



AfCAP
Africa Community Access Partnership



Technical Assistance to Tanzania Local Government Infrastructure and Transportation Research Centre (Interim Phase)

Progress Report: January to March 2016



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CONTRACT REF NO. AFCAP/TAN/2046A

March 2016



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| <i>Quality assurance and review table</i> | | | |
|---|----------------|----------------|---------------|
| Version | Author | Reviewer(s) | Date |
| 1.0 | BMJA Verhaeghe | N Leta (AfCAP) | 10 April 2016 |
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Abstract

AFCAP2 is providing technical assistance to the Directorate of Infrastructure Development in the Prime Minister's Office: Regional Administration and Local Government of Tanzania, to achieve its objective of setting up a Local Government Infrastructure and Transportation Research Centre (LoGITReC) in Dodoma .

During 2014/15, a strategic plan for implementation of LoGITReC's research priorities in accordance with the National Transport Policy was developed. This plan addressed: (a) the vision, mission, goal and strategic objectives of LoGITReC; (b) governance issues, including the role and responsibilities of the Steering Committee, the institutional and physical location of LoGITReC, sources of funding, key performance indicators, and strategic relationships and linkages; (c) the short to longer term research agenda of LoGITReC, which future revisions will be guided by a Technical Committee, which also still has to be convened, and the establishment of specific internal and external technical committees and working groups; (d) capacitation of LoGITReC in terms of human resources and research infrastructure; and (d) establishing mechanisms for creating greater visibility of LoGITReC and for sharing/disseminating/demonstrating its achievements. In addition to the above, a budget was proposed, but this will have to be reassessed following the physical establishment of LoGITReC.

The objectives of this 12-month Technical Assistance programme to LoGITReC are as follows:

- 1) to make further progress with priority activities for the establishment and operationalisation of LoGITReC; and
- 2) to achieve the key performance indicator targets set out in the LoGITReC Strategic Plan for the first year of operation.

This report outlines the progress that has been achieved between January and March 2016.

Key words

Road Research Centre, capacity building, Research & Development, laboratory management

AFRICA COMMUNITY ACCESS PARTNERSHIP (AfCAP)
Safe and sustainable transport for rural communities

AfCAP is a research programme, funded by UK Aid, with the aim of promoting safe and sustainable transport for rural communities in Africa. The AfCAP partnership supports knowledge sharing between participating countries in order to enhance the uptake of low cost, proven solutions for rural access that maximise the use of local resources. AfCAP is brought together with the Asia Community Access Partnership (AsCAP) under the Research for Community Access Partnership (ReCAP), managed by Cardno Emerging Markets (UK) Ltd.

See www.afcap.org

Acronyms

| | | |
|----------|---|--|
| AFCAP | : | Africa Community Access Programme |
| ALAT | : | Association of Local Authorities of Tanzania |
| ARTReF | : | African Road and Transport Research Forum |
| CSIR | : | Council for Scientific and Industrial Research |
| CML | : | Central Materials Laboratory |
| DFID | : | Department for International Development (UK) |
| DICT | : | Directorate of Information and Communication Technology |
| DID | : | Directorate of Infrastructure Development |
| DRRC | : | District Road research Centre |
| ESRF | : | Economic and Social Research Foundation |
| IT | : | Information Technology |
| JICA | : | Japan International Cooperation Agency |
| LoGITReC | : | Local Government Infrastructure and Transportation Research Centre |
| MOW | : | Ministry of Works |
| NIT | : | National institute of Transport |
| PMO-RALG | : | Prime Minister's Office Regional Administration and Local Government |
| PS | : | Permanent Secretary |
| R&D | : | Research and Development |
| TANROADS | : | Tanzania National Roads Agency |
| UDSM | : | University of Dar es Salaam |

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1 Executive Summary

AFCAP2 is providing technical assistance to the Directorate of Infrastructure Development in the Prime Minister's Office: Regional Administration and Local Government of Tanzania, to achieve its objective of setting up a Local Government Infrastructure and Transportation Research Centre (LoGITReC) in Dodoma .

During 2014/15, a strategic plan for implementation of LoGITReC's research priorities in accordance with the National Transport Policy was developed. This plan addressed: (a) the vision, mission, goal and strategic objectives of LoGITReC; (b) governance issues, including the role and responsibilities of the Steering Committee, the institutional and physical location of LoGITReC, sources of funding, key performance indicators, and strategic relationships and linkages; (c) the short to longer term research agenda of LoGITReC, which future revisions will be guided by a Technical Committee, which also still has to be convened, and the establishment of specific internal and external technical committees and working groups; (d) capacitation of LoGITReC in terms of human resources and research infrastructure; and (d) establishing mechanisms for creating greater visibility of LoGITReC and for sharing/disseminating/demonstrating its achievements. In addition to the above, a budget was proposed, but this will have to be reassessed following the physical establishment of LoGITReC.

The objectives of this 12-month Technical Assistance programme to LoGITReC are as follows:

- 1) to make further progress with priority activities for the establishment and operationalisation of LoGITReC; and
- 2) to achieve the key performance indicator targets set out in the LoGITReC Strategic Plan for the first year of operation.

This report outlines the progress that has been achieved between January and March 2016.

2 Long and Short-Term Objectives

The objectives of the Technical Assistance programme to the Tanzania Local Government Infrastructure and Transportation Research Centre (interim Phase) are as follows:

1. to make further progress with priority activities for the establishment and operationalisation of LoGITReC; and
2. to achieve the key performance indicator targets set out in the LoGITReC Strategic Plan for the first year of operation (see Table 1 below).

Table 1: Critical Success Factors, Key Performance Indicators and Targets for LoGITReC

| Critical Success Factors | Key Performance Indicators | Targets | | | | |
|--|--|---------|----------|----------|---------|------------|
| | | 2014/15 | 2015/16 | 2016/17 | 2017/18 | 2018/19 |
| R&D portfolio efficiency and effectiveness | No. of Technical Committee meetings held | 2 | 4 | 4 | 4 | 4 |
| | Compliance with Technical Committee directives | 100% | 100% | 100% | 100% | 100% |
| | % of projects in active breakthrough vs. incremental projects | 0% | 100% | 100% | 80% | 60% |
| | No. of research projects in active development | 2 | 4 | 6 | 8 | 12 |
| | No. of research projects successfully completed | 0 | 2 | 3 | 5 | 9 |
| | No. of research projects secured with private sector funding | 0 | 0 | 1 | 2 | 4 |
| | Value of projects supported by Development Partners as % of total | N/A | Report | Report | Report | Report |
| | % Milestones met (i.e. % R&D objective achievements) | 100% | 100% | 100% | 100% | 100% |
| | Released vs. planned deliverables (%) | N/A | 100% | 100% | 100% | 100% |
| | Portfolio yearly spending against budget (%) | 100% | 100% | 100% | 100% | 100% |
| Cost savings attributable to R&D | N/A | Report | Report | Report | Report | |
| Stakeholder satisfaction with research outcomes | N/A | 70% | 75% | 80% | 80% | |
| Ensuring effective transfer of technology to practice | No. of conference papers presented | 2 | 5 | 8 | 10 | 14 |
| | No. of journal articles published | 0 | 1 | 2 | 3 | 4 |
| | No. of industry workshops and dissemination fora held | 2 | 4 | 6 | 8 | 8 |
| | No. of courses held (incl. Technical Assistance programme) | 0 | 3 | 4 | 5 | 5 |
| | No. of industry guidelines and manuals published | 0 | 1 | 2 | 3 | 3 |
| | No. of norms and standards published | 0 | 0 | 1 | 2 | 2 |
| Strengthening the skills base of LoGITReC | No. of demonstration projects successfully completed | 0 | 1 | 3 | 5 | 7 |
| | No. of Doctorates | 1 | 1 | 2 | 2 | 3 |
| | No. of Masters | 1 | 2 | 2 | 3 | 3 |
| | No. of staff classified as researchers | 3 | 5 | 7 | 9 | 11 |
| | No. of laboratory technicians in Dodoma | 4 | 6 | 6 | 12 | 15 |
| | No. of laboratory technicians in Regional Laboratories | 0 | 20 | 50 | 68 | 100 |
| | No. of staff registered as professionals | 1 | 2 | 3 | 4 | 6 |
| | No. of staff studying towards a PhD | 0 | 0 | 1 | 1 | 2 |
| | No. of staff studying towards a Masters | 0 | 1 | 1 | 2 | 2 |
| | No. of studentships/interns | 0 | 2 | 3 | 4 | 4 |
| | No. of staff inducted at international R&D centres | 0 | 1 | 2 | 2 | 2 |
| Average % time spent by research staff on R&D projects | 50% | 50% | 55% | 60% | 60% | |
| Average % time spent on capacity building | 20% | 15% | 10% | 5% | 5% | |
| Average % time spent on industry events (e.g. workshops) | 5% | 10% | 10% | 10% | 10% | |
| Ensuring good governance | No. of Steering Committee meetings held | 3 | 3 | 2 | 2 | 2 |
| | Compliance with Steering Committee directives | 100% | 100% | 100% | 100% | 100% |
| | Adherence to standards of good corporate governance | 100% | 100% | 100% | 100% | 100% |
| | ISO 9000 quality system implementation | - | initiate | initiate | certify | compliance |
| | Adherence to health, safety and environment standards | 100% | 100% | 100% | 100% | 100% |
| | Collaboration with other public entities (e.g. CML): No. of projects | 2 | 3 | 4 | 4 | 5 |
| | Collaboration with universities: No. of projects | 0 | 1 | 2 | 3 | 3 |
| | International R&D collaboration: No. of MoUs signed | 2 | 3 | 4 | 6 | 6 |

The services that will be provided over the 12-month period are described in the Terms of Reference. They include:

- 1) To meet with the manager of LoGITReC to review progress with priority activities for the establishment of the research centre and achievement of the Key Performance Indicator targets (as set out in the Strategic plan);
- 2) To formulate and implement prioritised 'quick win' projects, with particular focus on the monitoring of all trial sections that were constructed under AFCAP 1 and establishment of knowledge management databases.
- 3) To identify specific areas of support needed to resolve constraints to the achievement of priority activities and targets and provide this support where possible; this may include (amongst others):
 - Assistance with the organisation of steering committee meetings;
 - Assistance with the organisation technical committee meetings;
 - Preparing staff job descriptions;
 - Assessing candidates for research posts;
 - Identifying IT requirements and preparing specifications for procurement;
 - Design of knowledge management databases;
 - Identifying laboratory and site testing equipment requirements and preparing specifications for procurement;
 - Preparing TORs for research projects, identifying funding, and appointing consultants as necessary;
 - Preparing TORs for research projects, identifying funding, and appointing consultants as necessary;
 - Identifying suitable conferences and preparing abstracts and papers;
 - Identifying appropriate topics for industry workshops and arranging venues, speakers, facilitators etc.;
 - Assisting with the organisation of knowledge sharing events for example field visits and study tours;
 - Identifying and contacting other public entities and drafting collaboration agreements;
 - Identifying appropriate international organisations, making contact and drafting Memoranda of Understanding;
 - Identifying and maximising opportunities for research centre participation in relevant programmes and activities being implemented by the host organisation.
- 4) At the end of the assignment, to revise and update the existing LoGITReC Strategic plan in collaboration with the research centre management.
- 5) To prepare an inception report, brief progress reports every two months, and a final report at the end of the assignment.

In the Inception Report for this project, the following activities were planned for the period January to March 2016:

- Provision of assistance with the setting up of the LoGITReC Technical Committee and Steering Committee meetings, inclusive of presentation material for the first meeting of both committees (January).
- Finalisation of Concept Note / Proposal on *Capacitation of the LoGITReC Laboratory (inclusive of training of laboratory staff)* .

- Third trip to Tanzania (early February – one week):
 - Participation in the first meetings of the Technical Committee (on a Tuesday) and Steering Committee (on a Friday);
 - Hold further discussions with collaborative partners in Tanzania with whom PO-RALG will enter into agreements with, and agree on the format of agreements;
 - Identification of topics for national workshops and assistance with the organisation thereof (i.e. provision of broad guidelines);
 - Interactions between CSIR Knowledge Management and IT specialists and their counterparts in PO-RALG to initiate the mapping of knowledge management and IT requirements, and reporting on the outcomes of these meetings.
- Oversee the final approval and implementation of projects: (a) capacity building of LoGITReC staff; (b) monitoring of road trials in the Bagamoyo and Siha Districts; (c) mapping of aggregate resources for road construction (National database (March)).
- Based on the outcomes of the meeting of the DRRTC, draft three Concept Notes for (a) research and development activities on community-based contracting; (b) the development of associated guidelines for stone/timber bridges and segmented pavement design and construction; and (c) research and development of alternative materials for application on low-volume access roads (March).
- Draft quarterly report (March).

Progress against the above objectives and activities are outlined in the sections below.

3 Progress on Short Term Objectives (January to March 2016)

3.1 LoGITReC Technical Committee Meeting

The first meeting of the LoGITReC Technical Committee was held on Wednesday, 9 March 2016 at the Roads Fund Board (RFB). The meeting was attended by 15 members (cf. Draft Minutes of meeting in Annex A).

The meeting was opened by Mr J Haule, Roads Fund Manager of the Roads Fund Board. In his welcoming address he stated the following:

1. Investment in Research and Development (R&D) is important for organisations such as the RFB, TANROADS and PO-RALG since it will enable these organisations to make informed decisions based on verified data and evidence. This will prevent costly mistakes. The outcomes of R&D will also enable the above organisations, and especially local government authorities, to improve on service delivery.
2. Since there is never enough funding available for R&D, the R&D needs and projects have to be prioritised, and allocated funding used effectively, so that the projects deliver the maximum value and impact.
3. It becomes increasingly more important that local capacity for R&D needs to be developed and nurtured. Far too much R&D is being undertaken by international service providers and far too little capacity is being developed inside Tanzania.
4. The products of R&D have to be disseminated – even half-day seminars may be appropriate. LoGITReC staff needs to work closely together with universities and the Transportation Technology Transfer Centre.

Dr F Magafu, Assistant-Director of Planning and Research in the Directorate of Infrastructure Development of PO-RALG presided over the first part of the meeting. He presented the Implementation Plan for the establishment of LoGITReC. A copy of his presentation is provided in Annex B. In his presentation, he addressed the change in name from the *District Road Research Centre* to the *Local Government Infrastructure and Transportation Research Centre* (LoGITReC). He noted that the name change implies that the research centre will be involved in a broader spectrum of activities (i.e. not only low-volume district roads, but also urban roads, water infrastructure and buildings, as well as transportation and traffic safety).

It was noted that the *Road Research Strategic Plan* will have to be adjusted to reflect the new identity of the research centre.

Following the above, the roles and responsibilities of the Technical Committee as well as its composition were table by Dr Magafu for discussion (cf. Annex B). The following recommendations were made:

- All members should be empowered with information prior to the meeting in order to be able to provide advice and to perform their duties as members of the Committee;
- Although technical experts should be sought for the Committee, the meetings of the Committee could also be used to build capacity by inviting young engineers to witness the proceedings;
- The membership should be fixed to ensure continuity (i.e. same members to attend each meeting);
- Minimum criteria should be set for people wanting to join the Committee;

- The membership of the Committee should be limited to a maximum of 25 members;
- Domain-specific Subcommittees should be established (e.g. road materials, transportation, etc.). These Subcommittees can invite other experts to attend their meetings to deliberate specific issues. Feedback from these Subcommittees will be presented at the main meetings of the Technical Committee;
- It was recommended that a technical representative of the Contractor Association of Tanzania (CATA) as well as a technical representative of the National Environment Management Council (NEMC) be invited to become members of the Committee.

It was agreed by the members of the Committee that Eng E. Kunyaranyara (ALGETA) be appointed as the Chairperson and that Dr Magafu be appointed as the Secretary of the Technical Committee. Eng Kunyaranyara presided over the remainder of the meeting.

Eng B Verhaeghe then proceeded with a presentation on the prioritised research needs (cf. Annex B). The identified research priorities were accepted by all the members. For at least two of the projects, the question was asked whether the projects would be undertaken by local researchers/engineers or by international service providers. Eng Verhaeghe clarified that all projects were planned to be undertaken by local researchers, but that most projects made provision for the appointment of international service providers for the sole purpose of providing guidance to the project teams and for mentoring the team members (i.e. capacity building and skills transfer), and not to execute the projects themselves.

Two new projects were proposed:

1. Study on the efficacy of soil stabilisers; and
2. Study on the enhancement of urban transport in emerging cities.

With respect to (1), it was proposed that a series of trial sections be constructed on a homogeneous section of road. It was proposed that each section be designed and constructed (or that the construction be overseen) by the product suppliers. All inputs into the construction of the section (e.g. type and quantity of stabilisers) should be recorded to be able to assess the construction cost of each section. This project could form part of the Priority Project "*Continued Monitoring of Existing Road Trials and Establishment of New Road Trials*". Finally, it was noted that the project should also investigate the potential environmental effects of the stabilisers.

With respect to (2), the issue was raised that solutions, such as the implementation of Bus Rapid Transport (BRT), may not be applicable to some of the emerging cities, and particularly those situated in hilly terrain. Hence, other solutions may need to be investigated to mitigate traffic congestion in those emerging cities.

The next meeting of the Technical Committee will be held in Dodoma on or during the week of 1 June 2016.

3.2 LoGITReC Steering Committee Meeting

The first meeting of the LoGITReC Steering Committee was held on Friday, 11 March 2016 at the Roads Fund Board (RFB). The meeting was attended by 11 members (cf. Draft Minutes of meeting in Annex C).

The apologies were noted of representatives from the Ministry of Works, Transport and Communications, the Roads Fund Board, TANROADS and TANROADS-CML. They all had to attend a meeting with the Minister of Works, Transport and Communications.

Dr F Magafu presided over the meeting. He presented the value proposition of LoGITReC (see Annex D) highlighting that LoGITReC will eventually have a multidisciplinary skills and expertise base not restricted to only road engineering, but in infrastructure engineering in general (i.e. inclusive of buildings and water infrastructure), as well as in transportation.

Kimaro Moses stated that ALAT is in full support of the decision of PO-RALG to establish LoGITREC.

This presentation was followed by a presentation on the establishment of LoGITReC (see Annex D). The following issues were noted / debated:

- Whereas the Roads Act of 2007 may have provided the legislative context and mandate for establishing a road research centre, it does not provide the legislative mandate to establish a centre for research on buildings, water infrastructure and transportation research. There is a need to legislate LoGITReC.
- The vision, mission and strategic objectives only address roads and transport, and not water and buildings. Hence, they are not in line with the scope of LoGITReC as outlined in the value proposition.
- The Permanent Secretaries (PSs) need to be informed about the broadening of the scope of the then District Road Research Centre (DRRC).
- Given that LoGITReC is in an embryotic stage, it does not have the capacity to target all envisaged research areas and hence should focus on only one specific research area, excel in this area and only then expand to other research areas. In view of the current membership of the Steering Committee and current LoGITReC documentation (e.g. the Road Research strategic Plan), it was recommended that this area should be road research.
- Changes in focus, and therefore also changes in names (i.e. DRRC to LoGITReC), should not be directed by structural changes in PO-RALG.

Dr Magafu responded by stating that the shift occurred in July 2015, when the Sub-Directorate *Planning and Research* was established under the Directorate of Infrastructure Development. This then also led to the broadening of the scope, as well as the name change from DRRC to LoGITReC. He noted that the broadening of the scope from road research to the inclusion of research on buildings, water infrastructure and transportation will be a gradual process. At present, the primary focus is on road research, but other areas of research will be brought in incrementally.

The PSs are aware of these changes, but Dr Magafu agreed that more energy should be invested in communication. Also, current documentation should be updated, including the development (in time) of domain-specific strategic plans for all targeted focus areas of research as well as an integrated strategic plan encompassing all focus areas.

It was proposed that the scope of activities of LoGITReC should be debated at the Technical Committee and that their recommendations should be sent to the Steering Committee for consideration.

The Members also expressed some concern about potential duplication of research efforts between LoGITReC (local /district roads) and TANROADS-CML (higher volume roads). Dr Magafu pointed out that there is currently good communication and collaboration between the two entities, and that it is expected that resources of both entities will be called upon to execute research projects. All Concept Notes produced for ReCAP/AfCAP to date reflect the cooperation between especially LoGITReC and TANROADS-CML. He also pointed out that

TANROADS-CML is a member of both the Technical Committee and Steering Committee, and also of the AfCAP National Steering Committee. Hence, CML is kept fully informed on the intent and planned activities of LoGITReC.

Under *Strategic Relationships and Linkages*, it was recommended that the National Institute of Transport (NIT), the Economic and Social Research Foundation (ESRF) and independent researchers be added to the list of entities/individuals with whom LoGITReC should interact.

Under *Knowledge Transfer*, the importance of dissemination was highlighted (JICA). Strategic relationships should be established with dissemination partners, also those involved in labour-based technologies.

Following the above discussions, the proposed role and responsibility, as well as the proposed composition of the Steering Committee were presented (see Annex D). The following were noted / recommended:

- In view of the fact that the current focus of LoGITReC is road research, the composition of the Steering Committee is acceptable as is;
- Development Partners should attend the Steering Committee meetings on invitation;
- The nominated Chairperson of the Steering Committee is the Roads Fund Manager of the Roads Fund Board (to be confirmed);
- The nominated Secretary of the Steering Committee is the Director of Infrastructure Development in PO-RALG (to be confirmed);
- It has been recommended that four Steering Committee meetings be held per annum; each meeting to be held within a few days after the Technical Committee meeting.

B Verhaeghe presented the current research priorities of LoGITReC, inclusive of proposed criteria applicable to all R&D projects to be undertaken by LoGITReC (cf. Annex D). The following were noted / accepted:

- The proposed criteria applicable to LoGITReC projects were endorsed by the members of the Steering Committee;
- The Steering Committee endorsed all 12 research projects as well as the two additional projects proposed by the Technical Committee (cf. Section 3.1), especially since the projects address diverse issues which all will be beneficiary local government;
- One member, subsequently supported by others, requested a greater focus on the potential use of alternative materials in roads (e.g. the Indian concept of “plastic roads” which was also seen as an opportunity to create jobs in cities and at the same time solves the problem of the dumping of plastic bags causing environmental pollution);
- The members remarked that the biggest challenge for LoGITReC is capacity to undertake the projects. Dr Magafu acknowledged this and noted that tri-party arrangements between PO-RALG, TANROADS-CML and universities will be established to alleviate this problem in the short term.

The members requested that the final report on the establishment of the research centre as well as the Road Research strategic Plan be distributed to the members who attended the meeting.

3.3 Concept Notes for Priority Projects

Based on discussions held in October and November 2015 with PO-RALG, the Ministry of Works and CML of Tanroads, the following two Concept Notes were drafted in December 2015:

- *Continued Monitoring of Existing Road Trials and Establishment of New Road Trials;* and
- *National Road Material and Aggregate Inventory Database.*

The above two Concept Notes were reviewed in January 2016, incorporating comments received from Dr Magafu and Eng Mataka from TANROADS-CML.

A Concept Note for *Capacity Building and Skills Development Programme for the Laboratories of LoGITReC* was drafted in February, incorporating information received from Eng Mataka of TANROADS-CML, and subsequently sent to Dr Magafu for his comments.

The versions sent to AfCAP by Dr Magafu of PO-RALG are provided in Annex E.

It was agreed that Dr Magafu will compile the Concept Note for the development of *“Guidelines for design and construction of stone arch and timber bridges”* (for the purposes of capacity building), while the Service Provider will draft a Concept Note on *“the use of local and alternative materials in roads”*.

The remaining Concept Note on the *“Optimisation of delivery methods for the maintenance of local government roads”* will be initiated after a Technology Transfer workshop/seminar on the subject. The outcomes of the event, inclusive of its recommendations, will be integrated in this Concept Note.

3.4 Other Activities

The Service Provider has assisted PO-RALG with the organisation of the Technical Committee and Steering Committee meetings, which included (for both meetings):

- The drafting of the agendas;
- The preparation of presentations; and
- The drafting of meeting notes.

Further discussions were held on the establishment of the Information Centre. A temporary location for the Information Centre has been identified, adjacent to the materials testing laboratory. An information specialist from PO-RALG’s Directorate of Information and Communication Technology (DICT) still needs to be identified and appointed to head the Information Centre. Once appointed, communication between this person and the CSIR’s Knowledge Management expert will be initiated.

A meeting was held with Dr. Hannibal Bwire of the University of Dar es Salaam (UDSM). He welcomed a close collaboration between UDSM and LoGITReC. Post-graduate research students can be identified and allocated to a project at any time, for a duration of 18 months up to two years. He will send a typical Memorandum of Agreement to the Service Provider. Similarly, the generic MoU contained in the Road Research Strategic Plan will be sent to him for perusal.

3.5 Red Flags

The following concerns were identified:

1. *Dr Magafu repeatedly having to act as the Director of Infrastructure Development, to be assigned on Special Projects and, during the most recent visit of the AfCAP Service Provider, to also having to act as the PS and being called upon to attend meetings with the Minister.* Concern: not having the required time/energy to invest in establishing/strengthening/managing the Sub-Directorate Planning and Research, and therefore not being able to further the objectives of DRRC/LoGITReC.
2. *No structures or capacity to support Dr Magafu.* Concern: No resources available to act on Dr Magafu's behalf, and to provide leadership or to execute the mandate of LoGITReC when he is unavailable. Also, at present there is no dedicated research capacity available in PO-RALG to execute planned R&D projects. One of the reasons cited is that the present building of PO-RALG does not have sufficient space to accommodate more staff. A new building is in the process of being modernised. Once this process is completed, sufficient space should become available for LoGITReC staff.

In the meantime, LoGITReC would have to rely on partnerships with TANROADS-CML and universities to execute projects. A partnership agreements with UDSM is in the process of being established.

A model similar to the one deployed in Mozambique was recommended, namely to form a Working Group of interested/dedicated PO-RALG staff to further the establishment of LoGITReC, with the objective that they would be incorporated in the structures of LoGITReC once current constraints have been resolved.

3. *Road Materials Laboratory being quiescent.* PO-RALG, with AfCAP support, has established a low-volume road research laboratory operated by five technicians and supervised by a Laboratory Manager, but the laboratory staff is still lacking experience to operate at the level of a research (reference) laboratory. The capacity building programme should bring them to the required (basic) level to operate as a competent laboratory, with the ultimate aim for this laboratory to act as a research and reference laboratory for PO-RALG.

4 Planned Activities and Deliverables for Third Quarter

4.1 Activities

The following activities are planned for the period April to June 2016:

- Based on the outcomes of the meeting of the Technical and Steering Committee meetings held in March 2016, draft three Concept Notes for (a) research and development activities on community-based contracting; (b) the development of associated guidelines for stone/timber bridges and segmented pavement design and construction; and (c) research and development of alternative materials for application on low-volume access roads (April/May).
- Assistance with the setting up of Technical and Steering Committee meetings.
- Broad-based assistance with the layout of the to-be-established research facilities of PO-RALG located within the Institutional zone of Njedengwa in the East of Dodoma.
- Draft agreements between PO-RALG and collaborative partners in Tanzania who are willing to enter into agreements.
- Fourth trip to Tanzania (May or June):
 - Oversee the initiation/execution of projects: (a) capacity building of LoGITReC laboratory; (b) monitoring of road trials in the Bagamoyo and Siha Districts; (c) Implementation of a National Road Material and Aggregate Inventory Database;
 - Assist with the signing of agreements between PO-RALG and collaborative partners in Tanzania;
 - Identify international organisations with whom PO-RALG should enter into agreements with, and agree on the format of agreements;
 - Interactions between CSIR Knowledge Management and their counterparts in PO-RALG to discuss and finalise the action agenda for satisfying knowledge management requirements, and reporting on the outcomes of these meetings¹¹;
 - Participation in the second meetings of the Technical and Steering Committee (if required).
- Oversee the final approval (and implementation) of new projects: (a) research and development activities on community-based contracting; (b) the development of guidelines for stone/timber bridges design and construction; and (c) research and development of alternative materials for application on low-volume access roads (June).
- Draft quarterly report (June).

4.2 Deliverables

The Technology Assistance programme is expected to produce the following deliverables in the Third Quarter (April to June 2016):

- Status report on progress and activity report (i.e. status of implementation projects as per the Concept Notes submitted);
- Overview of status of collaborative/cooperation agreements signed with local entities;
- Action agenda for addressing the knowledge management requirements of LoGITReC/PO-RALG;
- Minutes of the second meeting of LoGITReC.

5 References

MAGAFU, F and VERHAEGHE B. 2015. Technical Assistance to PMO-RALG to Develop Road Research Capacity in Dodoma: Draft Road Research Strategic Plan for First Five Years in Operation. Project AFCAP/TAN2010A. Cardno Emerging Markets (UK).

VERHAEGHE, B. 2015. Technical Assistance to Tanzania Local Government Infrastructure and Transportation Research Centre (Interim Phase): Inception Report. Project AFCAP/TAN/2046A. Cardno Emerging Markets (UK).

VERHAEGHE, B. 2015. Technical Assistance to Tanzania Local Government Infrastructure and Transportation Research Centre (Interim Phase): Capacity Building and Skills Development Action Plan (Draft). Project AFCAP/TAN/2046A. Cardno Emerging Markets (UK).

Annex A: Minutes of the LoGITReC Technical Committee Meeting

MINUTES OF LoGITReC TECHNICAL COMMITTEE HELD ON 9th MARCH 2016 IN THE ROADS FUND BOARD CONFERENCE ROOM.

1.0 ATTENDANCE:

| | | | | |
|------------------------------|---|---------|---|-------------------|
| 1. Eng. Joab S.C.A Mutagwaba | - | Member | - | ALGETA |
| 2. Mahmoud M. Chamle | - | Member | - | ATTI |
| 3. Gaspar O.M. Ojoro | - | Member | - | CML |
| 4. Eng. Kunyaranyara E.M.S | - | Member | - | ALGETA |
| 5. Eng. Godwin S. Mpinzile | - | Member | - | ALGETA |
| 6. Eng. Bhoke Magira | - | Member | - | CRB |
| 7. Eng. Patrick Barozi | - | Member | - | ERB |
| 8. Eng. Abdul R. Digaga | - | Member | - | ALGETA |
| 9. Jubily Musagasa | - | Member | - | DIT |
| 10. Dr. Hannibal Bwire | - | Member | - | UDSM |
| 11. Benoit Verhaeghe | - | TA | - | CSIR |
| 12. Eng. Dr. Fikiri Magafu | - | Member | - | PORALG |
| 13. Eng. Ray Seng'enge | - | Member | - | ACET |
| 14. Eng. Hagai K.S. Bishanga | - | Member | - | TANT ² |
| 15. Vincent Lwanda | - | Invitee | - | PORALG |

2.0 ABSENTEES:

1. Ministry of Works, Transportation and Communication:
 - Works Sector - Without apology
 - Transportation Sector - Without apology
2. Roads Fund Board - Without apology
3. SUMATRA - Without apology
4. TACECA - Without apology

3.0 AGENDA

1. Welcome and Apologies
2. Implementation Plan for the Establishment of LoGITReC
3. Role and Responsibilities of the Technical Committee (TC)
 - 3.1 Agreement on the Terms of Reference for the TC
 - 3.2 Membership of the TC
 - 3.3 Appointment of Chairperson for the TC
 - 3.4 Frequency of TC Meetings
 - 3.5 Relationship between the TC and the Steering Committee (SC)
4. Prioritized Research Needs
 - 4.1 Overview of Past Research Undertaken in Mozambique
 - 4.2 Road Research Priorities Identified in Strategic Research Plan

- 4.3 Ongoing Research Projects and Projects to be Initiated in 2016:
 - 4.3.1 National Road Material and Aggregate Inventory Database
 - 4.3.2 Continued Monitoring of Existing Road Trials and Establishment of New Road Trials
 - 4.3.3 Development and Implementation of Design Methods for Low-Volume Roads
 - 4.3.4 Optimization of Delivery Methods for the Maintenance of Local Government Roads
 - 4.3.5 Use of Local and Alternative Materials in Roads
- 4.4 Additional Research Needs
- 4.5 Prioritization of Research Needs
5. Way Forward
6. Any Other Business
7. Date of Next Meeting
8. Closure

4.0 OPENING OF THE MEETING

Before official opening of the meeting, Head of LoGITReC welcomed members to the first (inaugural) meeting of LoGITReC Technical Committee. He pointed out that even if no formal apologies were made, he is aware of several other meetings going on in Dar es Salaam involving people from the same institutions constituting membership in this committee which would affect attendance of members to this meeting. After that remark, the Head of LoGITReC welcomed the Guest of Honour to open the meeting.

The meeting was officially opened at 10:18 after remarks made by the Roads Fund Board manager who was the guest of honour. In his speech, the guest of honour explained that LoGITReC is an important tool that will enable decision makers to make their decisions based on evidences. He also pointed out that LoGITReC is expected improve existing common practices into best infrastructure development practices using research and dissemination of research outcomes for efficient spending of funds. He concluded by calling LoGITReC to establish strong relationship with higher learning and other knowledge sharing institutions in order to achieve its goals.

5.0 MEETING METHODOLOGY

The meeting was conducted through presentations followed by discussions.

6.0 IMPLEMENTATION PLAN FOR THE ESTABLISHMENT OF LOGITREC

This agenda was presented by the Head of LoGIReC. The presentation covered

- Vision, Mission and Strategic Objectives
- Institutional locations

- Scope of current activities
- Key Performance Indicators targets and
- Overview of current progress

The presenter pointed out that the Vision of LoGITReC is **to be the premier research centre in sub-Saharan Africa delivering technological solutions for the attainment of an efficient and effective local government road transport system** whereas the mission is **to support the development of a safe, reliable and efficient local government transport system through research and innovation.**

Concerning Strategic objectives of LoGITReC, the following were presented:

1. To serve the Tanzanian road infrastructure engineering needs, focussing on Local Government roads, through:
 - the development, application and dissemination of new knowledge
 - the provision of laboratory testing services
 - opening opportunities for technological development of equipment/tools, and
 - development of human capital

Its goal is to provide practical, innovative, cost-effective R&D based solutions that:

- address the current and future road infrastructure needs of LGAs;
 - support sustainable development and asset preservation; and
 - enhance socio-economic impact.
2. Provide engineering solutions for the design, construction, maintenance and management of road infrastructure assets, based on basic and applied research, supporting the provision of a sustainable and cost-effective Local Government transport system.

The long-term goal, through the provision of technical support to PO-RALG and LGAs, is to bring all roads under the responsibility of LGAs to a standard that permits traffic to pass throughout the year.

About Institutional location, LoGITReC is under PO-RALG, in the Division of Infrastructure Development. It consists of three parts; Information Centre, Research Group and Central and Regional Laboratories. There are also two committees serving LoGITReC; Technical and Steering Committees. Physical location is currently in PO-RALG's SOKOINE HOUSE opposite CDA and also in Dodoma Municipal Engineer's office premises while future physical location is Njedengwa area in Dodoma Municipality.

Presenting on the Scope of current activities, the following were addressed;

- Establishment of LoGITReC research capacity
- Fast-tracking the physical establishment of LoGITReC in Dodoma, as well as the Information Centre and the Central Road Research Laboratory
- Implementation of a capacity building and skills development programme targeting researchers as well as laboratory staff

- Initiation and implementation of LoGITReC's research agenda to achieve appropriate and implementable research outcomes
- Establishment of technical working groups and committees, as well as strategic relationships and linkages, both nationally and internationally
- Targeted processes to ensure that LoGITReC lives up to its mandate and achieves its Key Performance Indicators

The presenter also explained the key performance indicators and Overview of current progress in which the following were outlined:

- Road Research Strategic Plan for first five years in operation drafted and endorsed by AfCAP Steering Committee on 30 March 2015
- Capacity Building & Skills Development drafted, containing:
 - A Good Research Practice Guide for LoGITReC researchers
 - A Good Practice Guide for Research Laboratories
 - Job descriptions for LoGITReC staff
- Establishment of the LoGITReC laboratory in Dodoma
 - Laboratory manager supported by five laboratory technicians
 - Laboratory equipped to conduct basic testing with addition equipment to be procured
 - Concept note for skills development & capacity building prepared
- Two research projects under active development
- One conference paper to be presented in Kenya (15-17 March)
- One industry workshop held (low-volume road design manual)

During discussions on this agenda, members raised concern on how does LoGITReC accommodate infrastructures such as buildings which are not included in the strategic plan.

It was explained that at concept stage, the centre was meant for roads only as stipulated in the strategic plan. However, to accommodate changes that later happened in PORALG where Infrastructure Development Unit was changed to a full division, the management decided the centre should include buildings and water which are also under division of infrastructure development.

7.0 ROLE AND RESPONSIBILITIES OF THE TECHNICAL COMMITTEE (TC)

This agenda was also presented by the head of LoGITReC covering the following;

- Agreement on Terms of Reference, and relationship with Steering Committee
- Membership of the Technical Committee
- Appointment of Chairperson
- Frequency of Technical Committee meetings

Generally, all role and responsibilities stipulated in the strategic plan were accepted by members.

Regarding agreement on terms of reference and relationship between Technical and Steering committees, members approved the proposal stipulated in the strategic plan without changes.

Concerning membership, it was suggested that Contractor's Association of Tanzania (CATA) should also be included and that there should be members from three higher learning institutions with each nominating a member to represent the rest high learning institutions. Institutions chosen were The University of Dar es Salaam, Dar es Salaam Institute of Technology and Mbeya University of Science and Technology.

Members also discussed the proposal of chairmanship and appointed Eng. Kunyaranyara E (Member from ALGETA) to be chairman of the committee while the Head of LoGITReC was appointed to be the secretary. Members also suggested the chairman be nominated a member of Steering Committee to represent their committee.

Furthermore, members agreed with the proposed committee meetings schedule which is set once quarterly (four times per year).

8.0 PRIORITISED RESEARCH NEEDS

This agenda presented by the Technical Assistant (TA) from CSIR and the following were discussed.

- Road research priorities identified in Strategic Research Plan
- On-going research projects and new projects to be initiated in 2016
- Overview of projects planned for Mozambique
- Additional research needs

The presentation outlined four categories of research identified in Strategic Research Plan as follows:

1. High priority, 'quick win' short-term projects.

These are "breakthrough projects" addressing most pressing needs in a fairly short time span (~12 months). These projects are potential for yielding high impact and demonstrating value of LoGITReC to stakeholders.

- Development and implementation of design methods for low-volume roads
- Road trials, demonstrations and monitoring
- Review of gravel road maintenance manuals and procedures
- Optimization of delivery methods for the maintenance of local government roads
- Guidelines for design and construction of stone arch and timber bridges

2. High priority medium to longer-term projects: These are similar high impact, yielding similar benefits.

- Road asset inventory condition and data
- National road material and aggregate inventory and database

- Guidelines for the use of block paving for roads and footways
 - Review of existing standards and specifications for rural roads
 - Use of local and alternative materials in roads
3. Cross-cutting yet high priority activities: Developed/implemented in parallel with above.
- Climate resilience
 - Cost-benefit studies
4. Technical Assistance for establishment of LoGITReC

Regarding On-going research projects and new projects to be initiated in 2016, the following projects were presented:

ON-GOING PROJECTS,

- Development and implementation of design methods for low-volume roads
- Road trials, demonstrations and monitoring

PROJECTS TO BE INITIATED IN 2016

- Review of gravel road maintenance manuals and procedures
- Optimization of delivery methods for the maintenance of local government roads
- Guidelines for design and construction of stone arch and timber bridges
- Road asset inventory condition and data
- National road material and aggregate inventory and database
- Guidelines for the use of block paving for roads and footways
- Review of existing standards and specifications for rural roads
- Use of local and alternative materials in roads
- Climate resilience and
- Cost-benefit studies

Currently, Concept Notes have been prepared for the following:

- Continued Monitoring of Existing Road Trials and Establishment of New Road Trials
- National Road Material and Aggregate Inventory Database

Members discussed this agenda, approved all projects adding two proposals. The two proposals together with the 12 projects would be forwarded for scrutiny and recommendation by the Steering committee. Proposed projects are:

- i. Efficacy of Soil Stabilizers (road trials)
- ii. Enhancement of Urban Transport in Emerging Cities (congestion relief)

Concerning an overview of projects planned for Mozambique, presenter also being TA in Mozambique shared with participants the planned priority projects in Mozambican RRC as follows:

1: High-Gain Priority Research Projects

- Mapping of natural materials for road construction and development of a database
- Use of local materials in roads
- Protocols for improving the proficiency of material testing laboratories
- Protocols and database for systematic collection and recording of data generated during implementation of road projects
- Characterization of road assets
- Guidelines for the design of small bridges

2: Other Priority Research Projects

- Analysis of the effects of traffic overloading on pavement performance
- Implementation of a national/regional strategy for vehicle overloading control
- Standard specification for roads
- Construction of pilot projects identified in the study on the Use of Road Works to Enhance Community Water Supplies in Mozambique
- Manuals for roads

Members adopted the presentation, appreciating potentials that were noted in the presented projects. They also thanked presenter for giving them an idea of what is going on in neighbouring country and check if their speed is adequate.

9.0 ANY OTHER BUSINESS

There was no agenda brought on the table for discussion as any other business

10. DATE OF NEXT MEETING

After discussions, it was agreed that the next meeting should be held on Wednesday, 1st June, 2016.

11. CLOSING

While closing the meeting, the chairman thanked members for their active participation and valuable contributions made during discussions. He argued them to keep on the spirit in the coming meetings. He finally wished them a safe journey back to their working stations and officially closed the meeting at 4:35pm.










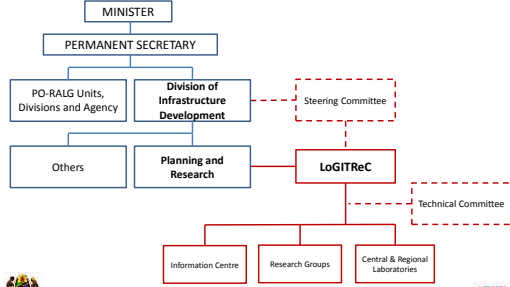


MINUTES CONFIRMED:

Eng. Dr. Fikiri F. Magafu
SECRETARY

Eng. Ezekiel Kunyaranyara,
CHAIRMAN

DATE:

Annex B: Presentations made at the LoGITReC Technical Committee

| | |
|--|--|
| <div style="text-align: center;">  <h3>LoGITReC Implementation Plan</h3> <p>LoGITReC Technical Committee Roads Fund Board Offices 09 March 2016</p> </div> | <div style="text-align: center; background-color: #e0e0e0; padding: 5px;"> <h3>Outline</h3> </div> <ul style="list-style-type: none"> • Vision, Mission and Strategic Objectives • Institutional location • Scope of current activities • KPI targets • Overview of current progress <div style="display: flex; justify-content: space-between; align-items: center; margin-top: 10px;">   </div> |
| <div style="text-align: center; background-color: #e0e0e0; padding: 5px;"> <h3>Local Government Infrastructure and Transportation Research Centre (LoGITReC)</h3> </div> <ul style="list-style-type: none"> • Vision: <ul style="list-style-type: none"> – To be the premier research centre in sub-Saharan Africa delivering technological solutions for the attainment of an efficient and effective local government road transport system • Mission: <ul style="list-style-type: none"> – Through research and innovation, to support the development of a safe, reliable and efficient local government transport system <div style="display: flex; justify-content: space-between; align-items: center; margin-top: 10px;">   </div> | <div style="text-align: center; background-color: #e0e0e0; padding: 5px;"> <h3>Strategic Objectives (1)</h3> </div> <ul style="list-style-type: none"> • Serve the Tanzanian road infrastructure engineering needs, focussing on Local Government roads, through: <ul style="list-style-type: none"> – the development, application and dissemination of new knowledge – the provision of laboratory testing services – opening opportunities for technological development of equipment/tools, and – the development of human capital. • Its goal is to provide practical, innovative, cost-effective R&D based solutions that: <ul style="list-style-type: none"> – address the current and future road infrastructure needs of LGAs; – support sustainable development and asset preservation; and – enhance socio-economic impact. <div style="display: flex; justify-content: space-between; align-items: center; margin-top: 10px;">   </div> |
| <div style="text-align: center; background-color: #e0e0e0; padding: 5px;"> <h3>Strategic Objectives (2)</h3> </div> <ul style="list-style-type: none"> • Provide engineering solutions for the design, construction, maintenance and management of road infrastructure assets, based on basic and applied research, supporting the <u>provision of a sustainable and cost-effective Local Government transport system.</u> • The long-term goal, through the provision of technical support to PO-RALG and LGAs, is to bring all roads under the responsibility of LGAs <u>to a standard that permits traffic to pass throughout the year.</u> <div style="display: flex; justify-content: space-between; align-items: center; margin-top: 10px;">   </div> | <div style="text-align: center; background-color: #e0e0e0; padding: 5px;"> <h3>Institutional Location</h3> </div>  <div style="display: flex; justify-content: space-between; align-items: center; margin-top: 10px;">   </div> |

Present physical location



Present physical location



Future physical location



Scope of current activities

- Establishment of LoGITReC research capacity
- Fast-tracking the physical establishment of LoGITReC in Dodoma, as well as the Information Centre and the Central Road Research Laboratory
- Implementation of a capacity building and skills development programme targeting researchers as well as laboratory staff
- Initiation and implementation of LoGITReC's research agenda to achieve appropriate and implementable research outcomes
- Establishment of technical working groups and committees, as well as strategic relationships and linkages, both nationally and internationally
- Targeted processes to ensure that LoGITReC lives up to its mandate and achieves its KPIs



Key Performance Indicators

From: Strategic Road Research Plan

| Critical Success Factors | Key Performance Indicators | Targets | | | | |
|---|---|----------|----------|---------|---------|---------|
| | | 2014/15 | 2015/16 | 2016/17 | 2017/18 | 2018/19 |
| R&D portfolio efficiency and effectiveness | Compliance with LoGITReC processes | 100% | 100% | 100% | 100% | 100% |
| | % of projects in active development vs. investment projects | 0% | 100% | 100% | 100% | 100% |
| | % of research projects successfully completed | 0 | 2 | 3 | 5 | 9 |
| | % of research projects entered into pre-proposal tender funding | 0 | 0 | 1 | 2 | 4 |
| | Actual of projects supported by Development Partners as % of total | N/A | Report | Report | Report | Report |
| | Research in planned deliverables (%) | N/A | 100% | 100% | 100% | 100% |
| | Portfolio mean research spend per budget (%) | 100% | 100% | 100% | 100% | 100% |
| | Cost savings attributable to R&D | N/A | Report | Report | Report | Report |
| | Researcher satisfaction with research outcomes | N/A | 20% | 25% | 30% | 35% |
| | Researcher administration with research outcomes | N/A | 20% | 25% | 30% | 35% |
| Ensuring effective transfer of technology to practice | % of industrial papers generated | 0 | 1 | 4 | 10 | 14 |
| | % of journal articles published | 0 | 1 | 2 | 3 | 4 |
| | % of research findings, technical assistance programmes | 0 | 1 | 4 | 6 | 6 |
| | % of industry guidelines and manuals published | 0 | 1 | 2 | 3 | 3 |
| | % of research and knowledge published | 0 | 0 | 1 | 2 | 2 |
| Strengthening the skills base of the IRC | % of demonstration projects successfully completed | 0 | 1 | 1 | 5 | 7 |
| | % of Donorships | 1 | 1 | 2 | 2 | 3 |
| | % of staff qualified as researchers | 3 | 5 | 7 | 9 | 11 |
| | % of laboratory technicians in training | 4 | 6 | 6 | 12 | 15 |
| | % of laboratory technicians in regional laboratories | 0 | 20 | 50 | 68 | 100 |
| | % of staff registered as practitioners | 1 | 2 | 3 | 4 | 6 |
| | % of staff studying towards a PhD | 0 | 0 | 1 | 1 | 2 |
| | % of staff studying towards a Masters | 0 | 1 | 1 | 1 | 2 |
| | % of staff studying towards a Bachelor | 0 | 2 | 2 | 4 | 4 |
| | % of staff members of international level centres | 0% | 0% | 0% | 0% | 0% |
| Ensuring good governance | Overall % time spent on capacity building | 100% | 110% | 100% | 100% | 100% |
| | Overall % time spent on capacity building by workshops | 1% | 10% | 20% | 20% | 20% |
| | % of LoGITReC meetings held | 1 | 1 | 2 | 2 | 2 |
| | Compliance with LoGITReC processes | 100% | 100% | 100% | 100% | 100% |
| | Compliance with standards of good governance | 100% | 100% | 100% | 100% | 100% |
| Ensuring good governance | ISO 9000 quality system implementation | initiate | initiate | certify | certify | certify |
| | Adherence to health, safety and environment standards | 100% | 100% | 100% | 100% | 100% |
| | Collaboration with other public entities (e.g. CHS) No. of projects | 2 | 1 | 4 | 4 | 5 |
| | Collaboration with other public entities No. of projects | 0 | 1 | 2 | 1 | 1 |
| | International R&D collaboration No. of MoUs signed | 2 | 1 | 4 | 6 | 6 |

Targets for Year 1
















- Three Steering Committee meetings held
- Two Technical Committee meetings held
- Three researchers employed
- Four laboratory/field technicians employed
- Two research projects under active development
- Two conference papers presented
- Two industry workshops held
- Two Memoranda of Understanding signed for international collaboration on research and development.

























Overview of current progress





















- Road Research Strategic Plan for first five years in operation drafted and endorsed by AfCAP Steering Committee on 30 March 2015
- Capacity Building & Skills Development drafted, containing:
 - A Good Research Practice Guide for LoGITReC researchers
 - A Good Practice Guide for Research Laboratories
 - Job descriptions for LoGITReC staff
- Establishment of the LoGITReC laboratory in Dodoma
 - Laboratory manager supported by five laboratory technicians
 - Laboratory equipped to conduct basic testing with addition equipment to be procured
 - Concept note for skills development & capacity building prepared
- Two research projects under active development
- One conference paper to be presented in Kenya (15-17 March)
- One industry workshop held (low-volume road design manual)



























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|  <p style="text-align: center;">Role and Responsibility of the Technical Committee</p> <p style="text-align: center;">LoGITReC Technical Committee Roads Fund Board Offices 09 March 2016</p> | <div style="background-color: #e1eef6; padding: 5px; text-align: center;">Points of Discussion</div> <ul style="list-style-type: none"> Agreement on Terms of Reference, and relationship with Steering Committee Membership of the Technical Committee Appointment of Chairperson Frequency of Technical Committee meetings   |
| <div style="background-color: #e1eef6; padding: 5px; text-align: center;">Terms of Reference for the Technical Committee</div>   | <div style="background-color: #e1eef6; padding: 5px; text-align: center;">Purpose of Technical Committee</div> <ul style="list-style-type: none"> Provide technical guidance and direction to LoGITReC Advise the Steering Committee on nature and scope of RDI activities that will be or are being undertaken in the road infrastructure engineering domain Seek endorsement from Steering Committee for implementation of Road Research Strategic Plan   |
| <div style="background-color: #e1eef6; padding: 5px; text-align: center;">Role & Responsibilities (Technical Committee)</div> <ul style="list-style-type: none"> Advise on Research, Development and Implementation (RDI) needs and priorities Assist with technology foresight studies Advise on strategic plans and research portfolio plans for the RDI programme Assist with project portfolio analysis Assist in review of research proposals in line with the strategy Assist in the review of outputs and outcomes of RDI projects Assist in assessing the impact of RDI activities   | <div style="background-color: #e1eef6; padding: 5px; text-align: center;">Role & Responsibilities (Steering Committee)</div> <ul style="list-style-type: none"> Steer establishment and operations of LoGITReC and assess the adoption of 'good governance' principles Endorsement of priority research, development and implementation projects recommended by the TC and identify and/or endorse allocation of funding to projects Support appointment of project champions and teams; Provide overarching project management and output quality reviews Monitor dissemination of research output, transfer of technology, best practices and implementation of outcomes for effectiveness Make periodic reviews/assessments of the establishment and operation of LoGITReC with a view of potential migration to a research centre covering all classes of roads, and in the long term becoming a Road and Transport Research Centre.   |
| <div style="background-color: #e1eef6; padding: 5px; text-align: center;">Composition of the Technical Committee</div>   | <div style="background-color: #e1eef6; padding: 5px; text-align: center;">Composition of Technical Committee</div> <ul style="list-style-type: none"> Technical experts from MoW, MoT, RFB, PO-RALG, TANROADS, TANROADS-CML Tanzania Transportation T² Centre SUMATRA (research unit) ALGETA Engineers Registration Board of Tanzania (Research Unit) Contractors Registration Board (R&D Unit) Association of Consulting Engineers of Tanzania (ACET) Tanzania Civil Engineering Contractor Association (TACECA) Higher Learning (Univ. of Dar es Salaam; Mbeya Univ. of S&T; Dar es Salaam Inst. of S&T) Development Partners (on invitation)   |

























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| <p style="text-align: center;">Chairperson & Secretary of the Technical Committee</p>    | <p style="text-align: center;">Chairperson & Secretary</p> <ul style="list-style-type: none"> • Proposal: <ul style="list-style-type: none"> – Chairperson: Head of LoGITReC – Secretary: Representative of ALGETA    |
| <p style="text-align: center;">Chairperson & Secretary</p> <ul style="list-style-type: none"> • Approved by Technical Committee: <ul style="list-style-type: none"> – Chairperson: Eng. Kunyaranyara, E – Secretary: Head of LoGITReC    | <p style="text-align: center;">Frequency of Technical Committee Meeting</p>    |
| <p style="text-align: center;">Frequency of Meetings</p> <ul style="list-style-type: none"> • Proposal: <ul style="list-style-type: none"> – Four meetings per annum (one meeting/quarter)    | |
| <p style="text-align: center;">  Prioritised Research Needs LoGITReC Technical Committee Roads Fund Board Offices 09 March 2016 </p>    | <p style="text-align: center;">Outline</p> <ul style="list-style-type: none"> • Road research priorities identified in Strategic Research Plan • Ongoing research projects and new projects to be initiated in 2016 • Overview of projects planned for Mozambique • Additional research needs    |

























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| <div data-bbox="268 277 767 371" style="background-color: #d9e1f2; padding: 10px; text-align: center;"> <h3>Priority Projects</h3> <p>(as per LoGITReC Strategic Research Plan)</p> </div> <div data-bbox="245 521 288 566" style="text-align: center;"></div> <div data-bbox="641 533 782 568" style="text-align: center;"></div> | <div data-bbox="852 165 1326 232" style="background-color: #d9e1f2; padding: 10px; text-align: center;"> <h3>Four Project Categories</h3> </div> <ul style="list-style-type: none"> • High priority, 'quick win' short-term projects: <ul style="list-style-type: none"> – "breakthrough projects" addressing most pressing needs in a fairly short time span (~12 months) – potential for yielding high impact and demonstrating value of LoGITReC to stakeholders • high priority medium to longer-term projects: <ul style="list-style-type: none"> – similar high impact, yielding similar benefits • Cross-cutting yet high priority activities: <ul style="list-style-type: none"> – Developed/implemented in parallel with above • Technical Assistance for establishment of LoGITReC <div data-bbox="831 510 874 555" style="text-align: center;"></div> <div data-bbox="1203 517 1343 553" style="text-align: center;"></div> |
| <div data-bbox="268 613 767 680" style="background-color: #d9e1f2; padding: 10px; text-align: center;"> <h3>1: High Priority, 'Quick Win' Short-Term Projects (12 months)</h3> </div> <ul style="list-style-type: none"> • Development and implementation of design methods for low-volume roads • Road trials, demonstrations and monitoring • Review of gravel road maintenance manuals and procedures • Optimisation of delivery methods for the maintenance of local government roads • Guidelines for design and construction of stone arch and timber bridges <div data-bbox="245 969 288 1014" style="text-align: center;"></div> <div data-bbox="641 981 782 1016" style="text-align: center;"></div> | <div data-bbox="852 613 1326 680" style="background-color: #d9e1f2; padding: 10px; text-align: center;"> <h3>2: High Priority Medium to Longer-Term Projects</h3> </div> <ul style="list-style-type: none"> • Road asset inventory condition and data • National road material and aggregate inventory and database • Guidelines for the use of block paving for roads and footways • Review of existing standards and specifications for rural roads • Use of local and alternative materials in roads <div data-bbox="831 947 874 992" style="text-align: center;"></div> <div data-bbox="1203 965 1343 1001" style="text-align: center;"></div> |
| <div data-bbox="268 1061 767 1128" style="background-color: #d9e1f2; padding: 10px; text-align: center;"> <h3>3: Cross-Cutting yet High Priority Activities</h3> </div> <ul style="list-style-type: none"> • Climate resilience • Cost-benefit studies <div data-bbox="245 1417 288 1462" style="text-align: center;"></div> <div data-bbox="641 1429 782 1464" style="text-align: center;"></div> | <div data-bbox="852 1061 1326 1128" style="background-color: #d9e1f2; padding: 10px; text-align: center;"> <h3>Priority Projects</h3> </div> <ul style="list-style-type: none"> • Full project proposals provided in Road Research Strategic Plan for all 12 priority projects • Structure of proposals <ul style="list-style-type: none"> – Background – Problem statement – Project objectives – Expected benefits – Methodology – Deliverables – Implementation of findings – Project plan (Gantt chart, project costs & project team) <div data-bbox="831 1395 874 1440" style="text-align: center;"></div> <div data-bbox="1203 1413 1343 1449" style="text-align: center;"></div> |
| <div data-bbox="268 1509 767 1576" style="background-color: #d9e1f2; padding: 10px; text-align: center;"> <h3>1: High Priority, 'Quick Win' Short-Term Projects (12 months)</h3> </div> <ul style="list-style-type: none"> • Development and implementation of design methods for low-volume roads • Road trials, demonstrations and monitoring • Review of gravel road maintenance manuals and procedures • Optimisation of delivery methods for the maintenance of local government roads • Guidelines for design and construction of stone arch and timber bridges <div data-bbox="245 1865 288 1910" style="text-align: center;"></div> <div data-bbox="641 1877 782 1912" style="text-align: center;"></div> | <div data-bbox="852 1509 1326 1576" style="background-color: #d9e1f2; padding: 10px; text-align: center;"> <h3>1: High Priority, 'Quick Win' Short-Term Projects (12 months)</h3> </div> <ul style="list-style-type: none"> • Development and implementation of design methods for low-volume roads • Road trials, demonstrations and monitoring • Review of gravel road maintenance manuals and procedures • Optimisation of delivery methods for the maintenance of local government roads • Guidelines for design and construction of stone arch and timber bridges <div data-bbox="831 1843 874 1888" style="text-align: center;"></div> <div data-bbox="1203 1861 1343 1897" style="text-align: center;"></div> |



















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| <p>Development and implementation of design methods for low-volume roads*</p> <ul style="list-style-type: none"> • Objectives <ul style="list-style-type: none"> – Finalisation of the design manual and embedding the manual as an integral part of the low-volume road pavement engineering practice in Tanzania • Methodology <ul style="list-style-type: none"> – Finalise the manual – Incorporate the technology into a number of experimental/demonstration sections – Promote the use of the technology – Prepare summary reports and recommendations for improving the manual    | <p>Development and implementation of design methods for low-volume roads*</p> <ul style="list-style-type: none"> • Expected benefits <ul style="list-style-type: none"> – Improved understanding of fundamentals of low-volume road design and performance – Development of a more cost-effective road network – Greater use of local materials – Simplified site investigations and material testing procedures • Duration and resource inputs <ul style="list-style-type: none"> – 12 Months – 285 man-days for researchers – Estimated cost: USD 110,000    |
| <p>1: High Priority, 'Quick Win' Short-Term Projects (12 months)</p> <ul style="list-style-type: none"> • Development and implementation of design methods for low-volume roads • Road trials, demonstrations and monitoring • Review of gravel road maintenance manuals and procedures • Optimisation of delivery methods for the maintenance of local government roads • Guidelines for design and construction of stone arch and timber bridges    | <p>Road trials, demonstrations and monitoring*</p> <ul style="list-style-type: none"> • Objectives <ul style="list-style-type: none"> – Assessment of outcomes of existing road trials in Bagamoyo and Siha Districts – Continued monitoring of existing road trials – Establishment of new road trials • Methodology <ul style="list-style-type: none"> – Review of existing trial, demonstration sections – Development of guidelines/protocol for establishing and monitoring trial sections – Establishment of new trials and ongoing monitoring    |
| <p>Road trials, demonstrations and monitoring*</p> <ul style="list-style-type: none"> • Expected benefits <ul style="list-style-type: none"> – Development of basic knowledge on the behaviour and performance of pavements subjected to traffic and the environment – Lead to development of new specifications for innovative material use or construction methods – Ability to assess cost-effectiveness of solutions • Duration and resource inputs <ul style="list-style-type: none"> – 12 Months (excluding LTPP assessments – 4 yrs) – 475 man-days for researchers – Estimated cost: USD 130,000    | <p>1: High Priority, 'Quick Win' Short-Term Projects (12 months)</p> <ul style="list-style-type: none"> • Development and implementation of design methods for low-volume roads • Road trials, demonstrations and monitoring • Review of gravel road maintenance manuals and procedures • Optimisation of delivery methods for the maintenance of local government roads • Guidelines for design and construction of stone arch and timber bridges    |
| <p>Review of gravel road maintenance manuals and procedures</p> <ul style="list-style-type: none"> • Objectives <ul style="list-style-type: none"> – produce an improved manual that will be used as a standard for unpaved low volume road construction and maintenance in Tanzania • Methodology <ul style="list-style-type: none"> – Technical review of existing manuals (incl. international) – Undertake assessment of road maintenance practices – Prepare draft manual – Hold regional workshops – Prepare final manual and publish    | <p>Review of gravel road maintenance manuals and procedures</p> <ul style="list-style-type: none"> • Expected benefits <ul style="list-style-type: none"> – Introduction of timely maintenance programmes will lead to better performing unpaved roads, increase the cost-effectiveness of operations, and result in environmental and sustainability benefits – Better performing gravel roads will reduce road user costs and improve mobility and accessibility • Duration and resource inputs <ul style="list-style-type: none"> – 18 Months – 335 man-days for researchers – Estimated cost: USD 98,000    |

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| <p>1: High Priority, 'Quick Win' Short-Term Projects (12 months)</p> <ul style="list-style-type: none"> • Development and implementation of design methods for low-volume roads • Road trials, demonstrations and monitoring • Review of gravel road maintenance manuals and procedures • Optimisation of delivery methods for the maintenance of local government roads • Guidelines for design and construction of stone arch and timber bridges    | <p>Optimisation of delivery methods for the maintenance of local government roads*</p> <ul style="list-style-type: none"> • Objectives <ul style="list-style-type: none"> – Monitor the implementation of the various types of maintenance delivery methods to determine which are the most efficient and cost-effective • Methodology <ul style="list-style-type: none"> – Review work already completed (2010-2013) – Identify candidate road maintenance projects – Prepare tender documents for projects and adjudicate and award tenders – Monitor contractors' performance and road conditions – Carry out a review of stakeholders perceptions – Report and workshop    |
| <p>Optimisation of delivery methods for the maintenance of local government roads*</p> <ul style="list-style-type: none"> • Expected benefits <ul style="list-style-type: none"> – more efficient maintenance procurement system – the wider use of small labour-based contractors (provision of employment and social upliftment) – ensure regular routine maintenance of a high standard with a concomitant improvement in the rural/tertiary road quality and accessibility • Duration and resource inputs <ul style="list-style-type: none"> – 12 Months – 353 man-days for researchers – Estimated cost: USD 120,000    | <p>1: High Priority, 'Quick Win' Short-Term Projects (12 months)</p> <ul style="list-style-type: none"> • Development and implementation of design methods for low-volume roads • Road trials, demonstrations and monitoring • Review of gravel road maintenance manuals and procedures • Optimisation of delivery methods for the maintenance of local government roads • Guidelines for design and construction of stone arch and timber bridges    |
| <p>Guidelines for design and construction of stone arch and timber bridges*</p> <ul style="list-style-type: none"> • Objectives <ul style="list-style-type: none"> – Produce guidelines that will assist district engineers to design and supervise the construction of stone arch and timber bridges while also assisting technologist and artisan on the proper procedures for constructing stone arch and timber bridges • Methodology <ul style="list-style-type: none"> – Carry out a technical review of regional/international practices – Undertake an assessment of current practices in Tanzania – Prepare draft manual – Hold a major workshop – Prepare final manual    | <p>Guidelines for design and construction of stone arch and timber bridges*</p> <ul style="list-style-type: none"> • Expected benefits <ul style="list-style-type: none"> – Generation of more semi-skilled workers and employment creation – The development of local small-contractors with minimal outlay required on plant and equipment – Use of local materials and reduced reliance on industrial materials such as steel girders and plates, reinforcement bars, cement, and crushed aggregate that have to be imported at high cost – Ability to carry out rapid and effective repairs of localised failed areas by re-using the stones with minimum skill requirements • Duration and resource inputs <ul style="list-style-type: none"> – 18 Months – 250 man-days for researchers – Estimated cost: USD 118,000    |
| <p>2: High Priority Medium to Longer-Term Projects</p> <ul style="list-style-type: none"> • Road asset inventory condition and data • National road material and aggregate inventory and database • Guidelines for the use of block paving for roads and footways • Review of existing standards and specifications for rural roads • Use of local and alternative materials in roads    | <p>2: High Priority Medium to Longer-Term Projects</p> <ul style="list-style-type: none"> • Road asset inventory condition and data • National road material and aggregate inventory and database • Guidelines for the use of block paving for roads and footways • Review of existing standards and specifications for rural roads • Use of local and alternative materials in roads    |

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| <p style="text-align: center;">Road asset inventory and data</p> <ul style="list-style-type: none"> • Objectives <ul style="list-style-type: none"> – improve the consistency of subjective visual assessments – identify appropriate objective surveillance equipment suitable for use in Tanzania • Methodology <ul style="list-style-type: none"> – Carry out a technical review of local/international practice – Undertake an assessment of the findings – Prepare a draft visual assessment manual – Hold a workshop – Prepare final manual    | <p style="text-align: center;">Road asset inventory condition and data</p> <ul style="list-style-type: none"> • Expected benefits – improved: <ul style="list-style-type: none"> – Characterisation and monitoring of the road assets – Data quality and consistency, using quality standards based on international best practices – Standardisation of asset condition assessment methods and improved ability to compare data sets objectively – Data reporting – Access to the use of new technologies for testing, monitoring and data collection, providing a major benefit to the management of road assets – Data quality and consistency, which together with more convenient analysis and reporting tools will result in better management decisions • Duration and resource inputs <ul style="list-style-type: none"> – 12 Months – 280 man-days for researchers – Estimated cost: USD 94,000    |
| <p style="text-align: center;">2: High Priority Medium to Longer-Term Projects</p> <ul style="list-style-type: none"> • Road asset inventory condition and data • National road material and aggregate inventory and database • Guidelines for the use of block paving for roads and footways • Review of existing standards and specifications for rural roads • Use of local and alternative materials in roads    | <p style="text-align: center;">National road material and aggregate inventory and database*</p> <ul style="list-style-type: none"> • Objectives <ul style="list-style-type: none"> – to extend the current database of potential material resources and to develop GIS maps to include these as well as additional resources, including marginal materials that have been used successfully or have the potential to be used in road construction • Methodology <ul style="list-style-type: none"> – Survey to capture stakeholder information needs – Review available material databases – Examination of existing and development of new sourcing techniques – Trial sourcing techniques (in one or more Regions) and improve – Map and sample entire Region(s), and assess material properties – Prepare manual/guideline on use of the system/database    |
| <p style="text-align: center;">National road material and aggregate inventory and database*</p> <ul style="list-style-type: none"> • Expected benefits <ul style="list-style-type: none"> – Design of new and rehabilitated roads making use of identified materials which can provide the optimum design based on the best local materials available – Time normally required to locate materials will be reduced – Analysis of the data collected will assist in establishing correlations between material properties and performance, as well as to establish project material costs – Development of material sourcing technologies and methods – Integration of GIS database in Road Asset Management System • Duration and resource inputs <ul style="list-style-type: none"> – 30 Months – 460 man-days for researchers – Estimated cost: USD 130,000    | <p style="text-align: center;">2: High Priority Medium to Longer-Term Projects</p> <ul style="list-style-type: none"> • Road asset inventory condition and data • National road material and aggregate inventory and database • Guidelines for the use of block paving for roads and footways • Review of existing standards and specifications for rural roads • Use of local and alternative materials in roads    |
| <p style="text-align: center;">Guidelines for the use of block paving for roads and footways</p> <ul style="list-style-type: none"> • Objectives <ul style="list-style-type: none"> – Produce a manual that will be used as a standard for the construction of roads and footways using block paving in its widest sense (i.e. including setts, cobble stones, etc.) • Methodology <ul style="list-style-type: none"> – Carry out a local/international technical review – Undertake an assessment of current practice – Prepare a draft manual – Hold a major workshop – Prepare final manual    | <p style="text-align: center;">Guidelines for the use of block paving for roads and footways</p> <ul style="list-style-type: none"> • Expected benefits <ul style="list-style-type: none"> – Generation of more semi-skilled workers and significant employment creation – Development of small-contractors with minimal outlay required on plant and equipment – Use of more local materials and a reduced reliance on high foreign exchange commodities such as bitumen – Ability to carry out rapid and effective repairs of localised failed areas re-using the blocks already in the road – Less expenditure on deviations during the construction of roads using block paving, by constructing in half-widths – They are especially effective in urban areas (e.g. large intersections, footways, parking areas at hospitals, schools, colleges, etc.) • Duration and resource inputs <ul style="list-style-type: none"> – 12 Months – 250 man-days for researchers – Estimated cost: USD 114,000    |

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| <p>2: High Priority Medium to Longer-Term Projects</p> <ul style="list-style-type: none"> Road asset inventory condition and data National road material and aggregate inventory and database Guidelines for the use of block paving for roads and footways Review of existing standards and specifications for rural roads Use of local and alternative materials in roads    | <p>Review of existing standards and specifications for rural roads</p> <ul style="list-style-type: none"> Objectives <ul style="list-style-type: none"> Review the currently used Standard Specifications and identify their shortcomings for the entire road network in Tanzania Address shortcomings and problems in a revised Specification that has buy-in from all stakeholders Methodology <ul style="list-style-type: none"> Critical review of existing standard specifications, including a review of contractual claims to identify gaps Draft a revised Table of Contents including those areas that require additions, circulate to a committee of stakeholders for comment and to ensure completeness, and hold major workshop Compile draft revised Standard Specifications using latest standards and techniques, circulate for comment and hold 2nd workshop Finalise the Standard Specification incorporating feedback from the workshop for implementation by practitioners    |
| <p>Review of existing standards and specifications for rural roads</p> <ul style="list-style-type: none"> Expected benefits <ul style="list-style-type: none"> Nearly all countries have their own standard specification for road construction indicating the importance of having a document relating specifically to the conditions in the country Without a unique document of its own, it opens avenues for a greater number of claims and time and cost overruns resulting from ambiguities, poor clarification of certain issues and an ever more vigilant contracting community who tender low and make up the profits from claims All roads will be constructed to the same relevant standards and all Contractors will understand their commitments at the time of tender Duration and resource inputs <ul style="list-style-type: none"> 18 Months 295 man-days for researchers Estimated cost: USD 97,000    | <p>2: High Priority Medium to Longer-Term Projects</p> <ul style="list-style-type: none"> Road asset inventory condition and data National road material and aggregate inventory and database Guidelines for the use of block paving for roads and footways Review of existing standards and specifications for rural roads Use of local and alternative materials in roads    |
| <p>Use of local and alternative materials in roads*</p> <ul style="list-style-type: none"> Objectives <ul style="list-style-type: none"> Identify local and alternative materials that can potentially be used for paved/unpaved road construction, improve their properties through laboratory and field studies, and where necessary develop appropriate specifications for their use Investigate alternative materials such as sisal fibres, molasses, natural pozzolan, granulated blast furnace slag, fly ash, etc Methodology <ul style="list-style-type: none"> Literature study on local/international practices Assess results of all experiments carried out to date Identify alternative materials that would warrant further investigation, and conduct studies Develop preliminary specifications Construct full-scale demonstration sections Assess results and develop final specifications    | <p>Use of local and alternative materials in roads*</p> <ul style="list-style-type: none"> Expected benefits <ul style="list-style-type: none"> Ability to use marginal/alternative materials not traditionally used for road construction, potentially resulting in: <ul style="list-style-type: none"> lower construction costs environmental and sustainability benefits reduced vehicle operating costs through a better road network riding quality, reduced accidents and improved mobility and access Duration and resource inputs <ul style="list-style-type: none"> 36 Months 900 man-days for researchers Estimated cost: USD 391,000    |
| <p>3: Cross-Cutting yet High Priority Activities</p> <ul style="list-style-type: none"> Climate resilience Cost-benefit studies    | <p>3: Cross-Cutting yet High Priority Activities</p> <ul style="list-style-type: none"> Climate resilience Cost-benefit studies    |

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| <h3 style="text-align: center;">Climate resilience</h3> <ul style="list-style-type: none"> • Objectives <ul style="list-style-type: none"> – Develop and initiate the implementation of a climate resilience strategy for district roads, as well as associated action plans, guidelines and manuals, for: <ul style="list-style-type: none"> • Assessing the vulnerability of road pavements to adverse climate effects (i.e. quantifying the risk profile) • Identifying and prioritising adaptation measures for road infrastructure that could be implemented immediately or phased in over time, so as to avert the negative consequences of adverse climate effects on the serviceability of Local Government road networks • Methodology <ul style="list-style-type: none"> – Develop/implement a methodology to assess network vulnerability and risk – Draft climate adaptation strategies and plans – Use the IRAT Programme as a demonstration project – Production of design and maintenance guidelines for climate resilient roads and structures    | <h3 style="text-align: center;">Climate resilience</h3> <ul style="list-style-type: none"> • Expected benefits <ul style="list-style-type: none"> – implementation of a climate resilience and adaptation strategy, with accompanying vulnerability maps, guidelines and manuals, will increase the adaptive capacity of PO-RALG and LGAs, and reduce the sensitivity of district road infrastructure assets to abnormal climate events and their effects (long term) • Duration and resource inputs <ul style="list-style-type: none"> – 36 Months – 1,595 man-days for researchers – Estimated cost: USD 1 million    |
| <h3 style="text-align: center;">3: Cross-Cutting yet High Priority Activities</h3> <ul style="list-style-type: none"> • Climate resilience • Cost-benefit studies    | <h3 style="text-align: center;">Cost-benefit studies</h3> <ul style="list-style-type: none"> • Objectives <ul style="list-style-type: none"> – Develop a data base of typical costs of activities related to unpaved and paved road operations, including construction costs, maintenance costs and typical road user costs prevailing in Tanzania – Develop a manual and software to determine the cost-benefits of different road alternatives • Methodology <ul style="list-style-type: none"> – Carry out a review of current practice – Collect local data and develop database – Prepare draft manual and software – Hold training courses in the use of the manual/software – Prepare final manual and software    |
| <h3 style="text-align: center;">Cost-benefit studies</h3> <ul style="list-style-type: none"> • Expected benefits <ul style="list-style-type: none"> – Ability to carry out cost-benefit analyses will allow decision-making regarding whether, for instance, to upgrade an unpaved road to a paved standard to be made on a scientific and economic basis. Such justifications can have a major impact on influencing the decisions made by politicians and managers in the road sector. • Duration and resource inputs <ul style="list-style-type: none"> – 12 Months – 255 man-days for researchers – Estimated cost: USD 85,000    | <h3 style="text-align: center;">Outline</h3> <ul style="list-style-type: none"> • Road research priorities identified in Strategic Research Plan • Ongoing research projects and projects to be initiated in 2016 • Overview of projects planned for Mozambique • Additional research needs    |
| <h3 style="text-align: center;">1: High Priority, ‘Quick Win’ Short-Term Projects (12 months)</h3> <ul style="list-style-type: none"> • Development and implementation of design methods for low-volume roads • Road trials, demonstrations and monitoring • Review of gravel road maintenance manuals and procedures • Optimisation of delivery methods for the maintenance of local government roads • Guidelines for design and construction of stone arch and timber bridges    | <h3 style="text-align: center;">2: High Priority Medium to Longer-Term Projects</h3> <ul style="list-style-type: none"> • Road asset inventory condition and data • National road material and aggregate inventory and database • Guidelines for the use of block paving for roads and footways • Review of existing standards and specifications for rural roads • Use of local and alternative materials in roads    |

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| <p style="text-align: center;">Current Status</p> <ul style="list-style-type: none"> • Concept Notes have been prepared for the following: <ul style="list-style-type: none"> – Continued Monitoring of Existing Road Trials and Establishment of New Road Trials – National Road Material and Aggregate Inventory Database • Concept Notes are being prepared for the other four projects    | <p style="text-align: center;">Outline</p> <ul style="list-style-type: none"> • Road research priorities identified in Strategic Research Plan • Ongoing research projects and new projects to be initiated in 2016 • Overview of projects planned for Mozambique • Additional research needs    |
| <p style="text-align: center;">Mozambican RRC: High-Gain Priority Research Projects</p> <ul style="list-style-type: none"> • Mapping of natural materials for road construction and development of a database • Use of local materials in roads • Protocols for improving the proficiency of material testing laboratories • Protocols and database for systematic collection and recording of data generated during implementation of road projects • Characterisation of road assets • Guidelines for the design of small bridges    | <p style="text-align: center;">Mozambican RRC: Other Priority Research Projects</p> <ul style="list-style-type: none"> • Analysis of the effects of traffic overloading on pavement performance • Implementation of a national/regional strategy for vehicle overloading control • Standard specification for roads • Construction of pilot projects identified in the study on the Use of Road Works to Enhance Community Water Supplies in Mozambique • Manuals for roads    |
| <p style="text-align: center;">Mozambican RRC: Projects to be initiated in Year 1</p> <ul style="list-style-type: none"> • Finalisation of the development of a Mozambican Design Manual for Low-Volume Roads • Mapping of natural materials that can be in road construction and development of a database • Use of local materials in roads • Extend the period for monitoring of trial sections established during AfCAP1 • Protocols for improving the proficiency of material testing laboratories • Construction of pilot projects identified in the study on the Use of Road Works to Enhance Community Water Supplies in Mozambique    | <p style="text-align: center;">Outline</p> <ul style="list-style-type: none"> • Road research priorities identified in Strategic Research Plan • Ongoing research projects and new projects to be initiated in 2016 • Overview of projects planned for Mozambique • Additional research needs    |

Annex C: Minutes of the LoGITReC Steering Committee Meeting

MINUTES OF LoGITReC STEERING COMMITTEE HELD ON 11th MARCH 2016 IN THE ROADS FUND BOARD CONFERENCE ROOM.

1.0 ATTENDANCE:

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| Eng. Hagai K.S. Bishanga | - | Member | - | TANT2 |
| Kimaro Moses | - | Member | - | ALAT |
| Eng. Hamidu Mataka | - | Invitee | - | PORALG |
| Vincent Lwanda | - | Invitee | - | PORALG |
| Nancy Nyenga | - | Member | - | NEMC |
| Dr. Hannibal Bwire | - | Member | - | UDSM |
| Flavia Manyanga | - | Invitee | - | JICA |
| Nobuyuki Kobe | - | Invitee | - | JICA |
| Benoit Verhaeghe | - | TA | - | CSIR |
| Eng. Dr. Fikiri Magafu | - | Member | - | PORALG |
| Dr. Et hel Kasembe | - | Member | - | NIT |

2.0 ABSENTEES:

Ministry of Works, Transportation and Communication

- Works Sector - Without apology
- Transportation Sector - Without apology

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| Roads Fund Board | - | Without apology |
| TANROADS | - | Without apology |
| COSTECH | - | Without apology |

3.0 AGENDA

1. Welcome and Apologies
2. Consolidated Overview of LoGITReC: Value proposition
3. Role and Responsibilities of the Steering Committee (SC)
 - 3.1 Agreement on Terms of Reference, and relationship with Technical Committee
 - 3.2 Membership of the SC
 - 3.3 Appointment of Chairperson for the SC
 - 3.4 Frequency of SC Meetings
4. Research Priorities
 - 4.1 Process Followed for Identification of Research Needs
 - 4.2 Projects to be Initiated in 2016
 - 4.3 Research Priorities: Recommendations of the TC
 - 4.4 Research Priorities: Endorsement by the SC
 - 4.5 Way Forward with respect to Research Priorities

5. Establishment of LoGITReC
 - 5.1 Vision, Mission, Goals and Strategic Objectives
 - 5.2 Physical Location of LoGITReC (present and future)
 - 5.3 Resourcing LoGITReC
 - 5.4 Funding of Research
 - 5.5 Strategic Relationships and Linkages
 - 5.6 Knowledge Transfer
6. Any Other Business
7. Date of Next Meeting
8. Closure

4.0 OPENING OF THE MEETING

The meeting was officially opened at 09:15 by the Head of LoGITReC who was host of the meeting on behalf of The Director of Infrastructure Development of PO-RALG. Unfortunately there were no official apologies for members who did not attend the meeting although it was known that several meetings were going on in various venues within Dar es Salaam involving people from the same institutions invited also to attend this meeting.

In his opening remarks, the head of LoGITReC welcomed participants to the meeting reminding them that Two days ago another committee related to LoGITReC known as LoGITReC Technical Committee was conducted to discuss technical issues that have been brought to this meeting for scrutiny and endorsement. He therefore asked member to get fully involved with the meeting in order to make good judgement during scrutiny and endorsement of Technical committee proposals.

5.0 MEETING METHODOLOGY

The meeting was conducted through presentations and discussions.

6.0 CONSOLIDATED OVERVIEW OF LOGITREC: VALUE PROPOSITION

This agenda was presented by the Technical Assistant (TA) from CSIR. The presenter ensured participants that once established and fully operational, LoGITReC will add value through the provision of:

- a multidisciplinary skills and expertise base in infrastructure engineering and transportation
- core competences for developing and/or updating guidelines, norms and standards applicable to Local Government infrastructure and transportation, and for developing key solutions and products
- Access to Science, Engineering and Technology (SET) infrastructure including materials testing laboratories, with the Central Materials Research Laboratory (CMRL) based in Dodoma acting as a reference laboratory for the regional laboratories, and several technology and software platforms that allow for technical support to industry and advanced research

- An information centre that would be a repository for, inter alia, text books, local and international conference proceedings and journals, research reports, technical guidelines, norms and standards; and
- Capabilities for developing solutions and products aimed at solving Local Government infrastructure and transportation related problems in support of national policies and strategies, including those associated with public service delivery and socio-economic growth and development, thus leading to social impact and public good.

Members adopted the presentation and appreciated its content.

7.0 ROLE AND RESPONSIBILITIES OF THE STEERING COMMITTEE (SC)

This agenda was presented by the head of LoGITReC covering the following;

- Agreement on Terms of Reference, and relationship with Technical Committee
- Membership of the Steering Committee
- Appointment of Chairperson
- Frequency of Steering Committee meetings

Regarding Agreement on terms of Reference and relationship with technical Committee, it was explained that the purpose of Steering committee is to provide overarching strategic oversight of LoGITReC and that the following shall apply to all proposed projects as Terms of Reference:

- Projects must address an identified need
- Projects must improve on the current status quo
- Projects must be recommended by the Technical Committee and endorsed by the Steering Committee
- Ideally, all projects should be executed by local researchers/experts (i.e. LoGITReC staff in association with TANROADS-CML, universities, etc.)
- Projects can incorporate an element of capacity building / skills transfer
 - On most projects, provision has been made for the appointment of an external service provider
 - Role of service provider is not to execute the project but rather to coach and mentor researchers
- All projects must have distinct deliverables and an implementation/dissemination plan

While outlining the Relationship with Technical Committee, the presenter explained that LoGITReC SC will be advised by the Technical Committee on nature and scope of Research, Development and Implementation (RDI) activities planned or being undertaken in the road infrastructure and transportation domain and that, it will endorse implementation of Research Strategic Plan based on recommendations made by the Technical Committee.

Concerning roles and responsibilities of LoGITReC SC, the following were outlined;

- Steer establishment and operations of LoGITReC and assess the adoption of 'good governance' principles
- Endorsement of priority research, development and implementation projects recommended by the Technical Committee and identify and/or endorse allocation of funding to projects
- Support appointment of project champions and teams
- Provide overarching project management and output quality reviews
- Monitor dissemination of research output, transfer of technology, best practices and implementation of outcomes for effectiveness
- Make periodic reviews/assessments of the establishment and operation of LoGITReC with a view of potential migration to a research centre covering all classes of roads, and in the long term becoming a Road and Transport Research Centre.

The proposal for Chairperson and Secretary and Frequency of Steering Committee meetings were also presented to members for discussion.

Responding to the presentation, members accepted the terms of reference laid down for the projects. They also appointed Mr. Joseph Haule (Roads Fund Board Manager) to be the chairman and Eng. Elina Kayanda (Director of Infrastructure Development in PO-RALG) to be Secretary of the committee. About meeting frequency, Members decided that technical committee pattern should be followed for easy communication of the two committee proceedings.

8.0 RESEARCH PRIORITIES

This agenda was also presented by the head of LoGITReC and covered the following;

- Process followed for identification of research needs
- Projects to be initiated in 2016
- Research priorities:
 - Recommendations of the Technical Committee
 - Endorsement by the Steering Committee
- Way forward

The presentation started by outlining Process followed for identification of research needs in which the following were presented;

- Meetings held with key stakeholders including all major Government Ministries, Agencies, Commissions, Authorities and Institutions during 2013-2014. The meetings provided the following views and recommendations on research needs:
 - Unanimous support for establishing a research centre
 - Tanzania would benefit from the implementation of a coordinated and prioritised road research programme aimed at achieving 'more for less' in terms of construction and maintenance

- In the short term, a research programme should preferably be aimed at the implementation of existing knowledge and experience
- There is an acute need for appropriate and well maintained data - to be used for analysis and research
- Review of outcomes of AFCAP-supported surfacing demonstrations and trials in Bagamoyo and Siha Districts
- Scoping studies for 5 strategic research programmes covering:
 - Road trials, demonstrations and monitoring
 - Road asset inventory, condition and data
 - National road material and aggregates database and inventory
 - Climate resilience
 - Urban congestion
- Initiate cost/benefit studies (e.g. life-cycle analysis of gravelling verses low-volume seals)
- Embedment of new AFCAP low-volume road design manuals

The presentation outlined twelve Projects to be initiated in 2016 under three categories as follows:

- High priority, 'quick win' short-term projects (5 projects):
These are "breakthrough projects" addressing most pressing needs in a fairly short time span (~12 months). These projects are potential for yielding high impact and demonstrating value of LoGITReC to stakeholders.
- High priority medium to longer-term projects: These are similar high impact, yielding similar benefits (5 projects).
- Cross-cutting yet high priority activities: Developed/implemented in parallel with above. (2 projects);

Regarding High priority, 'quick win' short-term, the following projects were outlined:

- i. Development and implementation of design methods for low-volume roads
- ii. Road trials, demonstrations and monitoring
- iii. Review of gravel road maintenance manuals and procedures
- iv. Optimization of delivery methods for the maintenance of local government roads
- v. Guidelines for design and construction of stone arch and timber bridges

About High priority medium to longer-term projects: Similar high impacts, yielding similar benefits, these projects were outlined:

- i. Road asset inventory condition and data
- ii. National road material and aggregate inventory and database
- iii. Guidelines for the use of block paving for roads and footways

- iv. Review of existing standards and specifications for rural roads
- v. Use of local and alternative materials in roads

The Cross-cutting yet high priority activities: Developed/implemented in parallel with above, contain the following projects;

- i. Climate resilience
- ii. Cost-benefit studies

The presentation also outlined Way Forward with respect to Research Priorities as hereunder;

- AfCAP Concept Notes have been prepared for the following two projects:
 - Continued Monitoring of Existing Road Trials and Establishment of New Road Trials
 - National Road Material and Aggregate Inventory Database
- AfCAP Concept Notes are being prepared for the other four projects
- Critical actions:
 - Establishment of sufficient/appropriate research capacity to implement the research plan
 - Allocation of financial resources to support the execution of the research agenda

Members adopted the agenda, discussed the projects and recommended endorsement of all 12 prioritised projects with two proposed additional projects namely:

- Efficacy of Soil Stabilisers (road trials)
- Enhancement of Urban Transport in Emerging Cities (congestion relief)

9.0 ESTABLISHMENT OF LOGITREC

This agenda was presented by the Head of LoGITReC. The presentation covered

- Vision, Mission, Goals and Strategic Objectives
- Physical Location of LoGITReC (present and future)
- Resourcing LoGITReC
- Funding of Research
- Strategic Relationships and Linkages
- Knowledge Transfer

The presenter pointed out that the Vision of LoGITReC is **to be the premier research centre in sub-Saharan Africa delivering technological solutions for the attainment of an efficient and effective local government road transport system** whereas the mission is **to support the development of a safe, reliable and efficient local government transport system through research and innovation.**

The presentation of Strategic objectives of LoGITReC covered the following:

To serve the Tanzanian road infrastructure engineering needs, focussing on Local Government roads, through:

- the development, application and dissemination of new knowledge
- the provision of laboratory testing services
- opening opportunities for technological development of equipment/tools, and
- development of human capital

Its goal is to provide practical, innovative, cost-effective R&D based solutions that:

- address the current and future road infrastructure needs of LGAs;
- support sustainable development and asset preservation; and
- enhance socio-economic impact.

Provide engineering solutions for the design, construction, maintenance and management of road infrastructure assets, based on basic and applied research, supporting the provision of a sustainable and cost-effective Local Government transport system.

The long-term goal, through the provision of technical support to PO-RALG and LGAs, is to bring all roads under the responsibility of LGAs to a standard that permits traffic to pass throughout the year.

About Institutional location, LoGITReC is under PO-RALG, in the Division of Infrastructure Development. It consists of three parts; Information Centre, Research Group and Central and Regional Laboratories. There are also two committees supporting LoGITReC; Technical and Steering Committees. The current Physical location is PO-RALG's SOKOINE HOUSE opposite CDA and also in Dodoma Municipal Engineer's office premises, while future physical location is Njedengwa area in Dodoma Municipality.

The presentation also highlighted that Resourcing of LoGITReC involves;

- Research capacity
 - Currently: 2 researchers (target for Year 1: 3 researchers)
 - Aim to have 11 researchers by Year 5
- Laboratory staff
 - Currently: Laboratory Manager and 5 technicians
 - Aim to have 15 laboratory technicians in Dodoma by Year 5
- Information specialist
 - Currently none
- Equipping Laboratory to conduct basic testing on mainly granular materials
- Purchasing additional Laboratory test equipment

Regarding Funding of Research, the presentation explained that;

- LoGITReC will require guaranteed funding for first five years to cover HR costs, operational costs and overhead costs, and to invest in scientific equipment
- LoGITReC should aim to attract funding from other national entities (e.g. COSTECH) and from Development Partners (e.g. DFID/ AfCAP to

provide capacity building support by appointment of service providers to coach and mentor researchers)

The presentation on Strategic Relationships & Linkages emphasized;

- LoGITReC to establish strong linkages with:
 - Academic institutions in Tanzania (UDSM, MUST, SJUIT, DIT)
 - TANROADS-CML
 - Tanzania Transportation T2 Centre
 - Similar Africa road research organisations such as those in Ethiopia, Kenya, Mozambique and South Africa
 - Academic centres of excellence in SADC
 - Knowledge centres (AfCAP, gTKP, IRF, TRB, Austroads)

Finally, the presentation on Knowledge Transfer outlined that;

- Knowledge transfer is one of the key focus areas of LoGITReC
- Could assume the format of:
 - Drafting/updating of guidelines, manuals, norms and standards in association with MoW
 - Establishment of an effective and efficient Information Centre serving the needs of LoGITReC, PO-RALG and the industry at large
 - Diffusion of knowledge through newsletters, publications, lectures, workshops, seminars and conferences (e.g. participation in the Annual Roads Convention)
 - Establishment of demonstration projects

Members adopted this agenda and also promised to fully support LoGITReC in achieving its goals.

10.0 ANY OTHER BUSINESS

There was no agenda for discussion in Any Other Business.

11.0 DATE OF NEXT MEETING

Members decided the date of next meeting be arranged in harmony with next Technical Committee meeting as concluded during discussion about frequency of Steering Committee meetings.

12.0 CLOSING

During closing of the meeting, Head of LoGITReC on behalf of appointed Chairman thanked members for discussions and contributions they made in the meeting especially recommendation and endorsement of research projects proposed by the Technical Committee. He wished them all the best and closed the meeting at 3:20pm.












MINUTES CONFIRMED:

Eng. Elina Kayanda
SECRETARY

Joseph Haule
CHAIRMAN

DATE:

Annex D: Presentations made at the LoGITReC Steering Committee

| | |
|---|---|
|  <p style="text-align: center;">LoGITReC: Value Proposition</p> <p style="text-align: center;">LoGITReC Steering Committee Roads Fund Board Offices 11 March 2016</p> | <div style="background-color: #e6f2ff; padding: 5px; text-align: center;">Value Proposition (1)</div> <ul style="list-style-type: none"> The establishment of the Local Government Infrastructure and Transportation Research Centre (LoGITReC) is a high priority for PO-RALG. Once established and fully operational, LoGITReC will add value through the provision of: <ul style="list-style-type: none"> – a multidisciplinary skills and expertise base in infrastructure engineering and transportation – core competences for developing and/or updating guidelines, norms and standards applicable to Local Government infrastructure and transportation, and for developing key solutions and products    |
| <div style="background-color: #e6f2ff; padding: 5px; text-align: center;">Value Proposition (2)</div> <ul style="list-style-type: none"> – Access to Science, Engineering and Technology (SET) infrastructure including materials testing laboratories, with the Central Materials Research Laboratory (CMRL) based in Dodoma acting as a reference laboratory for the regional laboratories, and several technology and software platforms that allow for technical support to industry and advanced research – An information centre that would be a repository for, inter alia, text books, local and international conference proceedings and journals, research reports, technical guidelines, norms and standards; and    | <div style="background-color: #e6f2ff; padding: 5px; text-align: center;">Value Proposition (3)</div> <ul style="list-style-type: none"> – Capabilities for developing solutions and products aimed at solving Local Government infrastructure and transportation related problems in support of national policies and strategies, including those associated with public service delivery and socio-economic growth and development, thus leading to social impact and public good    |
|  <p style="text-align: center;">Establishment of LoGITReC</p> <p style="text-align: center;">LoGITReC Steering Committee Roads Fund Board Offices 11 March 2016</p> | <div style="background-color: #e6f2ff; padding: 5px; text-align: center;">Outline</div> <ul style="list-style-type: none"> Vision, Mission and Strategic Objectives Institutional location Physical location Resourcing LoGITReC Funding of research Strategic relationships and linkages Knowledge transfer    |

Vision and Mission

- **Vision:**
 - To be the premier research centre in sub-Saharan Africa delivering technological solutions for the attainment of an efficient and effective local government road transport system
- **Mission:**
 - Through research and innovation, to support the development of a safe, reliable and efficient local government transport system



Strategic Objectives (1)

- Serve the Tanzanian road infrastructure engineering needs, focussing on Local Government roads, through:
 - the development, application and dissemination of new knowledge
 - the provision of laboratory testing services
 - opening opportunities for technological development of equipment/tools, and
 - the development of human capital.
- Its goal is to provide practical, innovative, cost-effective R&D based solutions that:
 - address the current and future road infrastructure and transportation needs of LGAs;
 - support sustainable development and asset preservation; and
 - enhance socio-economic impact.

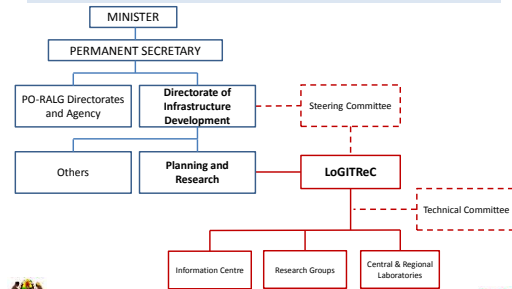


Strategic Objectives (2)

- Provide engineering solutions for transportation and for the design, construction, maintenance and management of road infrastructure assets, based on basic and applied research, supporting the provision of a sustainable and cost-effective Local Government transport system.
- The long-term goal, through the provision of technical support to PO-RALG and LGAs, is to bring all roads under the responsibility of LGAs to a standard that permits traffic to pass throughout the year.



Institutional Location



Present physical location



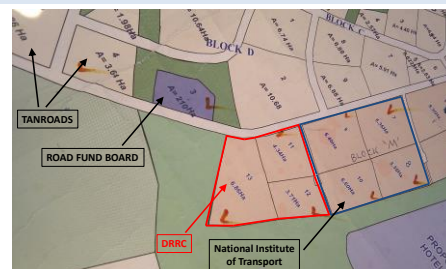
Present physical location














































Future physical location















































Future physical location













































| <h3 style="text-align: center;">Resourcing of LoGITReC</h3> <ul style="list-style-type: none"> Research capacity <ul style="list-style-type: none"> Currently: 2 researchers (target for Year 1: 3 researchers) Aim to have 11 researchers by Year 5 Laboratory staff <ul style="list-style-type: none"> Currently: Laboratory Manager and 5 technicians Aim to have 15 laboratory technicians in Dodoma by Year 5 Information specialist <ul style="list-style-type: none"> Currently none Laboratory equipped to conduct basic testing on mainly granular materials Additional test equipment to be purchased    | <h3 style="text-align: center;">Key Performance Indicators</h3> <p>From: <i>Strategic Road Research Plan</i></p> <table border="1"> <thead> <tr> <th rowspan="2">Critical Success Factors</th> <th rowspan="2">Key Performance Indicators</th> <th colspan="5">Targets</th> </tr> <tr> <th>2014/15</th> <th>2015/16</th> <th>2016/17</th> <th>2017/18</th> <th>2018/19</th> </tr> </thead> <tbody> <tr> <td 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| | Compliance with Terms of Reference (ToR) | 100% | 100% | 100% | 100% | 100% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | No. of research projects under active development | 2 | 3 | 5 | 8 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | No. of research projects under active development | 2 | 3 | 5 | 8 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | No. of research projects under active development | 2 | 3 | 5 | 8 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | No. of research projects under active development | 2 | 3 | 5 | 8 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | No. of research projects under active development | 2 | 3 | 5 | 8 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | No. of research projects under active development | 2 | 3 | 5 | 8 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | No. of research projects under active development | 2 | 3 | 5 | 8 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | No. of research projects under active development | 2 | 3 | 5 | 8 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ensuring effective transfer of technology to practice | No. of conference papers presented | 2 | 3 | 5 | 8 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | No. of research projects under active development | 2 | 3 | 5 | 8 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | No. of research projects under active development | 2 | 3 | 5 | 8 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | No. of research projects under active development | 2 | 3 | 5 | 8 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | No. of research projects under active development | 2 | 3 | 5 | 8 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Strengthening the skills base of LoGITReC | No. of staff employed as researchers | 2 | 3 | 5 | 8 | 12 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | No. of staff employed as technicians | 5 | 8 | 12 | 15 | 20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | No. of staff employed as technicians | 5 | 8 | 12 | 15 | 20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | No. of staff employed as technicians | 5 | 8 | 12 | 15 | 20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | No. of staff employed as technicians | 5 | 8 | 12 | 15 | 20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | No. of staff employed as technicians | 5 | 8 | 12 | 15 | 20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | No. of staff employed as technicians | 5 | 8 | 12 | 15 | 20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | No. of staff employed as technicians | 5 | 8 | 12 | 15 | 20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | No. of staff employed as technicians | 5 | 8 | 12 | 15 | 20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | No. of staff employed as technicians | 5 | 8 | 12 | 15 | 20 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ensuring good governance | Completion with Steering Committee Meetings | 100% | 100% | 100% | 100% | 100% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Adherence to Terms of Reference (ToR) | 100% | 100% | 100% | 100% | 100% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Adherence to Terms of Reference (ToR) | 100% | 100% | 100% | 100% | 100% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Adherence to Terms of Reference (ToR) | 100% | 100% | 100% | 100% | 100% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Adherence to Terms of Reference (ToR) | 100% | 100% | 100% | 100% | 100% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <h3 style="text-align: center;">Targets for Year 1</h3> <ul style="list-style-type: none"> Two Steering Committee meetings held Four Technical Committee meetings held Three researchers employed Four laboratory/field technicians employed Two research projects under active development Two conference papers presented Two industry workshops held Two Memoranda of Understanding signed for international collaboration on research and development.    | <h3 style="text-align: center;">Overview of current progress</h3> <ul style="list-style-type: none"> Road Research Strategic Plan for first five years in operation drafted and endorsed by AfCAP Steering Committee on 30 March 2015 Capacity Building & Skills Development drafted, containing: <ul style="list-style-type: none"> A Good Research Practice Guide for LoGITReC researchers A Good Practice Guide for Research Laboratories Job descriptions for LoGITReC staff Establishment of the LoGITReC laboratory in Dodoma <ul style="list-style-type: none"> Laboratory manager supported by five laboratory technicians Laboratory equipped to conduct basic testing with addition equipment to be procured Concept note for skills development & capacity building prepared Two research projects under active development One conference paper to be presented in Kenya (15-17 March) One industry workshop held (low-volume road design manual)    | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <h3 style="text-align: center;">Funding of Research</h3> <ul style="list-style-type: none"> LoGITReC will require guaranteed funding for first five years to cover HR costs, operational costs and overhead costs, and to invest in scientific equipment LoGITReC should aim to attract funding from other national entities (e.g. COSTECH) and from Development Partners (e.g. DFID/AfCAP to provide capacity building support by appointment of service providers to coach and mentor researchers)    | <h3 style="text-align: center;">Strategic Relationships & Linkages</h3> <ul style="list-style-type: none"> LoGITReC to establish strong linkages with: <ul style="list-style-type: none"> Academic institutions in Tanzania (UDSM, MUST, SJUIT, DIT) TANROADS-CML Tanzania Transportation T2 Centre Similar Africa road research organisations such as those in Ethiopia, Kenya, Mozambique and South Africa Academic centres of excellence in SADC Knowledge centres (AfCAP, gTKP, IRF, TRB, Austroads)    | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <h3 style="text-align: center;">Knowledge Transfer</h3> <ul style="list-style-type: none"> Knowledge transfer is one of the key focus areas of LoGITReC Could assume the format of: <ul style="list-style-type: none"> Drafting/updating of guidelines, manuals, norms and standards in association with MoW Establishment of an effective and efficient Information Centre serving the needs of LoGITReC, PO-RALG and the industry at large Diffusion of knowledge through newsletters, publications, lectures, workshops, seminars and conferences (e.g. participation in the Annual Roads Convention) Establishment of demonstration projects    | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

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|  <h2 style="text-align: center;">Role and Responsibility of the Steering Committee</h2> <p style="text-align: center;">LoGITReC Steering Committee Roads Fund Board Offices 11 March 2016</p> | <h3 style="text-align: center; background-color: #e1eef6;">Points of Discussion</h3> <ul style="list-style-type: none"> Agreement on Terms of Reference, and relationship with Technical Committee Membership of the Steering Committee Appointment of Chairperson Frequency of Steering Committee meetings    |
| <h3 style="text-align: center; background-color: #e1eef6;">Terms of Reference for the Steering Committee</h3>    | <h3 style="text-align: center; background-color: #e1eef6;">Purpose of Steering Committee</h3> <ul style="list-style-type: none"> Provide overarching strategic oversight of LoGITReC Relationship with Technical Committee: <ul style="list-style-type: none"> – Be advised by the Technical Committee on nature and scope of Research, Development and Implementation (RDI) activities planned or being undertaken in the road infrastructure and transportation domain – Endorse implementation of Research Strategic Plan based on recommendations made by the Technical Committee    |
| <h3 style="text-align: center; background-color: #e1eef6;">Role & Responsibilities (Steering Committee)</h3> <ul style="list-style-type: none"> Steer establishment and operations of LoGITReC and assess the adoption of 'good governance' principles Endorsement of priority research, development and implementation projects recommended by the Technical Committee and identify and/or endorse allocation of funding to projects Support appointment of project champions and teams Provide overarching project management and output quality reviews Monitor dissemination of research output, transfer of technology, best practices and implementation of outcomes for effectiveness Make periodic reviews/assessments of the establishment and operation of LoGITReC with a view of potential migration to a research centre covering all classes of roads, and in the long term becoming a Road and Transport Research Centre.    | <h3 style="text-align: center; background-color: #e1eef6;">Role & Responsibilities (Technical Committee)</h3> <ul style="list-style-type: none"> Advise on RDI needs and priorities Assist with technology foresight studies Advise on strategic plans and research portfolio plans for the RDI programme Assist with project portfolio analysis Assist in review of research proposals in line with the strategy Assist in the review of outputs and outcomes of RDI projects Assist in assessing the impact of RDI activities    |
| <h3 style="text-align: center; background-color: #e1eef6;">Composition of the Steering Committee</h3>    | <h3 style="text-align: center; background-color: #e1eef6;">Composition of Steering Committee</h3> <ul style="list-style-type: none"> Representatives of PO-RALG, MoW, MoT, RFB, TANROADS the Association of Local Authorities of Tanzania (ALAT) the Tanzania Transportation Technology Transfer Centre (TanT²) the Association of Universities in Tanzania the National Institute of Transport (NIT) the Tanzania Commission for Science and Technology (COSTECH) the National Environment Management Council (NEMC) Development Partners (e.g. DFID, JICA, EU, USAID, World Bank, China, AfDB, NORAD).    |

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| <p style="text-align: center;">Chairperson & Secretary of the Technical Committee</p>    | <p style="text-align: center;">Chairperson & Secretary</p> <ul style="list-style-type: none"> • Proposal: <ul style="list-style-type: none"> – Chairperson: Director of Infrastructure Development (PO-RALG) – Secretary: To be nominated    |
| <p style="text-align: center;">Frequency of Steering Committee Meetings</p>    | <p style="text-align: center;">Frequency of Meetings</p> <ul style="list-style-type: none"> • Proposal: <ul style="list-style-type: none"> – Two meetings per annum (ideally three during period of establishment)    |
| <p style="text-align: center;">  Research Priorities LoGITReC Steering Committee Roads Fund Board Offices 11 March 2016 </p>    | <p style="text-align: center;">Outline</p> <ul style="list-style-type: none"> • Process followed for identification of research needs • Projects to be initiated in 2016 • Research priorities: <ul style="list-style-type: none"> – Recommendations of the Technical Committee – Endorsement by the Steering Committee • Way forward    |
| <p style="text-align: center;">Process followed for identification of research needs</p>    | <p style="text-align: center;">Prioritisation process</p> <ul style="list-style-type: none"> • Meetings held with key stakeholders including all major Government Ministries, Agencies, Commissions, Authorities and Institutions during 2013-2014 • They provided the following views and recommendations on research needs: <ul style="list-style-type: none"> – Unanimous support for establishing a research centre – Tanzania would benefit from the implementation of a coordinated and prioritised road research programme aimed at achieving 'more for less' in terms of construction and maintenance – In the short term, a research programme should preferably be aimed at the implementation of existing knowledge and experience – There is an acute need for appropriate and well maintained data - to be used for analysis and research    |

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| <p>Priority research areas (March 2014)</p> <ul style="list-style-type: none"> • Review of outcomes of AFCAP-supported surfacing demonstrations and trials in Bagamoyo and Siha Districts • Scoping studies for 5 strategic research programmes covering: <ul style="list-style-type: none"> – Road trials, demonstrations and monitoring – Road asset inventory, condition and data – National road material and aggregates database and inventory – Climate resilience – Urban congestion • Initiate cost/benefit studies (e.g. life-cycle analysis of graveling versus low-volume seals) • Embedment of new AFCAP low-volume road design manual    | <p>Priority Projects (as per LoGITReC Strategic Research Plan)</p>    |
| <p>Criteria</p> <ul style="list-style-type: none"> • The following shall apply to all proposed projects: <ul style="list-style-type: none"> – Projects must address an identified need – Projects must improve on the current status quo – Projects must be recommended by the Technical Committee and endorsed by the Steering Committee – Ideally, all projects should be executed by local researchers/experts (i.e. LoGITReC staff in association with TANROADS-CML, universities, etc.) – Projects can incorporate an element of capacity building / skills transfer <ul style="list-style-type: none"> • On most projects, provision has been made for the appointment of an external service provider • Role of service provider is not to execute the project but rather to coach and mentor researchers – All projects must have distinct deliverables and an implementation/dissemination plan    | <p>Format of Priority Projects</p> <ul style="list-style-type: none"> • Full project proposals provided in Road Research Strategic Plan for 12 priority research projects • Structure of proposals <ul style="list-style-type: none"> – Background – Problem statement – Project objectives – Expected benefits – Methodology – Deliverables – Implementation of findings – Project plan (Gantt chart, project costs & project team)    |
| <p>Three Project Categories</p> <ul style="list-style-type: none"> • High priority, 'quick win' short-term projects: <ul style="list-style-type: none"> – "breakthrough projects" addressing most pressing needs in a fairly short time span (~12 months) – potential for yielding high impact and demonstrating value of LoGITReC to stakeholders • high priority medium to longer-term projects: <ul style="list-style-type: none"> – similar high impact, yielding similar benefits • Cross-cutting yet high priority activities: <ul style="list-style-type: none"> – Developed/implemented in parallel with above    | <p>1: High Priority, 'Quick Win' Short-Term Projects (12 months)</p> <ul style="list-style-type: none"> • Development and implementation of design methods for low-volume roads • Road trials, demonstrations and monitoring • Review of gravel road maintenance manuals and procedures • Optimisation of delivery methods for the maintenance of local government roads • Guidelines for the use of stones to construct arch bridges    |
| <p>2: High Priority Medium to Longer-Term Projects</p> <ul style="list-style-type: none"> • Road asset inventory condition and data • National road material and aggregate inventory and database • Guidelines for the use of block paving for roads and footways • Review of existing standards and specifications for rural roads • Use of local and alternative materials in roads    | <p>3: Cross-Cutting yet High Priority Activities</p> <ul style="list-style-type: none"> • Climate resilience • Cost-benefit studies    |

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| <p style="text-align: center;">Outline</p> <ul style="list-style-type: none"> • Process followed for identification of research needs • Projects to be initiated in 2016 • Research priorities: <ul style="list-style-type: none"> – Recommendations by the Technical Committee – Endorsement by the Steering Committee • Way forward    | <p style="text-align: center;">1: High Priority, 'Quick Win' Short-Term Projects (12 months)</p> <ul style="list-style-type: none"> • Development and implementation of design methods for low-volume roads • Road trials, demonstrations and monitoring • Review of gravel road maintenance manuals and procedures • Optimisation of delivery methods for the maintenance of local government roads • Guidelines for the use of stones to construct arch bridges    |
| <p style="text-align: center;">2: High Priority Medium to Longer-Term Projects</p> <ul style="list-style-type: none"> • Road asset inventory condition and data • National road material and aggregate inventory and database • Guidelines for the use of block paving for roads and footways • Review of existing standards and specifications for rural roads • Use of local and alternative materials in roads    | <p style="text-align: center;">Development and implementation of design methods for low-volume roads</p> <ul style="list-style-type: none"> • Objectives <ul style="list-style-type: none"> – Finalisation of the design manual and embedding the manual as an integral part of the low-volume road pavement engineering practice in Tanzania • Expected benefits <ul style="list-style-type: none"> – Improved understanding of fundamentals of low-volume road design and performance – Development of a more cost-effective road network – Greater use of local materials – Simplified site investigations and material testing procedures    |
| <p style="text-align: center;">Road trials, demonstrations and monitoring*</p> <ul style="list-style-type: none"> • Objectives <ul style="list-style-type: none"> – Assessment of outcomes of existing road trials in Bagamoyo and Siha Districts – Continued monitoring of existing road trials – Establishment of new road trials • Expected benefits <ul style="list-style-type: none"> – Development of basic knowledge on the behaviour and performance of pavements subjected to traffic and the environment – Lead to development of new specifications for innovative material use or construction methods – Ability to assess cost-effectiveness of solutions    | <p style="text-align: center;">Optimisation of delivery methods for the maintenance of local government roads</p> <ul style="list-style-type: none"> • Objectives <ul style="list-style-type: none"> – Monitor the implementation of various types of maintenance delivery methods to determine which are the most efficient and cost-effective • Expected benefits <ul style="list-style-type: none"> – more efficient maintenance procurement system – the wider use of small labour-based contractors (provision of employment and social upliftment) – ensure regular routine maintenance of a high standard with a concomitant improvement in the rural/tertiary road quality and accessibility    |
| <p style="text-align: center;">Guidelines for design and construction of stone arch and timber bridges</p> <ul style="list-style-type: none"> • Objectives <ul style="list-style-type: none"> – Produce guidelines that will assist district engineers to design and supervise the construction of stone arch and timber bridges while also assisting technologist and artisan on the proper procedures for constructing stone arch and timber bridges • Expected benefits <ul style="list-style-type: none"> – Generation of more semi-skilled workers and employment creation – The development of local small-contractors with minimal outlay required on plant and equipment – Use of local materials and reduced reliance on imported materials – Ability to carry out rapid and effective repairs    | <p style="text-align: center;">National road material and aggregate inventory and database*</p> <ul style="list-style-type: none"> • Objectives <ul style="list-style-type: none"> – to extend the current database of potential material resources and to develop GIS maps • Expected benefits <ul style="list-style-type: none"> – Design of new and rehabilitated roads making use of identified materials which can provide the optimum design based on the best local materials available – Time normally required to locate materials will be reduced – Analysis of the data collected will assist in establishing correlations between material properties and performance, as well as to establish project material costs – Development of material sourcing technologies and methods – Integration of GIS database in Road Asset Management System    |

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| <h3 style="text-align: center;">Use of local and alternative materials in roads</h3> <ul style="list-style-type: none"> • Objectives <ul style="list-style-type: none"> – Identify local and alternative materials that can potentially be used for paved/unpaved road construction, improve their properties through laboratory and field studies, and where necessary develop appropriate specifications for their use – Investigate alternative materials such as sisal fibres, molasses, natural pozzolan, granulated blast furnace slag, fly ash, etc • Expected benefits <ul style="list-style-type: none"> – Ability to use marginal/alternative materials not traditionally used for road construction, potentially resulting in: <ul style="list-style-type: none"> • lower construction costs • environmental and sustainability benefits • reduced vehicle operating costs through a better road network riding quality, reduced accidents and improved mobility and access    | <h3 style="text-align: center;">Climate Resilience</h3> <ul style="list-style-type: none"> • Objectives <ul style="list-style-type: none"> – Develop and initiate the implementation of a climate resilience strategy for district roads, as well as associated action plans, guidelines and manuals • Expected benefits <ul style="list-style-type: none"> – implementation of a climate resilience and adaptation strategy, with accompanying vulnerability maps, guidelines and manuals, will increase the adaptive capacity of PO-RALG and LGAs, and reduce the sensitivity of district road infrastructure assets to abnormal climate events and their effects (long term)    |
| <h3 style="text-align: center;">Outline</h3> <ul style="list-style-type: none"> • Process followed for identification of research needs • Projects to be initiated in 2016 • Research priorities: <ul style="list-style-type: none"> – Recommendations by the Technical Committee – Endorsement by the Steering Committee • Way forward    | <h3 style="text-align: center;">Recommendations by Technical Committee</h3> <ul style="list-style-type: none"> • Recommends endorsement of all 12 prioritised projects • Proposes two additional projects: <ul style="list-style-type: none"> – Efficacy of Soil Stabilisers (road trials) – Enhancement of Urban Transport in Emerging Cities (congestion relief)    |
| <h3 style="text-align: center;">Outline</h3> <ul style="list-style-type: none"> • Process followed for identification of research needs • Projects to be initiated in 2016 • Research priorities: <ul style="list-style-type: none"> – Recommendations by the Technical Committee – Endorsement by the Steering Committee • Way forward    | <h3 style="text-align: center;">Way Forward</h3> <ul style="list-style-type: none"> • AfCAP Concept Notes have been prepared for the following two projects: <ul style="list-style-type: none"> – Continued Monitoring of Existing Road Trials and Establishment of New Road Trials – National Road Material and Aggregate Inventory Database • AfCAP Concept Notes are being prepared for the other four projects • Critical actions: <ul style="list-style-type: none"> – Establishment of sufficient/appropriate research capacity to implement the research plan – Allocation of financial resources to support the execution of the research agenda    |

Annex E: Final Concept Notes

PROJECT CONCEPT NOTE

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| <p>Project Title: Continued Monitoring of Existing Road Trials and Establishment of New Road Trials</p> |
| <p>Country/Countries/Region: Tanzania, Bagamoyo and Siha Districts</p> |
| <p>Project Background:</p> <p>A number of road trials have been constructed in Tanzania, supported by AfCAP, which were designed to demonstrate and verify different options in design, material utilisation and construction methods for particularly low-volume roads. Examples of these include:</p> <ul style="list-style-type: none">• Bogo to Talawanda road in the Bagamoyo District of the Pwani Region• Lawate to Kibongoto road in the Siha District of the Kilimanjaro Region <p>A review of the outcomes of all road trials constructed in Tanzania will be necessary. Some of the road trials have been monitored over a period time and should therefore have good as-built information and performance data available that can be used as a benchmark to assess future performance.</p> <p>However, the available performance data may not always be consistent between projects and over the monitoring periods. Also, the establishment of these road trials may not necessary have been geared towards providing sufficient data that will enable researchers to assess the full impact of all factors that can influence the performance of pavements (incl. traffic and environmental data). Hence, the extraction of information for back analysis may be difficult without a framework for guidance. It is therefore necessary that a protocol for establishing and monitoring trial section to guide the collection of the required data, including consistent condition assessments of the road trials, is developed to ensure proper analysis.</p> <p>There is thus a need to evaluate the existing road trials in order to determine the quality of monitoring data, and to identify which road trials are worth monitoring for a further period of time and which should not. To effectively undertake such a research project, it is therefore necessary to have a systematic method of evaluation and monitoring in place for the existing as well as new road trials, which will include condition assessment over a number of years.</p> <p>This Concept Note is for the development of a framework for assessing the quality of data obtained from existing road trials, for the establishment of new road trials and for the systematic collection and recording of condition and performance data generated during the monitoring period of road trials. The Concept Note describes the elements, approach and resources required to carry out the project.</p> |
| <p>Concise Project Purpose:</p> <p>The goal of the project is the assessment of the outcomes of existing road trials, the continued monitoring of existing road trials as well as the establishment of new road trials and the development and implementation of protocols for establishing and monitoring road trials in a systematic way. In order to achieve this goal, the project has been subdivided into three main tasks with specific activities as outlined in the Project Methodology section of this Concept Note.</p> <p>The objective of the first task is to evaluate the nature and quality of information available from existing road trials. An in-depth review (including an updated back-analysis) of the existing road trials will be undertaken. The objective of the second task of the project is to develop guidelines/protocols to ensure that the establishment of road trials and collection of the information</p> |

is standardised. The objective of the **third** task is to establish new road trials, and to collect data on the old and new road trials on a continuous basis over a number of years according to the monitoring processes provided in the guidelines/protocols developed as part of Task 2.

Previous or Related Work:

The President's Office – Regional Administration and Local Government (PO-RALG) set up the Local Government Transport Programme (LGTP) in 2007 with the aim of supporting rural development and poverty alleviation. In 2009, AfCAP was requested by PO-RALG to assist with the implementation of demonstration road sites in Tanzania.

Two sites were selected in the Bagamoyo and Siha districts, located on the Bango to Talawanda road in the Bagamoyo District (about 20.3 km) and on the Lawate to Kibongoto road in the Siha District (about 13 km). Both sites were found to be ideal to demonstrate the types of challenges that can be overcome using Environmentally Optimised Design (EOD) and the Spot Improvement (SI) philosophy.

Two groups of surfacing options were identified and used on the two project roads. The first group comprised bituminous surfacing options, such as Otta seals with sand cover seal, slurry seals, double sand seals, double surface dressings and bituminous penetration macadam. The second group comprised non-bituminous surfacing solutions, such as concrete strips, concrete geocells, hand packed stone, concrete paving blocks, as well as unreinforced and lightly reinforced concrete.

The designs for the sections at Bagamoyo were based on the Tanzanian Pavement and Materials Design Manual (TPMDM), with modifications made to obtain an environmentally optimised design that is suitable for low-volume roads. Construction of the sections was completed in September 2011, baseline data were collected by October 2011, with subsequent monitoring visits carried out in April 2012, September 2012 and April 2013.

The designs at Siha were based on the Dynamic Cone Penetrometer (DCP) method in order to allow designs that only have one pavement layer below the surfacing. Construction was completed in September 2012, baseline data were collected by January 2013, with one monitoring visit carried out in April 2013.

An additional year of monitoring was done by the service provider as an extension to their original contract with AfCAP, after which one additional monitoring visit to both road trials was carried out by PO-RALG and the Central Materials Laboratory (CML) of TANROADS, involving District engineers. The latest set of performance data has not yet been analysed.

Project Methodology:

It is recommended that the proposed project be undertaken as outlined below (note that all three tasks can be conducted concurrently, inclusive of the establishment of new road trials forming part of Task 3):

TASK 1: Review of existing road trials:

Main activities to include:

- Extensive review of all existing road trials. This includes the identification of all road trials that have already been built in Tanzania and to assemble all available data, including all construction/as-built documentation, performance data and any back-analysis studies carried out.
- Assessment of the accessible information on the road trials. It should be noted that data collected from the different road trials may not be in the same format. The analysis of these data should provide the research team with a better understanding of the data collection methods used and also assist in decision-making on whether all existing sections should be included as candidates for further monitoring. Hence, the gathering of additional as-built information (i.e. baseline data) where such information is not available or found to be unreliable should also be conducted as part of this task.

- In-depth review of a sample of ongoing road trials, including a back-analysis where required. It is advisable to conduct this review to compare as-built data with the original final designs to establish reliability of information. Information should be validated with those who have been involved in the projects.

TASK 2: Development of guidelines/protocol for establishing and monitoring road trials

- Review and analysis of all available national and international guidelines and protocols on the establishment and monitoring of road trials: these guidelines and protocols will provide the required information to develop local guidelines for the establishment of road trials and data collection, which should be based on best proven practices. It should be borne in mind that different protocols are required for different types of road investigations, e.g. structural design, materials usage, surfacing types, traffic loading evaluation gravel loss on unpaved roads, drainage effectiveness and societal impacts.
- Evaluation of data collection methods: the method of data collection is critical for future back-analysis in order to achieve the objectives of the project. The appropriateness of the format for data collection should be evaluated against best practices. This task should involve peer review of the identified data elements. This is vital because monitoring data can prove to be almost worthless unless certain rules are followed.
- Drafting of guidelines/protocols: work is to focus on the development of the draft guidelines/protocols based on the review of existing guidelines/protocols. The research team should further examine, improve, and finalise the structure and embark on the development of the guidelines/protocols taking into account the variability of the data formats.
- Finalisation of the guidelines/protocols: existing and new road trials will be used for testing the protocols for monitoring the sections. The exercise should provide insight into the process. The guidelines/protocols will establish a benchmark for basic levels of managing the monitoring process of road trials.

Task 3: Establishment of new road trials and ongoing monitoring of existing road trials

- New road trials will have to be established as a matter of priority, especially since the Local Government Infrastructure and Transportation Research Centre (LoGITReC) of PO-RALG has funding available for the construction of approximately 3 km of road trials in their budget for the 2015/16 financial year. The establishment of these road trials will involve the following (inter alia):
 - A review of likely candidate materials needs to be carried out and suitable materials identified. A programme of laboratory testing and evaluation should then be carried out and material sources that are deemed most suitable should be selected for trials;
 - Define the desired outputs/outcomes, and plan project activities accordingly;
 - Identify a suitable location for the road trial and assess local conditions (site investigations);
 - Develop concept, preliminary and final designs for each experimental section that will form part of the road trial;
 - Develop a detailed monitoring and assessment programme, also specifying baseline data requirements;
 - Following the procurement process, construct the experimental sections while implementing a rigorous quality control system, also to capture all as-built data;
 - Set baseline data and implement the performance monitoring plan.
- Devise a programme schedule for the continued monitoring of the trials. Simple analysis of the data should be carried out after each monitoring activity, but the main analysis will take place when the trials have been monitored for long enough for the durability and long-term performance of the trials to be assessed reasonably accurately. This can be a relatively complex task and it is likely that in the early stages of the development of LoGITReC expert technical assistance may be required.

The establishment and the commitment of resources to a long-term monitoring strategy of the road trials will be critical to achieving the objectives of the project. The period of monitoring may be

project specific, but guidance will be provided in the developed guidelines/protocols. The monitoring of the performance of the road trials should be over a period of at least two years for unpaved roads and 5 years for paved roads. Climatic conditions may dictate the frequency of performance data collection.

Human Resources ReCAP Funded:

A service provider should be appointed with specialist knowledge on all aspects of long-term performance assessments of experimental sections / road trials, inclusive of: the planning, design and construction of sections; the setting up of a monitoring programme; the establishment of baseline data; performance monitoring of the sections (incl. the capturing of traffic and environmental data); data management (incl. capturing, validation and storage of data in a fit-for-purpose database); data processing and analysis; and reporting formats.

The service provider will assist the research team in the successful completion of the first two tasks outlined in the section "Research Methodology", as well as the initiation of the third task over at least one of the monitoring periods for the existing road trials, but also including assistance with the establishment of new road trials and, ideally, the first monitoring cycle of these newly established road trials.

One of the key responsibilities of the service provider is to transfer knowledge and expertise to Tanzanian engineers involved in the design, construction and performance monitoring of road trials. This capacity building and training programme will have to involve engineers from PO-RALG, TANROADS-CML and especially staff from LoGITReC, as well as university students willing to be involved in this project as part of their post-graduate studies. This programme should include specialist advice/guidance, hands-on training on site, workshops, as well as training courses presented to PO-RALG (inclusive of District engineers), TANROADS-CML and TANROADS staff at a central location (e.g. Dar es Salaam or Dodoma).

It will be expected that the service provider will spend 100 days (20 weeks) of productive time in-country (in Dodoma and Dar es Salaam and in the Bagamoyo and Siha Districts, predominantly) to provide specialist support and build local capacity, and 15 days (3 weeks) outside the country over a period of 24 months. The time spent outside the country should be devoted to the compilation of reports (i.e. Inception Report, progress reports, workshop and training reports and Final Report) as well as the preparation of workshop and training material.

The Service Provider should include a lump sum of GBP 15,000 in his budget to support the logistics of LoGITReC and TANROADS-CML.

Parallel Resources – non ReCAP Funded:

It is envisaged that two (but ideally three) researchers, who are individuals employed by LoGITReC / PO-RALG, will undertake the work, supported by at least two technicians. The project should be led by a senior researcher who should be an individual with a background in research, preferably on the assessment of road performance, in addition to being an experienced pavement engineer or materials specialist. Preferably, the other researcher(s) should have at least a Bachelor degree in engineering.

It would be essential that the researchers involved in this project liaise with TANROADS-CML and staff from the Bagamoyo and Siha Districts that have been involved in the construction and performance monitoring of the road trials. Other parties involved in the establishment of road trials, such as consultants and contractors, should also be consulted.

Experienced field technicians would also be required, together with laboratory and field testing staff/labour. They should in the first place be sourced from LoGITReC / PO-RALG, and if not available from TANROADS-CML. The field technicians should be experienced in routine and specialised field testing to support the research team in gathering and capturing quality data on the composition and performance of the road trials, as well as on traffic and environmental factors (i.e. weather data).

Other Resources:

The project team needs to identify and characterise the field equipment that has been used in the past to assess the condition of existing road trials. This is important since all future investigations of the road trials have to make use of the same equipment in order to be able to relate past measurements to future ones, and therefore be able to characterise the evolution of pavement performance over time. The above equally applies to all monitoring methods and techniques that have been used on road trials in the past; all future monitoring needs to be based on the use of the same principles and equipment.

One of the outcomes of Task 2 (*Development of protocols/guidelines*) is expected to be specified evaluation methods and equipment that will have to be deployed for the condition assessment of all future experimental/trial sections on low-volume roads. This might necessitate the procurement of additional equipment. Hence, provision should be made for the acquisition thereof.

Project Outputs, Impacts, & Uptake Strategy:

The deliverables from this project will be short to long term. The estimated time to completion after commencement of project is indicated for each main task. This will however be influenced by the availability of the required skills:

- **Task 1:** Review of existing road trials, inclusive of additional testing and back-analyses where required (approximately 6 months);
- **Task 2:** Development of guidelines/protocols: The core outputs of this task will be guidelines/ protocols for the establishment of the trial/demonstration sections, systematic collection and recording of data generated during the monitoring period of the sections, including quality assurance of data. This task could be done in parallel with Task 1 (approximately 5 months);
- **Task 3:** On-going activities on established and new road trials for monitoring (and updating) information for back-analysis (longer term: at least 48 months)

On-going revision of the guidelines/protocols is required following their implementation through their actual use on road trials, based on a thorough assessment of feedback received, in order to improve the guidelines/protocols. It is expected that processed information obtained from road trials will be used to promote the wider implementation of successful road products and/or methods of construction and will assist in developing or improving specifications.

Relevant AfCAP Logical Framework Indicators:

- **Impact Indicator 3:** Proportion of classified network that is paved
- **Outcome Indicator 1:** ENGINEERING: National policies, manuals and documents approved and published
- **Outcome Indicator 4:** Concrete example of change influenced by AfCAP applied to #km of road
- **Outcome Indicator 5:** Affordable solutions
- **Output Indicator 2.1:** % of Projects led by Africans

Key Contacts:

President's Office – Regional Administration and Local Government (PO-RALG):

- Director of the Infrastructure Directorate: Eng Elina Kayanda
- Assistant-Director and Head of LoGITReC: Dr Fikiri Magafu
- Bagamoyo and Siha District Engineers (Eng Samson Kalesi and Eng Meleck Silaa were involved at the time of construction of the road trials in Bagamoyo and Siha)
- Other PO-RALG staff associated with the road trials

Central Materials Laboratory of TANROADS:

- Manager: Eng Mussa Mataka
- Staff involved with the road trials: Eng John Malissa and Salahe Juma

International experts who were involved and/or contributed to the monitoring of previous road trials:

- Victor Rogers, Ramsey Neseiyif and Simon Gillett (Roughton International Ltd)

Key References:

Roughton International Ltd. 2013. Design and Construction of Demonstration Sites for District Road Improvement in Tanzania: Final Report. AFCAP/TAN008.

Roughton International Ltd. 2013. Design, Construction and Monitoring of Demonstration Sites for District Road Improvement in Tanzania: Bagamoyo Final Monitoring Report. AFCAP/TAN008.

Roughton International Ltd. 2013. Design, Construction and Monitoring of Demonstration Sites for District Road Improvement in Tanzania: Siha Final Monitoring Report. AFCAP/TAN008.

Roughton International Ltd. 2013. Design, Construction and Monitoring of Demonstration Sites for District Road Improvement in Tanzania: Workshop Report. AFCAP/TAN008.

Roughton International Ltd. 2012. Design, Construction and Monitoring of Demonstration Sites for District Road Improvement in Tanzania: Sociology Report. AFCAP/TAN008.

Concept Note Submitted by: B Verhaeghe on behalf of the Local Government Infrastructure and Transportation Research Centre (LoGITReC)

Organisation: President's Office – Regional Administration and Local Government (PO-RALG)

Date: January 2016

Concept Note Reviewed by (PMU)

Date:

PROJECT CONCEPT NOTE

Project Title:

National Road Material and Aggregate Inventory Database

Country/Countries/Region:

Tanzania

Project Background:

The effective planning and costing of road maintenance and road construction is affected by the proximity of sources of good materials as well as readily available information of the properties of these sources. Over the years, the Tanzania National Roads Agency (TANROADS), the Central Materials Laboratory (CML) and consultants have acquired information on the location and properties of road construction materials from projects undertaken in many parts of Tanzania. This information needs to be centralised in order to be put to effective use for planning and costing of possible material usage in adjacent future projects and for maintenance and rehabilitation.

Locating good construction materials especially when sources of good material are limited often has significant cost implications on a project. Several roads have over the years been constructed in Tanzania, including experimental sections that have been monitored and should therefore have information on material sources and properties. Although this information is available, it appears that a lot of this data is mostly contained in site project reports and therefore is not readily available, user friendly or in a format for an effective useful materials data base system. Ultimately, a system needs to be developed for Tanzania that will provide locations of potential materials sources with their typical properties and post-construction performance.

As in the case of most countries, the presence of good construction materials is diminishing, the art of material location is slowly being lost and environmental constraints and requirements are all hindering the timeous location of materials for construction. This often results in delays on construction projects, increasing costs.

The mapping of suitable materials for road construction should not be limited to materials that meet traditional specifications, namely those that are typically used for roads carrying medium to high volumes of traffic. Local materials, despite not conforming to traditional material requirements, can still perform satisfactorily and result in significant cost savings and environmental benefits, especially when used on low-volume paved and unpaved roads. Hence, all material sources that could potentially be used in roads should be mapped, inclusive of alternative materials such as industrial by-products.

Together with the mapping of the location of the materials, general testing should be carried out and a database of the sources and potential uses of the materials developed. Recommendations on how marginal materials could be rendered suitable for use in road construction (e.g. through blending, modification and/or stabilisation) should also be provided in the database.

This Concept Note describes the methodology for carrying out this work for one Administrative Region in Tanzania. Once this has been completed and the systems set up, the study should be extended to other Regions. Ultimately, a GIS-based map showing the likely locations and size of potential borrow pits or quarries with links to their typical properties and potential uses should be available for the entire country.

Concise Project Purpose:

This project aims to extend the existing databases of potential resources from TANROADS and to develop Geographic Information System (GIS) maps to include these as well as additional resources, including marginal materials that have been used successfully or have the potential to be used in road construction.

The aim is also to identify the most appropriate methodologies to use for developing the database and GIS maps that will eventually become a national materials management system for Tanzania. The system is to contain existing road construction material information and potential sources of all possible materials, including information on quantities of available materials, their properties and their potential applications. Such information should be accessible to anyone who requires it for a project in a specific area.

The final aim is to fully capacitate staff at the Local Government Infrastructure and Transportation Research Centre (LoGITReC), District Engineers and staff of TANROADS-CML to undertake road material mapping studies to support the establishment of the national materials management system.

Previous or Related Work:

In 1987, the Ministry of Works initiated a Stone Quarrying Survey for the purpose of (a) locating sources of coarse aggregate in various parts of the country, (b) conducting a survey on the supply and demand of aggregate at regional, district and village level, (c) assessing the volume of coarse aggregate available at the quarries and their estimated exploitation life span, and (c) conducting laboratory tests in order to evaluate the quality of coarse aggregate for various civil construction works.

The Central Materials Laboratory of the Ministry of Works was commissioned to undertake the study. The aim was for the Central Materials Laboratory to visit each Tanzanian region, prepare a report for each region and to collate all data and establish a national materials database.

The national materials database will enable the Ministry to provide advice and data to government and to public and private construction entities when information is sought for civil engineering projects to be undertaken in Tanzania.

To date, four regions have been surveyed, namely: Dodoma, Iringa, Mbeya and Morogoro. A full report on each region is available from the library of the Central Materials Laboratory.

It should be noted, however, that not all parts of the regions were visited due to obstacles encountered and other unavoidable circumstances. It was therefore intended that areas that could not be mapped be included in future surveys.

Project Methodology:

The available data collected from many projects over the years should be used as the starting point in the development of the national road material and aggregate database.

It should be noted that the basic system developed by TRL Ltd for Mozambique under AfCAP (see list of references) could also be consulted as a launching pad for the development of appropriate material location guidelines for Tanzania. The principles deployed for the location of calcrete deposits were sound, but they would have to be adapted for the location of other materials.

The project will be carried out in a number of phases.

- i. Carry out a survey amongst potential users of the database to determine what information they would ideally require. A good knowledge of the requirements of the different stakeholders will be necessary. The minimum data requirements should be established at this stage.
- ii. Review and provide a synthesis of all work carried out in Tanzania to date on the mapping of aggregate resources for road works.
- iii. Obtain, through literature scans and consultation, a thorough understanding of remote sensing, botanical or other indicator principles that can be applied in Tanzania to source suitable materials.
- iv. Obtain information from the TANROADS Regional Offices on all known borrow pits, their GIS coordinates, their geology, material properties and the quantity of materials that is potentially still available to be used for road works. Obtain similar information from all District engineers.
- v. Based on a qualitative assessment of the above information, the research team will then identify a District or several Districts to be used as a "pilot area" for this project. The research

team will then need to visit the District(s) and carry out a detailed investigation of the local soils and geology, to confirm which of the techniques or principles employed works best for which materials. Field investigations will involve use of probes, test pitting and soil profiling, and sampling at selected sites showing potentially useful materials of any kind. Laboratory testing will include normal grading, Atterberg limits, CBR testing and aggregate strength (ACV, AIV, 10% FACT, etc). X-ray diffraction (XRD) studies of some of the materials may also be useful.

- vi. Based on the results obtained from the “pilot area”, the optimum assessment techniques should be identified. These must then be applied to a desk-study of a second selected area. Only those sites that show positive potential should then be evaluated and the success rate of the process determined. Areas that weren’t successful should be investigated to determine “what went wrong”?
- vii. Once the process has been adequately fine-tuned, the entire Region should be “mapped” and sampled according to the method developed.
- viii. The results of the material location (inclusive of existing borrow pits) and sampling must then be placed in a database linked to a GIS such that anyone requiring material information in the Region can quickly access the available data. This database should include information on the potential use of the materials as well as potential treatments to render them suitable (i.e. for marginal materials).
- ix. Prepare a manual on the use of the system and the database including a method for users to supply all additional data to the database manager for addition to the existing information.
- x. Once this has been successfully completed, the process should be applied to the other Regions in Tanzania. This would be different projects in different phases

Human Resources ReCAP Funded:

A service provider should be appointed with specialist knowledge on material mapping techniques, material assessments and the cost-effective application of local materials in the construction of low to high-volume roads. One of the main responsibilities of the service provider is to transfer knowledge and expertise to Tanzanian engineers who will then assume responsibility for the implementation of the materials mapping processes in other Districts as well as in other Regions in Tanzania. Hence, the capacity building and implementation programme will have to involve engineers from the President’s Office – Regional Administration and Local Government (PO-RALG), inclusive of District engineers and especially staff from LoGITReC, TANROADS-CML, the Ministry of Works, the Ministry of Transportation, as well as university students willing to be involved in this study as part of their post-graduate studies.

It will be expected that the service provider will spend 90 days (18 weeks) of productive time in-country (in Dodoma and Dar es Salaam and in the Region prioritised for this study) to provide specialist support and build local capacity, and 10 days (2 weeks) outside the country over a period of 18 months. The time spent outside the country should be devoted to the compilation of reports (i.e. Inception Report, progress reports, workshop reports and Final Report) as well as the preparation of workshop material.

The Service Provider should include a lump sum of GBP 30,000 in his budget to support the logistics of LoGITReC field personnel and laboratory testing.

Parallel Resources – non ReCAP Funded:

The project team should consist of at least three researchers (two concentrating on the materials location and sampling side, the other on the GIS and database development aspects) sourced from LoGITReC / PO-RALG. The project would require full-time input from the lead researcher and the materials/ geotechnical researcher, but less input from the GIS specialist.

It would be essential that the researchers involved in this project liaise closely with other government institutions, such as Soils, Agriculture, Geological Survey and universities in order to gain maximum benefit from the relatively “high tech” and rapidly developing science of remote sensing and satellite observation, amongst others.

For maximum benefits, the lead researcher should be an experienced Materials Engineer or Engineering Geologist (preferably with a Masters but minimum BSc (Hons)), while the other researchers should be a road materials engineer and a GIS expert, the latter qualified at least at Honours level.

In addition, at least two experienced field engineers/technicians would be required together with laboratory and field testing staff/labour. They should in the first place be sourced from LoGITReC / PO-RALG, and if not available from TANROADS-CML. The field engineers/technicians should be experienced in routine field testing (test pitting and profiling), sampling, sample management and other skills required for this project.

Other Resources:

The resources needed initially would be mostly related to GIS and means of analysing and interpreting remote sensing data, particularly multi-spectral satellite or air-borne imagery. This would require purchasing such imagery and the software required for analysis and the resources to analyse relatively large files. Ideally, such skills and other resources should be sourced from within PO-RALG or TANROADS.

Field testing and sampling equipment would be normal apparatus. A mechanical excavator capable of excavating trenches to a depth of three metres will need to be available for the sampling, and means of transporting large quantities of sample back to PO-RALG (or TANROADS-CML) laboratories for testing will be required.

Project Outputs, Impacts and Uptake Strategy:

The deliverables from this project will be medium to long term development of the national road material and aggregate database and inventory. The location of sources of material and the material attributes should be captured in GIS for easy access to anyone who requires the information for a project in a specific area.

A number of benefits will be achieved by having a national road material and aggregate database and inventory.

Firstly, the design of new and rehabilitated roads will be able to make use of the identified materials which can provide the optimum design based on the best local materials available, thus potentially limiting the importation of materials from elsewhere.

Secondly, the time normally required to locate materials at the pre-tender and tender stage will be reduced and more confidence will be held in the materials proposed. There are many instances where the availability of good quality material is limited. Identified materials properties will therefore provide the initial project input based on the best local and nearby available materials for a project. It is envisaged that not only will the database contain information on existing materials sources but also on potential sources and post-construction performance, based on data obtained for similar material, climatic and topographic conditions. Thus a database containing information about the location, properties and volume of road building materials will assist in more effective planning and costing of road maintenance and road construction.

Thirdly, this project will extend the use of information collected on different materials to support the research agenda of LoGITReC. The analysis of the data collected will assist LoGITReC to establish correlations between material properties and performance, as well as to establish material costs for specific construction and maintenance projects.

This project would also assist in developing new material sourcing technologies and methods. LoGITReC would develop experience that can assist when consultants cannot locate suitable materials.

Finally, the GIS system and database would ultimately become integral parts of the Road Asset Management System.

Once the database and inventory development has been completed, countrywide implementation will take place through training to be provided by LoGITReC to all prospective users of the system.

It is proposed that a workshop be organised two months after project initiation of the project to discuss and agree on the mapping principles that will be adopted for the identified Region(s). It is also proposed that a final workshop be held at the completion of the mapping study to share the outputs and outcomes of the project as well as lessons learnt; the latter to benefit the rollout of materials mapping to other Regions.

Other Regions should be introduced to the process and the same procedure can be followed for each of these. It must be noted, however, that other Regions might have totally different geological features, which may require development of the process from first principles each time. The ReCAP service provider appointed for this study should provide some general guidance on these issues to the project team of LoGITReC and TANROADS-CML.

The following AfCAP Logical Framework indicators would apply:

- **Outcome Indicator 1:** Improved engineering practices in road construction
- **Output Indicator 1.1:** Practices supporting cost-effective LVRR construction and maintenance
- **Output Indicator 2.1:** % research projects led by African researchers
- **Outcome Indicator 4:** Concrete example of change influenced by AfCAP applied to #km of road

Key Contacts:

President's Office – Regional Administration and Local Government (PO-RALG):

- Director of the Infrastructure Directorate: Eng Elina Kayanda
- Assistant Director: Planning and Research, and Head of LoGITReC: Dr Fikiri Magafu
- District engineers (information on borrow pits and other sources of road construction material)

Tanzania National Roads Agency (TANROADS):

- TANROADS Regional Managers (information on existing borrow pits and other sources of road construction material)

Central Materials Laboratory (CML) of TANROADS:

- Manager: Eng Mussa Mataka
- Staff involved with current road trials: Eng John Malissa and Salahe Juma

Other organisations in Tanzania:

- Ministry of Works
- Ministry of Energy and Minerals
- Ministry of Natural Resources and Tourism
- Ministry of Agriculture, Food Security and Cooperatives
- Universities

Key References:

Reports prepared by CML-TANROADS on aggregate surveys conducted in the Administrative Regions of Dodoma, Iringa, Mbeya and Morogoro. The report on the Mbeya Region (last of four reports) was produced in 1993. All four reports are available from the library of TANROADS-CML.

Project AFCAP/MOZ/091: Identification and Mapping of Calcrete Deposits in Inhambane Province and Preparation of a Calcrete Classification System and Specifications for the Use of Calcrete in Road Construction in Mozambique (Final Report, produced in March 2013 by TRL Limited, UK, in association with InfraAfrica (Pty) Ltd, Botswana and Hearn Geoserve Ltd, is available on the ReCAP website: www.afcap.org)

Concept Note Submitted by: B Verhaeghe on behalf of the Local Government Infrastructure and Transportation Research Centre (LoGITReC)

Organisation: President's Office – Regional Administration and Local Government (PO-RALG)

Date: December 2015

Concept Note Reviewed by (PMU)

Date:

PROJECT CONCEPT NOTE

Project Title:

Capacity Building and Skills Development Programme for the Laboratories of LoGITReC

Country/Countries/Region:

United Republic of Tanzania

Project Background:

In 2015, the Local Government Infrastructure and Transportation Research Centre (LoGITReC) of the President's Office - Regional Administration and Local Government (PO-RALG), with assistance provided by AfCAP, produced a *Road Research Strategic Plan*. This Plan outlines among others the strategic objectives, the institutional structure, the key performance indicators, the RDI¹ plan and the operational requirements of LoGITReC. The Plan was endorsed by the AfCAP National Steering Committee on 30 March 2015.

Following the endorsement of the Plan, LoGITReC established a Central Materials Research Laboratory (CMRL) on the premises of the Municipal Council in Dodoma at a cost of Tsh 60 million. The laboratory has been fitted out with basic equipment required for the testing of soils, gravels and aggregate. The equipment was purchased by AfCAP and donated to the then Prime Minister's Office - Regional Administration and Local Government (PMO-RALG) in 2014. All current equipment has been calibrated by the Tanzanian Bureau of Standards in 2015 at a cost of Tsh 5.8 million. However, additional test equipment to enable the laboratory to operate at full potential will be required and will have to be procured.

The current staff complement of LoGITReC's laboratory consists of a Laboratory Manager and five civil engineering technicians. The technicians have had very little exposure to road material testing prior to joining LoGITReC. Some basic training has been provided by the TANROADS Regional Laboratory in Dodoma during October-November 2015, but the general consensus among the trainees was that "further knowledge strengthening was required as a matter of urgency". The current status of their exposure to materials testing is described in the *Capacity Building and Skills Development Action Plan*" (latest version of this Plan is dated December 2015).

Concise Project Purpose:

The overall purpose of this project is to equip the laboratory of LoGITReC with the necessary skills and equipment to enable the facility to operate as a *reference and quality control laboratory* for PO-RALG and a *research laboratory* for LoGITReC. With respect to the latter in particular, the capacitation of the laboratory will enable LoGITReC to execute the research programme defined in the *Road Research Strategic Plan*, and more specifically the following four Priority Projects expected to be initiated in 2016:

1. Continued monitoring of existing road trials and establishment of new road trials;
2. Establishment of a national road material and aggregate inventory database;
3. Optimisation of delivery methods for the maintenance of local government roads;
4. Development of guidelines on the use of local and alternative materials in roads.

Although it is not a requirement for the laboratory to be formally ISO 17025 accredited, it would be expected that all systems and processes implemented in the laboratory are such that it operates as an accredited laboratory.

In order to achieve the above, the project has been structured into three main tasks, each with specific activities and deliverables as outlined in the Project Methodology section of this Concept Note.

¹ RDI: Research, Development and implementation

The objective of the **first** task is to train laboratory staff to the extent that they become fully proficient in the testing of (as a minimum) granular and cementitious materials. The objective of the **second** task is to implement the necessary processes and procedures in the laboratory so that the facility is able to operate efficiently and effectively. The objective of the **third** task is to procure the necessary equipment to ensure that the laboratory becomes fully functional and able to satisfy the basic requirements of PO-RALG and LoGITReC in particular in terms of road materials testing.

Previous or Related Work:

None to date, except for the assistance provided by AfCAP in support of the establishment of the research centre and specifically its materials testing laboratory, inclusive of testing equipment purchased by AfCAP and delivered to PMO-RALG in 2014.

Project Methodology:

It is recommended that the proposed project be undertaken as outlined below:

TASK 1: Capacitation of laboratory staff

Main activities to include:

- *Training at TANROADS-CML in Dar es Salaam.* One month dedicated training of all laboratory staff (i.e. Laboratory Manager and five laboratory technicians) at CML in Dar es Salaam. The staff will be trained in all Tanzanian test methods for unbound road construction materials in accordance with the procedures outlined in the *CML Laboratory Testing Manual*. The testing proficiency of each technician will be evaluated and certificates indicating their proficiency in conducting specific test methods will be issued by CML.
- *Hand-on training at the LoGITReC testing laboratory in Dodoma.* Since some of the testing equipment at the LoGITReC Laboratory in Dodoma is different from equipment used by CML, two weeks of dedicated training will be provided by the appointed Service Provider to ensure that the technicians become accustomed to their equipment, inclusive of their maintenance and calibration requirements. This training will also be used to hone in on test precision and repeatability, as well as the processing and reporting of test results.
- *Secondment of the Laboratory Manager to an ISO 17025 accredited research laboratory.* The Laboratory Manager will be seconded for a period of three weeks to an accredited research laboratory to be fully inducted in the operational and managerial requirements of a testing laboratory, inclusive of all systems and procedures required to operate the laboratory, both as a reference laboratory and a research laboratory.

TASK 2: Operational systems for the laboratory

Main activities to include:

- *Development of Protocols.* The appointed Service Provider will instil the necessary operational systems in the laboratory so that it can function efficiently and effectively as a reference and research laboratory. In Annexure B of the draft *Capacity Building and Skills Development Action Plan*, 'good practices for laboratory management and operations' are provided, but these general guidelines need to be converted into protocols for the LoGITReC laboratory, namely a procedural document on how the laboratory will deal with all operations pertaining to the efficient and effective running of the facility, from the handling of incoming samples to the verification of test results and reporting.
- *Development of a framework (specifications) for a laboratory management system.* The appointed Service Provider will develop the architecture of and specifications for a laboratory management system in consultation with both LoGITReC and TANROADS-CML, since both these organisations expressed the need for such a system. As a minimum, the system should provide for the referencing and cataloguing of samples as received and as

tested; the processing of raw test data and recording of test results; the production of standardised testing reports (per test); and the archiving of test data, results and reports. The physical development and implementation of the laboratory management system, inclusive of associated costs, will be shared between LoGITReC and TANROADS-CML.

TASK 3: Procurement of additional laboratory equipment

In order for the LoGITReC's laboratory to be fully functional and be able to satisfy the basic requirements of PO-RALG and LoGITReC in terms of road materials testing, there is a need for LoGITReC to procure additional testing equipment.

The full list of equipment, including safety equipment, is provided in the section 'Other Relevant Information' of this Concept Note. The total estimated cost, exclusive of shipment and all taxes, is €28,880 (GBP 22,454; Tsh 70.2 million). This amount includes a nuclear soil moisture density gauge, which is the single most expensive item on the list (€9,500; GBP 7,386; Tsh 23.1 million).

In their budget, LoGITReC has allocated Tsh 10 million for the purchasing of part of the equipment, and are looking at Development Partners to fund the difference.

Human Resources ReCAP Funded:

A service provider should be appointed with specialist knowledge on different road materials testing, and especially the testing of unbound materials. In addition to the above, the service provider must be highly experienced in the management of road research laboratories, and preferably an ISO 17025 accredited research laboratory, and must be fully proficient in all aspects of laboratory management, inclusive of sample management, work scheduling, sample preparation, materials testing, data processing and analysis, quality control, reporting of test results, and maintenance and calibration of equipment. The service provider must also be able to design laboratory management systems that meet client requirements (in this case, both LoGITReC and TANROADS-CML).

One of the key responsibilities of the service provider is to transfer knowledge and expertise to all staff in the LoGITReC laboratory, and particularly to empower the LoGITReC's Laboratory Manager in-country and at the service provider's home base (i.e. accredited testing facility) with all the necessary knowledge and expertise to enable the Manager to effectively manage the facility on completion of the assignment.

The service provider will be involved in the following activities:

- Task 1: Hand-on training at the LoGITReC materials testing laboratory in Dodoma (**10 working days** in Dodoma over a total period of 3 weeks in-country);
- Task 1: Mentoring of the Laboratory Manager seconded to the ISO 17025 accredited research laboratory (**8 working days** spread over period of 3 weeks at home base);
- Task 2: Development of protocols² and a framework for a laboratory management system (**3 working days** in Dodoma and **2 working days** in Dar es Salaam over a total period of 3 weeks in-country).

Parallel Resources – non ReCAP Funded:

All human resource costs of LoGITReC staff and all incidental expenses (per diem, accommodation and travel) associated with the training of laboratory staff in Dar es Salaam will be carried by PO-RALG.

² Part of the time allocated to hands-on training in Dodoma (Task 1, 10 days) should be used to develop protocols.

Other Resources:

The following cost items could be provided for as a provision sum:

- Training of LoGITReC laboratory staff at TANROADS-CML: **GBP 13,000** (Tsh 40 million)
- Two-week secondment of Laboratory Manager to an ISO 17025 accredited research laboratory, inclusive of air travel, local transport, per diem and accommodation: **GBP 1,600**
- Additional laboratory equipment (see 'Other Relevant Information'): **GBP 19,716** (exclusive of shipment costs and all taxes)

Project Outputs, Impacts, & Uptake Strategy:

Any road materials research laboratory is kernel to the very existence of research centres. They produce the necessary data to support the development of new technical guidelines, norms and standards.

In the *Road Research Strategic Plan* of LoGITReC, the following goals and strategic objectives are set for the Central Materials Research Laboratory:

- Establishing a state-of-the-art Central Materials Research Laboratory (CMRL) in Dodoma for supporting research activities and for conducting quality control testing of materials used in Local Government road works; and
- Capacitating the CMRL with the necessary personnel and equipment, as well as training of laboratory personnel, to enable the facility to operate as a reference laboratory for the regional materials laboratories of PO-RALG.

Following the establishment of the Laboratory, its purpose will be to:

- Provide services for quality control on local government construction projects;
- Undertake independent technical audits of selected road projects where quality is suspected to have been compromised (in association with research engineers);
- Provide laboratory and field testing in support of the research agenda of LoGITReC, and at nominal charges to other government departments, road authorities and the private sector;
- Test, calibrate and verify precision instruments, gauges, scientific apparatus and other laboratory and field measurement equipment to ensure compliance;
- Certify civil engineering laboratory technicians in association with other entities.

The purpose of this project is to capacity CMRL to such an extent that it will be equipped to start fulfilling its mandate as outlined above, resulting in the following outcomes:

- A fully functioning road materials testing laboratory, delivering credible test results.
- Well trained staff capable of carrying out the various test methods and having an understanding of the meaning of the results.
- Implementation of sound operational and management procedures in the Laboratory.
- Fully equipping the laboratory in line with its testing functions.

The deliverables of this project will include:

- Certificates issued by CML indicating which laboratory technicians are suitably qualified to conduct specific tests;
- Reports by the service providers on the testing proficiency of the laboratory technicians, including their ability to maintain and calibrate laboratory equipment;
- Report by the service provider on the outcomes of the mentorship programme developed for the Laboratory Managers;
- Protocols for the efficient operation and management of CMRL;
- Architecture for the Laboratory Management System;
- Fully equipped laboratory to undertake the testing of aggregates, concrete, unbound materials and stabilised materials.

Key Contacts:

President's Office – Regional Administration and Local Government (PO-RALG):

- Director of the Infrastructure Directorate: Eng Elina Kayanda
- Assistant-Director and Head of LoGITReC: Dr Fikiri Magafu
- Manager of the LoGITReC Laboratory: Eng Vincent Lwanda

Central Materials Laboratory (CML) of TANROADS:

- Manager: Eng Mussa Mataka

Key References:

MINISTRY OF WORKS OT THE UNITED REPUBLIC OF TANZANIA. 2000. Laboratory Testing Manual 2000.

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MAGAFU, F and VERHAEGHE B. 2015. Technical Assistance to PMO-RALG to Develop Road Research Capacity in Dodoma: Draft Road Research Strategic Plan for First Five Years in Operation. Project AFCAP/TAN2010A. Cardno Emerging Markets (UK).

VERHAEGHE, B. 2015. Technical Assistance to Tanzania Local Government Infrastructure and Transportation Research Centre (Interim Phase): Capacity Building and Skills Development Action Plan (Draft). Project AFCAP/TAN/2046A. Cardno Emerging Markets (UK).

Other Relevant Information:

FO-RALG plans to purchase the following laboratory equipment/tools and safety equipment, to a budget limit of Tsh 10 million (inclusive of shipment costs and all taxes):

- Laboratory equipment and tools:
 - Moisture containers (20 Nos) (€30);
 - Allen Keys (1 complete set) (€109);
 - Adjusting spanner for CBR moulds (2Nos for CBR mould size 150mm Ø) (€130);
 - Heavy compaction hammer (modified) 4.5kg as per BS 1377 (€59);
 - Mallet rubber hammer (Large & Small size) (€16);
 - Scoop (medium & small size) (€20);
 - Wash bottle for Atterberg limits (2Nos) (€5);
 - Riffle box, large size (€353);
 - Triple mounting stand (9Nos) (€278);
 - Swell reading gauge (9Nos) (€64);
 - Perforated discs (9Nos) (€258);
 - Sand replacement cylinder for measurement of field density (2Nos) (€708);
 - Desiccator for moisture control, 300mm Ø (€202);
 - Mixing trays (nesting) small size (860x860mm) (€43);
 - Mixing tray (nesting) large size (1000x1000mm) (€57);
 - Stop watch (€14);
 - Schmidt Hammer (3Nos) (€602).
- Safety equipment:
 - Over coats (Short sleeve – white colour, 2 No) (€36);
 - Over coats (Short sleeve – blue colour, 12 No) (€218);
 - Gum boots (8 pairs) (€148);

- Dust masks (8 dozens) (€42);
- Gloves (8 dozens) (€6);
- Heat protection cloths (2 No.) (€11);
- Earmuffs (3 No.) (€37);
- Helmets (8 No: 2x white, 4x blue & 2x red) (€79).

Based on a quotation received in December 2015 from *Controls Testing Equipment*, the total cost of the above items, excluding shipment costs and all taxes, is **€3,521** (GBP 2,738; Tsh 8.6 million).

PO-RALG is looking for a Development Partner to donate the following equipment to PO-RALG:

- Nuclear soil moisture density gauge (€9,500);
- Pavement core drilling machine (€3,343);
- 2,000kN compression testing machine enabling the laboratory to measure UCS, ACV, 10% FACT and concrete cube strength (€6,491);
- Triaxial cell (€623);
- One additional oven (€1,138);
- 50 kg balance, readable to 5g (€676);
- Balance readable to 0.01g (€1,088);
- Vibrating table (for concrete cube preparation) (€590);
- Riffle box (small size) (€186);
- Linear shrinkage moulds (10 No.) (€464);
- Vacuum desiccator (€259);
- Vacuum pump (€344);
- Thermometers (-10 to 110 C, 5 No.) (€659);

Based on the quotation received from *Controls Testing Equipment*, the total cost of the above items, excluding shipment costs and all taxes, is **€25,358** (GBP 19,716; Tsh 61.6 million).

Concept Note Submitted by: B Verhaeghe on behalf of the Local Government Infrastructure and Transportation Research Centre (LoGITReC)

Organisation: President's Office – Regional Administration and Local Government (PO-RALG)

Date: February 2016

Concept Note Reviewed by (PMU)

Date