity building at the end of the project.

AM mentioned that capacity building will be done within the workshops, as the project progresses and also through electronic communication. Workshops may be extended to incorporate more capacity building sessions if the need arises.

RK requested clarity on how intellectual property will be handled.

UB added that the project will be handling intellectual property and permissions need to be acquired before such material can be hosted in the system. Makerere University only requires clearance from the Dean and this is easily obtained. For other sources, it was suggested that only certain aspects of the work e.g. Title, Abstract and the Author, etc may be included with a link to the publishing site that hosts the main article.

NL mentioned that the database will be linked to the ReCAP main library and repository.

AM communicated the implementation deadline for the first phase as follows;

	1. Inception report submitted end of year 2016 2. Presentation of inception report and workshop held last week of January 2017 (Either week starting 23rd or 30th as agreed by members present).	
6.	**Closing remarks and way forward** The chairperson thanked members for attending the meeting. He recapped that the modes of communication during the project could include skype, email, phones in addition to face-to-face meetings. He reiterated that this is the first country specific project supported by AfCAP and that it will set the tone for further collaboration. He extended special thanks to AfCAP and congratulated **Aurecon** for winning the bid to work with UNRA on this project. A meeting with the research specialist from **Aurecon** is scheduled for 10:00 am Thursday 24th November 2016.	All to note

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Mark Henry Rubarenzya   Immaculate Katutsi
Chairperson   Secretary

UGANDA NATIONAL ROADS AUTHORITY

SUBJECT	2ND KICK-OFF MEETING FOR AfCAP/UNRA PROJECT NO. UGA2096A		
	Baseline survey of past and current road sector research undertakings in Uganda and establishment of electronic data management system (EDMS)		
Meeting	Meeting No. 2	**Venue**	UNRA Headquarters
Date	Thursday 24th November 2016	**Time**	10:30HRS –12:20 HRS

Agenda

1. Communication from the Chairperson
2. Communication from AfCAP.
3. Communication from Research Expert.
4. Remarks and reactions from attending members.
5. Closing remarks from the Chairperson.

Attendance List

	NAME	COMPANY	EMAIL	PHONE CONTACT
1	Mark Henry Rubarenzya (MHR)	UNRA	mark.rubarenzya@UNRA.go.ug	0782163508
2	Nkululeko Leta (NL)	AFCAP	nkululeko.leta@cardno.uk.com	+27769956241
3	Wynand Steyn (WS)	AURECON/ UNIVERSITY OF PRETORIA	wynand.steya@up.ac.za	+27822199704
4	Umaru Bagampadde (UB)	MAKERERE UNIVERSITY	ubagampadde@gmail.com	0772605495
5	Moses Matovu (MM)	CEDAT, MUK	mmatovujr@gmail.com	0772605495
6	Jane Gatare (JG)	UNRA	jane.gatare@UNRA.go.ug	0712520323

	NAME	COMPANY	EMAIL	PHONE CONTACT
7	Rodgers Mugume (RM)	UNRA	rodgers.mugume@UNRA.go.ug	0706515760
8	Margaret Nabukenya (MN)	UNRA	margaret.nabukenya@UNRA.go.ug	0703812238
9	Immaculate Katutsi (IK)	UNRA	immaculate.katutsi@UNRA.go.ug	0785938305

Members absent with apology.

    i.   Albert J. Rugumayo - Ndejje University
    ii.   Dr. Maxwell Otim -Uganda National Council of Science and Technology (UNCST)
    iii.   Andrew Kagoda -Uganda Road Fund (URF)
    iv.   Eng. Dr. John Mbadwe - Ministry of Works and Transport (MOWT)
    v.   Dr. Moses Matovu -Makerere University (CEDAT)
    vi.   Dr. Micheal Kizza -Kampala Capital City Authority (KCCA)

Item	Remarks	Action by
1.	**Communication from the Chair (Dr. Mark Henry Rubarenzya)**	**All to note**
	The Chairperson welcomed members to the meeting and apologised for kicking off the meeting late as we waited for invited members to arrive.	
	Members were called upon to introduce themselves.	
	This meeting is the 2nd kick-off meeting for the project and Members were called upon to introduce themselves.	
	By way of introduction the Chairperson mentioned that this is the first country specific project that AfCAP is undertaking with Uganda. There are other two regional projects in Asset management and Road condition assessment using satellite images, supported by AfCAP are being carried out in conjunction with other AfCAP countries.	
	This project was identified and prioritised by the Research Steering Committee headed by the chairman, which Committee was set up in January 2016. The Steering Committee considered the need to advance road research in the country by first taking into account previous and ongoing research in order to identify existing gaps and formulate a road research strategy accordingly. The project will cover the entire road sector. The Steering Committee has representatives of stakeholders at the various road administration levels i.e. strategic, district, urban and community access.	

	The project will undertake an analysis of the research undertaken, record of who carried out, the objectives, methodology and conclusions obtained. It will also be checked to see if proper research methods and guidelines were followed.	
	Aspects relating to knowledge management and Information Technology were presented at the previous meeting (22 November 2016) because of linkage with the Electronic Document Management System and how it will be linked to internal and external knowledge repositories.	
2.	**Communication from AfCAP (The Regional Technical Manager East and Southern African, Eng. Nkululeko Leta).**	All to note
	Take note on issues previously discussed that require points of clarity from him	
	He communicated that **WS** is expected to take note on the following issues previously discussed and to give further explanation and points of clarity where possible.	
	He was requested to expound on;	
	• The composition and structure of the research team of the local experts. • Skills required and the tasks to be accomplished. • If he will need assistance in identifying and setting up communication with the actors in applied research. • The strategy to be used in collecting and compiling the information. • The harmonization of academic and applied research • His take on field visit time, its usefulness, and the approach to be taken. • His view on the program of activities.	
3.	**Communication from Research Specialist (Wynand Steyn)**	All to note
	He mentioned that he had received prior briefing from **Aurecon** on the meeting held on 22 November 2016, and was aware of the outstanding suggestions and concerns put forward.	
	His take on the objective of the project is that it is to support conducting applicable research.	
	There will be need to look at the current state of affairs within the country in terms of research, this will help avoid repetition of work, identifying why what hasn't been done hasn't been done hence optimising time in identifying the major areas that need to be addressed.	

He evaluated that not only high level i.e. published research is to be considered but all research that meets the minimum requirement of having Title, Abstract, Objectives, Conclusions, Author and Source.

He proposed to identity all universities currently involved in research, identifying their staff capability and equipment, and assigning to them focus areas that suit their strength. These focus areas may be identified by looking through the aggregated database. Attaching focus areas to universities will make it easier to procure funding for research projects as well making it easier for students to identify research topics of their choice.

The national research plan will then identify and focus on issues which are hindering the development of the road and transport sector.

He mentioned that he will need access to all research that has been done including research from universities. This will make it possible for the team to determine why some research may have failed. Only in-country research will be relevant.

In terms of analysis, there are International modes of research such the use of technology trees and competencies which involves identifying the competencies so as to best assign research to the relevant specialist. This will eliminate the risk of having various people undertaking and repeating research on the same thing.

He noted that the measure of research is its outcome. Non-financial benefits including capacity development need to be presented and factored into any benefits analysis on research investments.

He encouraged that the research undertaken is presented at conferences and published in journals. This would create visibility of the research being undertaken in Uganda. It will also encourage possible sponsors and funders of research to engage with the country.

He clarified that capacity building will be done for high level participants i.e. those managing the research. He also encouraged local experts to forge a link with universities and this would provide a window to learn good research strategies.

He remarked on the issue of field visit time that the idea will be to go to site for monitoring purposes. This in turn requires a look at the available lab equipment. There is need to identify the focus of the site visits that will make contribution to the country's development.

He reiterated the project timeline mentioning that the inception report is to be submitted by the end of the year. Following the presentation and workshop, he will be focussing on the collection and analysis of existing research material while another

	part of the team works on the database development. The research material should be accompanied with information on the location/part of the country and the properties/ type of road on which it was done.	
4.	**Remarks and reactions from attending members.** **NL** encouraged the **Aurecon** team to do proper planning and hence make the most out of their site visits. **MHR** noted that **WS** had indeed provided the meeting with a holistic approach to the research. He also mentioned that there are a lot of investigations which have resulted in solutions and therefore should also be considered as reputable information. He mentioned that whereas **WS** seems to be focusing on applied research, students are usually involved with fundamental research and inquired to know how these two would be linked. He noted the need to have a balance between applied and fundamental research. He also noted he was in agreement with **WS** take on field visits and on the importance of identifying key stakeholders in the project. **WS** stated to his knowledge, the stakeholder to be considered are UNRA, Ministry of Works and Transport, and the various universities. He also stated those researches carried out in Uganda by parties outside the country do not qualify to be included in the database. Some bodies have relevant links to research and could contribute to this project, these include engineering bodies like Uganda Institute of Professional Engineers, Road Pavement Forum, and Uganda Road Sector Transport Review Workshop among others. These bodies could provide analysis and recommendation to research carried out. Also they could act as sponsors/funders to some of the identified research ideas. **WS** mentioned that looking across Academia, Government and the Private Sector may reveal that these organizations /associations have equipment that is suitable for research, even though they aren't necessarily research organizations. **WS** agreed that indeed these organisations have to be invited for the workshop and that road contractors who may have contributions to make to gap analysis due to their extensive field experience. **WS** added that funding for research also depends on the performance of previous research. **MM** also pointed out instances where research is done in Uganda, and lab work may have been carried out from abroad to which **WS** confirmed that this information	

needs to be captured in the research and will be added in the database. He encouraged the universities to provide capacity building in research methods.

MN requested to know how detailed the research is to be and how the findings will be linked to implementation by the organization (UNRA)

MHR replied that the project implementation process will to the extent possible involve participation of all internal and external stakeholders who are to be the end users of this research project. He added that it will follow precedent set by ongoing internal research collaborations, an example being the AfCAP High-Tech Satellite project. On that project training has been scheduled for this month and will involve participants from different departments and institutions. Staff who have undergone training (led by **IK**) are scheduled to conduct training and knowledge dissemination to the station managers in the organization.

MN suggested also presenting the research at forums organized for the organization.

MHR informed the meeting that this will be done and is currently underway for one of the other AfCAP projects where **RM** will soon conduct a knowledge dissemination presentation on the outcomes of a recent regional research meeting.

WS also added that within the organization, research tracking will be incorporated so as to keep track of the staff involved and also in what it is that they were involved in. This will help Human Resource Directorate (HR) to monitor the capacity building of its staff. He therefore called upon HR to continually identify those candidates that would participate as key researchers as this in turn will ensure the continuity of the project.

MHR inquired of **WS** the **Aurecon**'s team composition including names and profiles, and also called upon him to make clear the amount of time he will actually devote to this project.

WS responded that he would need to inquire with Altus Moolman (**Aurecon** Team Leader) about the team composition. On the issue of his involvement, he intends to handle the key issues which will mainly be synthesizing the research material provided to him. He doesn't intend to read through all the material provided, which is virtually impossible, but will mainly use major components of the research material such as title, author, abstract, objectives, and conclusions to make informed decisions and identify validity and reliability of the research.

MM requested to know if there will be funding/sponsorship for the research ideas identified as part of the project. He outlined the challenges inherent in university research where most graduate students are self-sponsored and therefore tend to choose their own research topics.

	WS replied that usually request for research does come with funding (partial or full) provided by the requesting party. This is in instances where students are required to select from research ideas in demand. However for those students who may wish to research their own topics, they should be guided to eventually shape these topics to fall within the scope of a focus idea. He noted that students will usually pick up interest in a topic if they are shown the possible applications of its output.	
	UB reiterated that fundamental and applied research need to fit into each other as fundamental research brings out aspects that may not have been identified in the applied research. He also inquired to know if 'Evaluation of material to improve performance' could be stated as one of the outcomes of the project.	
	MHR replied that this could be and that it depends on how the research strategy is defined. He also added that this (research strategy) is one of the currently proposed projects to be funded by AfCAP.	
	RM inquired to know if the database will have the capability to rank the material for quality and impact among others. He noted that some institutions have a lot of research in hardcopy and inquired to know how this is going to be incorporated in the methodology.	
	WS replied that the system will not include a ranking mechanism. He explained that most of the ranking comes from citations and these don't necessarily show the quality of the work and are therefore unreliable as rank indicators. It will be left to	
	He also added that the methodology wouldn't cater to scanning of hardcopy material. For this kind of material, only information such as title, Author, abstract, and conclusion will be requested for and the source added for benefit of those who may want to get access to the main article.	
	JG requested to know the timeframe of completion of the entire project as it seems to be quite a lot of work. **NL** replied that it is scheduled to cover 8 months.	
	MHR remarked that the timeframe is indeed tight. The outstanding issues by the end of the project will be taken as recommendations for further research. **NL** and **WS** agreed to this and added that this project will focus on setting a (research and knowledge) baseline from which future research projects can be developed.	
5.	**Closing remarks and way forward** **MHR** thanked members for their attendance and contributions to the meeting. He added that regretfully the other invited stakeholders couldn't attend but sent	All to note

	apologies. He noted that in the course of the project interactions will be held between the Aurecon team of specialists and all other participants in the project.	

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Mark Henry Rubarenzya
Chairperson

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Immaculate Katutsi
Secretary