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6th September 2017

Our ref: ZAM2060B

Dear Tenderer,

INVITATION TO TENDER FOR "Development of Pavement and Geometric Design Standards for Low Volume Roads (Rural and Urban) in Zambia"

The documentation for the above project is attached to this letter. It includes:

A. Terms of Reference

1. Introduction
2. Objectives
3. Scope of Services
4. Procurement of Consultancy Services
5. Job Descriptions
6. Estimated Time Inputs and Fees Budget

B. Project Implementation

1. Rationale
2. Strategy
3. Work Programme

C. Instructions for Submitting Applications

1. General
2. Deadline for Submission

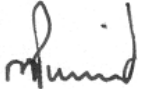
D. Annex 1

1. Curriculum Vitae V Template
2. Curriculum Vitae
3. Statement of Availability

Any clarifications sought on this tender must be sent to the Project Director no later than **Friday 22nd September 2017, 17.00 hrs UK time**. Any response provided will be circulated to all tenderers tendering for a particular position.

We look forward to receiving your tender before the deadline set in Item Part C – Instructions for Submitting Applications – **Friday 29th September 2017, 17:00 UK time**. Please send it to the Project Director appointed by ReCAP for the project at the following e-mail address: mipinard@global.bw.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'M I Pinard', with a stylized flourish at the end.

M I Pinard
Project Director

Development of Pavement and Geometric Design Standards for Low Volume Roads (Rural and Urban) in Zambia

PROJECT REFERENCE: ZAM2060B

A. TERMS OF REFERENCE

1. INTRODUCTION

Currently, there are no local design guidelines specific to the design of low volume rural and urban roads. For this reason, the Road Development Agency (RDA), through its Research and Development Unit (RDU), has embarked on a project to develop a manual for pavement and geometric design standards to ensure uniformity in the design of low volume rural and urban roads throughout the country. It is envisaged that the manual will be published in two volumes as indicated below:

- (a) Volume 1: Pavement Design Standards
- (b) Volume 2: Geometric Design Standards

2. OBJECTIVES

The specific objectives of the assignment are to develop a standard pavement and geometric design manual for low volume rural and urban roads in Zambia, taking the following into consideration:

- Design of the road pavement in order to apply appropriate pavement structure and surfacing material types, layer thicknesses and configurations to ensure that the pavement performs adequately and requires minimal maintenance under the anticipated traffic loading for the design life adopted.
- Appropriate use of locally-available materials and environmentally-optimised designs
- Development of geometric design standards for urban and rural roads which shall be applied to new construction or improvement projects.

3. SCOPE OF SERVICES

The specific assignment under these terms of reference is the **development of pavement and geometric design standards for low volume urban and rural roads in Zambia.**

The Consultant shall collect and review all relevant existing data, information and standards relating to the design of urban and rural roads in Zambia and the prevailing design practices for these two types of roads.

The assignment involves the drafting of the Design Manual, in two volumes: pavement design and geometric design, and covering design methodologies and specifications for low volume rural and urban roads in Zambia. The project

will draw on the findings of SEACAP research, AFCAP research carried out in Tanzania, Malawi, Kenya, Ethiopia and the SADC region, international best practice, and other recent relevant innovations in the provision of LVRs. A significant part of the relevant innovations is contained in recent LVR design manuals prepared for Tanzania, Ethiopia, Mozambique and Kenya under AFCAP.

The scope of the two manuals will be as follows:

(a) Volume 1: Pavement Design Standards

The pavement design of low volume rural and urban roads needs to provide simple and easily applied methods for determining appropriate pavement structures for the respective networks to ensure:

- consistent design criteria in the design of pavement structures for urban and rural roads according to their performance requirements, and thus provide a clear guide for less subjective decisions on road design;
- consistent, safe and reliable road facilities for movement of traffic.

Currently, there are no local design guidelines specific to pavement design of low volume rural and urban roads, although a guide for general pavement design exists in the form of a pavement design manual for the Government of the Republic of Zambia, entitled "Recommendations on the road design standards – Pavement design guide" of 1994, which the consultant is expected to make reference to in the execution of this assignment, in addition to other relevant design standards not limited to SATCC Code of Practice for the Design of Road Pavements.

Therefore, the purpose of this assignment is to provide the Road Development Agency (RDA), Local Road Authorities (LRAs), Consultancy firms and Contractors a detailed pavement design manual covering all materials, design, construction, maintenance and environmental considerations for low volume rural and urban roads projects. The guide shall:

- serve as a pavement design reference that users can utilize to check typical values, methods and practices;
- provide approved policies and procedures for pavement design for use on low volume urban and rural roads projects;
- provide pavement engineers with a uniform, streamlined process for designing pavements;
- serve as a guide to pavement engineers for selecting appropriate pavement construction and rehabilitation strategies.

The specific tasks under this assignment will include but not limited to:

- Develop pavement design guide for low volume rural and urban roads for flexible and rigid pavements (concrete and concrete pavers). In designing the concrete pavers pavements, the consultant is required to review the standards currently in use on the Pave Zambia Project. Consideration to geometry, thickness and strength of pavers must be given in the design.

- Develop pavement design standards that shall include but not limited to the following;
 - Provision to consider safety and access to all road users, being motor vehicles, cyclists and pedestrians and other non-motorised traffic;
 - Pavement design life selection criteria;
 - Design traffic loading, showing the procedure and various ranges of equivalent standard axles to be considered during the design process. The consultant is expected to obtain existing data on traffic counts and static vehicle axle load surveys where available;
 - Design Traffic Class to classify the various traffic categories for the pavement structures suggested;
 - The classification of the sub-grade conditions in terms of the California Bearing Ratio (CBR), and alternatively, using DCP-DN design catalogues, to represent realistic conditions for design;
 - Method for classifying sub-grade design CBR (design sub-grade strength) and recommended minimum sub-grade depth meeting design strength and alternatively using DCP-DN catalogues;
 - Provide guidelines on the selection of the appropriate pavement design based on moisture influence i.e. specific pavement structures for either nominally wet or nominally dry regions
 - The design should include the nominal material strength classifications for the base, sub-base and the capping/wearing course/selected layer. The materials to be considered are granular, cemented and bituminous.
 - The pavement design standards should have due consideration for topography, geology, climate, environment, heritage of the site and provide low cost of ownership (environmentally-optimised design);
 - A section on pavement design for unsealed low volume rural roads taking into account the local environmental and other conditions.

- In developing the pavement design standards, the team of experts shall take into account the following, where appropriate, although not limiting:
 - Subsurface conditions;
 - Pavement materials;
 - Design traffic;
 - Design of new flexible pavements (bituminous seal coat and asphalt concrete including cold-mix asphalt);
 - Design of new rigid pavements;
 - Design of unsealed (gravel) pavements;
 - Life Cycle Cost Analysis;
 - Cycle-path and footpath pavements;
 - Pavement drainage;
 - Intersections;
 - Roundabouts;
 - Traffic calming (slow-points, curb extension and speed humps);
 - Parking Areas;

- Check points. Note that these sections are prone to pavement deformations due to constant and prolonged traffic loading resulting from slow traffic movements and frequent stoppages, therefore consideration should be given to propose specific design to address this challenge, which may be different from the entire stretch of the road on which the check point is located.

(b) Volume 2: Geometric Design Standards

The principles of design for urban and rural low volume roads are similar in most aspects, hence the need to have the standard specifications for the geometric design of both considered side by side. Roads in urban areas, however, are characterized by busy pedestrian activities and frequent stopping of vehicles owing to short intersection spacing and congested built-up areas. Lower design speeds are usually adopted for urban roads and different cross-sectional elements are applied to take into account the nature of traffic and adjoining land use. It is for these reasons that variations in certain aspects of geometric design should be incorporated for these two types of road.

For the purposes of planning, design, rehabilitation and construction of roads in Zambia, having uniform standard design criteria is of great importance. The lack of standard design specifications has led to inconsistencies in geometric solutions being adopted by local authorities across the country and different design approaches being used by consultants.

It is against this background that RDA has requested AfCAP support to develop geometric design standards for low volume rural and urban roads. It is envisaged that this manual, once finalized, will ensure consistency in geometric design of the rural and urban low volume road networks throughout Zambia. The guide shall:

- serve as a geometric design reference that users can utilize to check typical values, methods and practices;
- provide approved policies and procedures for geometric design for use on low volume urban and rural roads projects; and
- provide engineers with a uniform, streamlined process for geometric design low volume urban and rural roads.

The specific tasks under this assignment will include but not limited to:

- Develop geometric design standard specifications that shall:
 - provide safe, short and fast roads and access to all road users, which include motor vehicles, cyclists and pedestrians, as well as other non- motorised traffic (NMTs);
 - clearly convey the primary function to road users;
 - deliver traffic volumes at speeds compatible with function;
 - provide convenient location for services;
 - provide an opportunity for landscaping;
 - allow for parking, where appropriate;

- have due regard to topography, geology, climate, environment and heritage of the site;
 - provide low cost of ownership;
 - comply with these standards and relevant Roads Act and other Local Authorities' guidelines and/or standards.
- Provide operating speed guidelines as a percentile speed of cars when traffic volumes are low considering that, traditionally, design speed has been a basic parameter in determining road standards and is a function of the road classification;
 - The consultant shall ensure that the geometric standards suitably assimilate into the design and layout with due consideration for the critical performance elements such as technical compliance, safety, environmental compatibility, amenity, accessibility, convenience and economy among other factors.
 - The consultant shall develop urban road design criteria which shall include but not limited to the following features:
 - Functional Classification and traffic requirements;
 - Design Vehicles;
 - Cross Sections which include general cross sections, travelled way, medians, shoulders, parking lanes, planted strip, frontage road, outer separation, sidewalks, clearance etc;
 - Sight Distance;
 - Horizontal Alignment considering appropriate curve parameters including super-elevation;
 - Vertical Alignment considered appropriate grade parameters, climbing lanes, vertical curves etc;
 - At-Grade Intersections outlining general design considerations, alignment near intersections, cross section near intersections, right and left turning lanes;
 - Verges and Property Access;
 - Roundabouts which should include determination of location and size of the circle considering traffic volumes and geometry etc.;
 - Traffic calming (thresholds, slow-points, speed humps, splitter islands etc.);
 - Parking;
 - Drainage;
 - Marking;
 - Utilities.

- The consultant shall develop rural road geometric design criteria which shall include but not limited to the following features:
 - General consideration of the road hierarchy;
 - Sight distances;
 - horizontal and vertical alignment;
 - Intersections;
 - Plan transitions;
 - Carriageways (cross section);
 - Super-elevation, where deemed essential;
 - Drainage and scour protection (explore incorporation of water harvesting features such as road dams, sand dams and other structures);
 - In the developing of these geometric standards, the following types of pavements shall be considered and appropriate parameter limits designed for the features indicated above for both urban and rural roads; (a) bituminous seals, (b) bituminous asphalt concrete pavement and (c) cement concrete pavement, and d) discrete paving elements such concrete pavers, cobblestones and others.

- The consultant shall include as part of the geometric design standard specifications the following standard drawings, only in as far as they relate to low volume roads, albeit not limiting:
 - Bus Bays – Setting Out Details;
 - Extruded Sections such as Barrier;
 - Guide Posts – Location and Details;
 - Junction Kerbing and Lane Details;
 - Truncations;
 - Local Road Median Island Set Out Details;
 - Keep Left Sign Installation Details;
 - Road Hump and Rumble strips;
 - Rural Road Cross Section;
 - Carriageway Formation and Staging

In preparing the standard drawings, the consultant is expected to indicate the appropriate scales for each type.

4. PROCUREMENT OF CONSULTANCY SERVICES

In order to undertake the preparation of the manual comprising the pavement and geometric design standards outlined above, the Contracting Authority, Cardno, will initially appoint an organization to manage the project. The appointed organization, through its Project Director, will subsequently undertake a transparent recruitment process to make recommendations to ReCAP and RDA for a suitable Expert Team to undertake the preparation of the manual.

The Expert Team will comprise the following individuals:

- a) A Team Leader
- b) A Lead Author – Pavement Design
- c) A Lead Author – Geometric Design
- d) Ad Hoc specialists – Urban Pavements, Urban Geometric Design and Road safety (to be appointed after selection of core team).

5. JOB DESCRIPTIONS

5.1 Team Leader

(a) Overall Job Description

To provide overall leadership and strategic direction to ensure that the objectives of the project are fully met, that the manuals are of the requisite quality and are delivered on time and budget.

(b) Specific Duties and Responsibilities

- i. To provide direction and coordination of all activities related to the development of the manuals.
- ii. To organise and integrate the inputs of the Senior Authors to ensure alignment with previous manuals and incorporation of lessons learnt in their application in practice.
- iii. To deliver the project outputs in close liaison with the Senior Authors and in a manner that produces the most cost-effective, time-effective and quality-effective manuals.
- iv. To liaise with all relevant stakeholders on project related matters.
- v. To take the lead role in facilitating all project workshops and meetings.
- vi. To prepare all project reports (mobilization, inception, workshop, etc.)
based on inputs from team members.
- vii. To review all relevant LVR manuals and gap analysis.
- viii. To prepare the layout of manual (Structure, ToC, etc.) prior to DTP.
- ix. To oversee the DTP and printing of the manuals and production of USBs

(c) Required Qualifications and Experience

- i. A competent and experienced, internationally recognised individual with at least an MSc in Civil Engineering or equivalent and a minimum of fifteen (15) years post-graduate experience.
- ii. A research background and team leadership experience in at least three similar projects.
- iii. Intimate knowledge of LVR Manuals recently prepared with AfCAP support.
- iv. Proven Project Management skills and an ability to deliver consultancy assignments in the road sector.
- v. Proven expertise in preparation and review of manuals, specifications, and similar documents for low-volume roads in similar contexts.
- vi. Considerable knowledge of international best practice and recent innovations in the provision of LVRs.
- vii. Design and implementation of research programmes for LVRs in Africa.
- viii. Research skills including data collection, analysis and documentation.
- ix. Excellent communication and presentation skills.
- x. Intimate knowledge of English.

5.2 Lead Author – Pavement Design

(a) Overall Job Specification

To prepare the Pavement Design Manual in line with the requirements listed in Section 1.1 (a) above.

(b) Specific Duties and Responsibilities

- i. Review all relevant LVR manuals and undertake a gap analysis.
- ii. Progress the drafting of the manual to its final stage, taking account of comments raised by stakeholders and the peer reviewer.
- iii. Incorporate inputs from an Ad Hoc Specialist on urban pavement design.
- iv. Participate in all meetings and workshops and to take the lead in presenting the various draft finals.

(c) Required Qualifications and Experience

- i. A competent and experienced, internationally recognised individual with at least an MSc in Civil Engineering or equivalent and a minimum of fifteen (15) years post-graduate experience.
- ii. Knowledge, experience and understanding of the use of local resources and labour-based methods for the construction and maintenance of rural and urban roads in the region.
- iii. Pavement design for low volume rural roads using a range of materials including chemical stabilisation.

- iv. An intimate knowledge of the DCP–DN pavement design method essential).
- v. Design of bituminous seals, including cold-mix asphalt, for low volume sealed roads.
- vi. Procedures for site supervision including quality control and site records, and the use of DCP for quality control during construction.
- vii. Site experience in the implementation of chemical stabilisation and construction of low cost surfacings
- viii. Options for low volume rural and urban roads. Use of discrete elements (concrete pavers, cobblestones, etc) for paving LVRs.
- ix. Excellent communication and presentation skills.
- x. Intimate knowledge of English.

5.3 Lead Author – Geometric Design

(a) Overall Job Specification

To prepare the geometric Design Manual in line with the requirements listed in Section 1.1 (b) above.

(b) Specific Duties and Responsibilities

- i. To review all relevant LVR manuals and undertake a gap analysis.
- ii. To progress the drafting of the manual to its final stage, taking account of comments raised by stakeholders and the peer reviewer.
- iii. To incorporate inputs from Ad Hoc Specialists on urban design and road safety.
- iv. To participate in all meetings and workshops and to take the lead in presenting the various draft finals.

(d) Required Qualifications and Experience

- i. A competent and experienced, internationally recognised individual with at least an MSc in Civil Engineering or equivalent and a minimum of fifteen (15) years post-graduate experience.
- ii. Knowledge, experience and understanding of the particular requirements for the design of LVRs in typical rural, peri-urban and urban environments in a context sensitive manner.
- iii. Knowledge of past and recent regional and international research on the influence of geometric design elements, including road marking and features in the road environment, on driving speed, driver behavior and accident rates.
- iv. Knowledge of recent developments in geometric design including a move to a human factors based design philosophy and its influence on the design of LVRs in rural and urban environments.
- v. Good communication and presentation skills. vi. Intimate knowledge of English.

6. ESTIMATED TIME INPUTS AND FEES BUDGET

Expert Team Positions	Time Input (Days)	Fee Budget (UK Pounds Sterling)
Project Director	10	6,500.00
Team Leader	43.5	28,275.00
Lead Author (Pav Design)	33.0	21,450.00
Lead Author (Geo Design)	28.0	18,200.00
Specialist (Urban Pavements)	8.5	5,525.00
Specialist (Urban Roads)	9.5	6,175.00
Specialist (Road Safety)	10.5	6,825.00

B. PROJECT IMPLEMENTATION

1. RATIONALE

The Terms of Reference (ToR) provide a strong rationale for undertaking the project – essentially that there are currently no local guidelines specific to the design of low volume rural and urban roads in Zambia. Consequently, the objective of the project is simply to develop manuals for pavement and geometric design standards to ensure uniformity in the design of low volume roads (LVRs) in rural and urban areas throughout the country.

The ToR rightly emphasise the need to ensure that the manuals provide *simple and easily applied methods* for determining appropriate pavement structures for the types of LVRs envisaged in both rural and urban environments in Zambia. Simplicity and ease of application will require that the manuals are “user friendly”, i.e. well written, well laid out and well-illustrated with step-by-step design procedures, where appropriate, to guide practitioners in their application in practice.

The manuals will also need to take account of the significant developments that have taken place in various aspects of LVR technology in the past few decades. These developments are based, in large part, on UK DFID-supported LVR research and investigations carried out in Asia and Africa under the SEACAP and AfCAP programmes respectively. The outputs of these programmes have not only questioned many of the accepted approaches to the provision of LVRs, but have also shown quite clearly the need to revise them in line with new developments. This has led to an increasing move away from the conservative, and often inappropriate, approaches of the past to more progressive approaches informed by research and performance-based evidence, including the development/recognition, amongst others, of the following:

- An environmentally optimised approach to the provision of LVRs that is task-based and appropriate to the local road environment in terms of a variety of impacting factors.

- A need for the adoption of optimized standards for the various LVR classes that are primarily design traffic related, are “fit-for-purpose” and are affordable to enable the Government of Zambia to expand and maintain the LVR network.
- The likely impact of climate-related events specific to the road environment with due consideration to the adoption of appropriate climate-adaptive countermeasures.
- The selection of locally available construction materials based on the use of performance-based specifications and appropriate methods of testing that has widened the scope for incorporating a wider range of such materials in LVR pavements.
- The use of simplified, but relatively robust, methods of pavement design, such as that based on the Dynamic Cone Penetrometer (DCP-DN) method, with the objective of providing a range of cost-effective pavement solutions that are appropriate to the local road environment.
- An increased focus on the provision of appropriate pavement side drainage, cross-drainage and finish road level design in relation to the drain invert level (drainage factor) to ensure that the pavement operates in as dry a state as possible.
- The use of a number of labour-friendly surfacings such as Cold Mix Asphalt that can be constructed with locally available, naturally occurring aggregates and simple plant and equipment.
- The use of enhanced levels of compaction to maximise pavement layer stiffness, minimise pavement layer deflections and reduce material permeability, coupled with improved but simplified methods for compaction quality control using the DCP.
- Adoption of more appropriate geometric cross-section elements, including road widths, to cater for variable travelling speeds as dictated by traffic volumes (AADT), local vehicle characteristics and prevailing topography.
- A need to cater for a significant amount of non-motorized traffic, especially in urban/peri-urban areas, coupled with a focus on the adoption of a range of low-cost road safety measures.

As regards the geometric design of rural and urban LVRs, cognizance needs to be taken of recent state-of-the-art developments in geometric design which have caused a paradigm shift in terms of the approach to designing roads. As a result, the following new concepts will need to be taken into account in the development of the geometric design manual:

- A move to a human factors based philosophy of design.
- Adoption of a multidisciplinary approach, generally referred to either as context sensitive design (CSD) or context sensitive solutions (CSS).
- Extended Design Domain (EDD) concept.

Of particular relevance is the emergence of the “Complete Streets Concept” which focuses on providing for the safe mobility of all travelers in urban and rural areas, not just those in motor vehicles.

Careful consideration of the above issues, amongst others, will feature prominently in the development of the LVR manuals. It is also appreciated that the previously developed AfCAP and SEACAP provide a valuable source of information that can be customized for application to the Zambian environment. However, since then, there have also been many lessons learnt from the application of the manuals in practice, as well as from the auditing of the design and construction of LVRs in the region, that will enhance the content of the new manuals.

2. STRATEGY

2.1 General

A well-conceived strategy is absolutely essential for the attainment of the project objectives. To this end, the Tenderer’s strategy for addressing the issues listed in Annex III of the tender dossier is presented below.

2.2 Recruitment of Team Experts

The procurement model stipulated for the recruitment and contracting of the Team Experts is an unusual one in that, as is normally the case, the entire project team is not being recruited via a single organizational entity. Instead, a Project Director will first be recruited and, subsequently, he/she will be responsible for recruiting individuals to comprise the project implementation team. Whatever the pros and cons of the approach may be, it is aimed essentially at achieving three key objectives, namely:

- Achieving Value for Money in the recruitment process
- Recruiting high calibre team members
- Engaging partner organisations in the recruitment process

The manner of attaining the above objectives is discussed briefly below.

1) ***Achieving Value for Money in the recruitment process***: This essentially entails adopting a process that is likely to result in the selection of an individual at the right, rather than necessarily the lowest, cost who offers a number of important personal attributes that will contribute to his success as a team member. The assessment of value for money will then require evaluation of a number of both tangible and non-tangible attributes including:

- i. Qualifications
- ii. Background in LVR research and practice
- iii. Previous experience in similar projects
- iv. Reliability
- v. Professionalism

Open and effective competition should be the central operating principle behind the procurement process as a means of providing new entrants an opportunity to bid. Achieving this goal will require a recruitment process that:

- i. is widely advertised in the African region.
- ii. is initiated in sufficient time to allow individuals to respond in a considered manner.
- iii. provides a clear job description and attributes required for each of the team positions required.
- iv. includes a fair and transparent process for evaluating applicants.

2.3 Proposed Team Structure, Roles and Responsibilities

1) **Team structure:** As per the ToR, under the direction of a Project Director, and notwithstanding the terminology used in the ToR to describe the key positions, the Expert Team is envisaged to include a Team Leader/Lead Author, and Senior Authors responsible for the pavement and geometric design manuals, supplemented as necessary, by short inputs from specialists in specific technologies such as expert in urban road design (intersections, roundabouts, etc.) and road safety which is a particular challenge in Zambia where road accidents cost the country about 2.3% of its GDP .

Collectively, the Expert Team would be expected to have extensive experience in the underlying theoretical aspects of LVR design as well as the practical application of these principles to the design of roads in the eastern African region - **attributes that are needed to ensure that the final output meets all the requirements of the ToR and is to the Client's full satisfaction.**

In accordance with this approach, the following team structure is proposed.

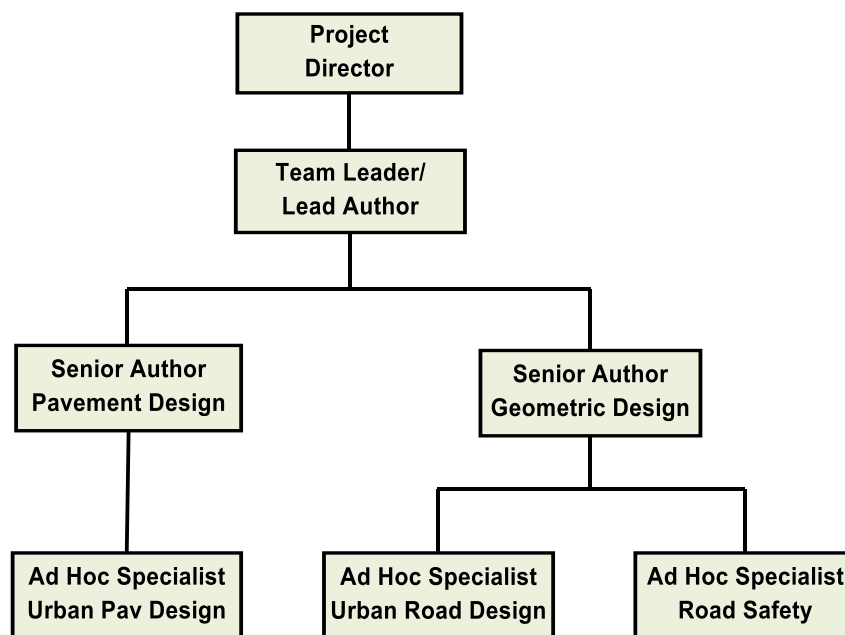


Figure 2-1: Proposed team structure

2) **Roles and responsibilities:** The envisaged roles and responsibilities of the team members are summarized below:

Project Director: Will be responsible for the following activities:

- Recruiting and contracting the Expert team including preparation of the Team Selection Report.
- Participating in the kick-off meeting.
- Attending to all contractual matters between the Client and the Consultant.
- Developing and confirming a definitive Work Programme, in consultation with the RDA.
- Managing the day-to-day work of the project and exercising financial and administrative control of the Consultant's operations by identifying, tracking and resolving project issues.
- Communicating and maintaining liaison with the RDA and other parties.
- Ensuring quality management and assurance on the project
- Identifying, managing and mitigating project risk.
- Managing the scope of the project to ensure that final delivery is fully in accordance with the requirements of the ToR.
- Managing the overall schedule to ensure that work is assigned and completed on time and within budget.
- Overseeing the desktop publishing and printing of the final manuals.
- Client invoicing and billing.

Team Leader/Lead Author: Will be responsible for the following activities:

- Direction and coordination of all activities related to the development of the manuals.
- Organising and integrating the inputs of the Senior Authors to ensure alignment with previous manuals and incorporation of lessons learnt in their application in practice.
- Delivery of project outputs in close liaison with the Senior Authors and in a manner that produces the most cost-effective, time-effective and quality-effective manuals.
- Liaison with all relevant stakeholders on project related matters.
- Lead participation in all project workshops and meetings.
- Preparation of all project reports (mobilization, inception, workshop, etc.) based on inputs from team members.
- Review of relevant LVR manuals and gap analysis.
- Preparation of aspects of the Pavement Design Manual.
- Layout of manual (Structure, ToC, etc.).

Senior Author–Pavement Design. Will be responsible for the following activities:

- Participation in all project workshops and meetings.
- Inputs to drafting of all project reports.
- Preparation of all stages of the Pavement Design Manual.

Senior Author–Geometric Design. Will be responsible for the following activities:

- Participation in all project workshops and meetings.
- Inputs to drafting of all project reports.
- Overseeing the preparation of the standard drawings.
- Preparation of all stages of the Geometric Design Manual.

Ad Hoc Specialist I- Pavement Design: Will be responsible for the following activities:

- Participation in mobilization meeting and Manuals Review Workshop.
- Specialised inputs on selected aspects of urban pavement design including intersections, roundabouts, parking areas, etc.
- Inputs to drafting of Pavement Design Manual.

Ad Hoc Specialist II- Geometric Design: Will be responsible for the following activities:

- Participation in mobilization meeting and Manuals Review Workshop.
- Specialised inputs on selected aspects of urban road design including layout of intersections, roundabouts, parking areas, etc.
- Inputs to drafting of Geometric Design Manual.

Ad Hoc Specialist III- Geometric Design: Will be responsible for the following activities:

- Participation in mobilization meeting and Manuals Review Workshop.
- Specialised inputs on selected aspects of urban road safety including roadside/pedestrian safety, traffic calming, safety barriers, street lighting.
- Inputs to drafting of Geometric Design Manual.

2.4 Terms of Reference for Individual Team Positions

As indicated in the recruitment strategy above, it is necessary to provide a clear job description and attributes required for each of the team positions required. This will provide a good basis for applicants to tailor their curriculum vitae (CV) which will require to be structured in a manner that allows their experience and credentials to be communicated clearly and unambiguously and to be matched against the job description. It is proposed that the structure for each of the key experts will be as follows:

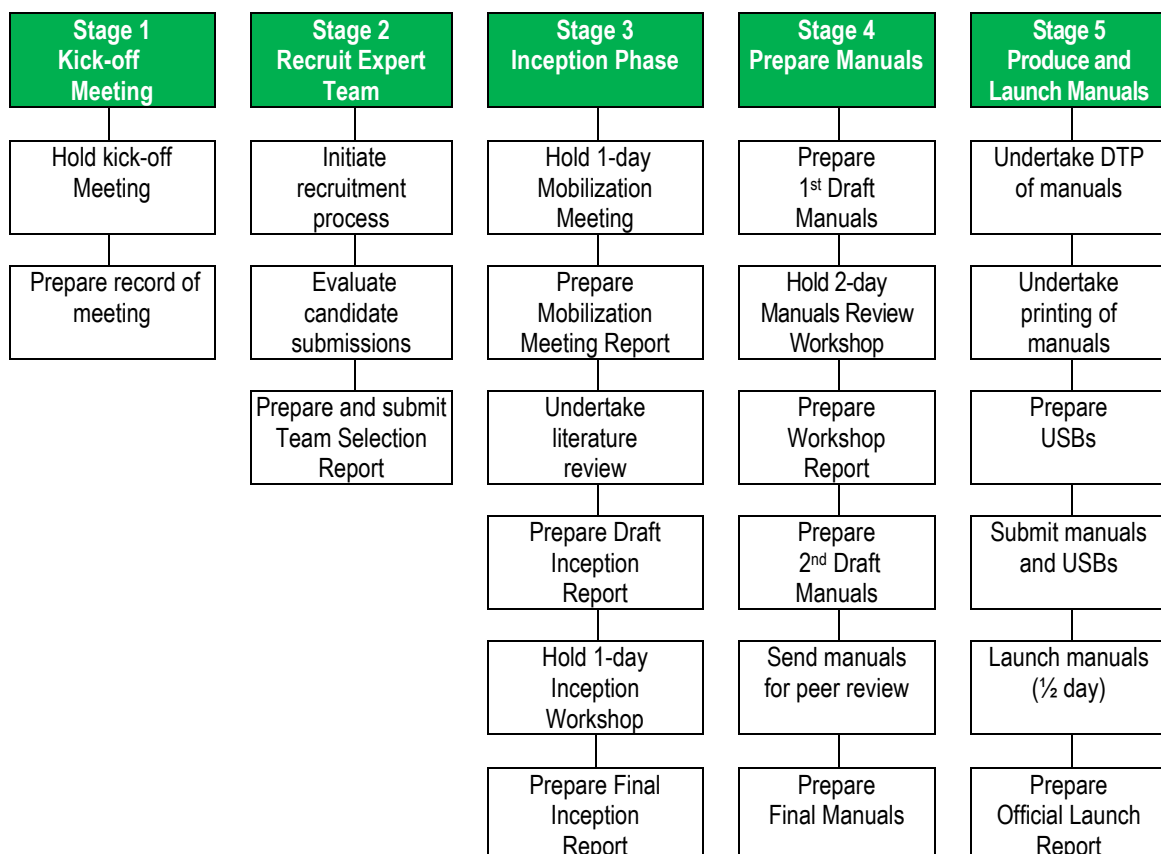
- i. Personal data
- ii. A Career Summary
- iii. Key Qualifications
- iv. Education and Professional Status
- v. Experience Record
- vi. A project compliance grid which lists achievements and experience against the specified fields of responsibility
- vii. Language ability
- viii. Publications

The ToR for each of the key positions is presented in Annex 1, whilst a proforma for the preparation of the CV, in line with the above structure, is presented in Annex 2 which also includes a project compliance grid.

2.5 Outline Approach for Contract Implementation/List of Proposed Tasks to Achieve Contract Objectives/Inputs and Outputs

- 1) **Outline approach:** the outline for implementing the contract is summarized in Table III-1 which shows the general scope of the study and its main components. As indicated in the table, the project has been broken down into five phases that are related to its key outputs, as stipulated in the ToR. Each phase includes a list of the proposed tasks considered necessary to achieve the contract objectives as discussed below.

Table 2-1: General approach to carrying out project



2.6 Proposed Tasks to Achieve Contract Objectives, Inputs and Outputs

The proposed tasks envisaged to achieve the contract objectives as well as the related inputs and outputs are discussed below:

2.6.1 Stage 1 – Kick-off Meeting

➤ **Objective**

To initiate the commencement of the project in Zambia, involving the Contracting Authority (Cardno), the Client (RDA) and the Consultant (Project Director). The opportunity will be taken to explain the modus operandi for undertaking the project and to seek the Client's views on any factors that might affect its implementation.

➤ **Approach and methodology (inputs)**

In order to achieve the above objective, a 1-day Kick-off meeting will be held in Zambia within 2 weeks of the signing of the contract between AfCAP and the Consultant. The Project Director will participate in this meeting and will prepare a record of the Kickoff meeting.

➤ **Outputs**

A report on the key issues discussed and agreement reached at the Kick-off meeting.

2.6.2 Stage 2 – Recruit Expert Team

➤ **Objective**

To recruit the Expert Team for participating in the implementation of the contract within a 6-week period.

➤ **Approach and methodology (inputs)**

In order to achieve the above objective, a recruitment process will be undertaken by the Project Director based on the strategy outlined in Section 2.2 above, and as may be refined during the contract negotiation period. In addition: the ToR prepared initially by the Consultant for the various positions on the project team will be finalized after discussion with ReCAP/RDA; an evaluation will be undertaken of the submissions for the various positions on the project team; a Team Selection Report will be prepared including recommendations to ReCAP and the RDA for a suitable team to complete the project.

Outputs: A Team Selection Report for consideration by ReCAP and RDA.

2.6.3 Stage 3 – Inception Phase

➤ **Objectives**

The objectives of the Inception Phase of the project are two-fold, viz:

- (1) To hold a 1-day mobilisation meeting with the RDA and Technical Steering Committee (TSC) to review, update and discuss issues related to the content and structure of the manual, as well as the approach and methodology for undertaking the project.

- (2) To review the LVR manuals prepared for Tanzania, Mozambique, Kenya and Ethiopia with AfCAP support in 2016, as well as other relevant documentation from Zambia and from other organisations, such as TRL and SATCC.

➤ **Approach and methodology (inputs)**

- (1) In order to achieve the first objective indicated above, the entire project team (core plus ad hoc experts) will participate in the meeting at which they will: provide an update on the activities undertaken since the commencement of the project; present their outline approach for undertaking the project; present their envisaged scope and content of the new manuals for discussion and agreement with the RDA/TSC.
- (2) In order to achieve the second objective indicated above, the entire project team (core plus ad hoc members), will be provided with the relevant documentation cited above for their close review in relation to the requirements of the ToR. This exercise will provide the basis for customizing the available documentation for use in the drafting of the new manuals. In the process, a gap analysis will also be undertaken to determine where new information is required to satisfy all the requirements of the ToR.

The completion of the above exercise will be a Draft Inception Report which will then be presented at a 1-day Inception Phase Workshop in Lusaka for discussion with the RDA prior to its finalization. It is assumed that the Technical Steering Committee (TSC) will participate in this workshop (no separate meeting is planned to be held with them) and will provide their comments for incorporation in the Final Inception Report.

➤ **Outputs**

- (1) A mobilization meeting report recording the agreements reached at that meeting.
- (2) A final Inception Report that will include the following:
 - i) The preparatory activities undertaken since the commencement of the project.
 - ii) A detailed methodology and programme for undertaking the project.
 - iii) The proposed time inputs for the core team of experts as well as for the ad hoc experts.
 - iv) The outputs of the literature survey.
 - v) The proposed content, structure and format of the manual.

It is assumed that items ii) and iii) above would have been substantially agreed by RECAP on the basis of the Tenderer's submission for the Project Director position and are unlikely to be changed after the contract has been awarded.

2.6.4 Stage 4 – Prepare Manuals

➤ **Objective**

To draft and finalise the manuals after presentation and discussion at a 2-day Manuals Review Workshop (1st Draft Manual) as well as on the basis of comments made by the peer reviewers on the final 2nd Draft Manual.

➤ **Approach and methodology (inputs)**

In order to achieve the above objectives, the entire project team (core plus ad hoc members), will be involved in drafting the manuals based on the outcome of the literature review undertaken during the literature phase and the format, structure and content of the new manuals agreed with the RDA during the Inception Phase of the project. As discussed in Section 1.2 i), it is assumed that the scope of the pavement design manual will be restricted to the detailed list of topics included in Section 3.5 of the ToR.

The 1st draft of the manuals will then be presented at the 2-day Manuals Review Workshop at which it is expected that the full complement of the TSC will be present and will subsequently produce their written comments. On this basis, their comments will be incorporated in the 2nd Draft manuals which will then be subjected to an external peer review process. Any comments from this process will then be taken into account in preparing the final manuals after which they will be proof-read in readiness for DTP and printing.

➤ **Outputs**

The final output of Stage 4 will be the approved Pavement Design Manual and Geometric Design Manual based on the preceding developmental stages involving TSC and peer review of the 1st and 2nd Draft manuals respectively.

2.6.5 Stage 5 – Produce and Launch Manuals

➤ **Objectives**

The objectives of the final stage of the project are:

- 1) To finalise the manuals based on the peer review comments on the final (2nd) draft manual.
- 2) To undertake DTP of the final manuals
- 3) To print the final manuals
- 4) To launch the manuals

➤ **Approach and methodology (inputs)**

Upon completion of the manuals, they will be proof-read by the entire project team and finalized by the Team Leader. The final product will then be sent to a DTP specialist for final layout. From experience of a number of previous manuals, this DTP activity is not as simple as it may seem and will require very tedious and time-consuming checks to ensure that the final layout is a faithful reproduction of the computer generated master copy. Thereafter, the print-ready DTP documents will be sent for printing in full colour and with “perfect” spine binding.

Upon completion of the printed manuals and production of the requisite 200 No. USBs, the Project Director will participate in the launching of the manuals for which a PowerPoint presentation of the key features of the manual will be presented and a launch report prepared subsequently

➤ **Outputs**

The outputs of the final stage of the project will include:

- i) The production of Pavement and Geometric Design Manuals for Low Volume Roads (Rural and Urban) in Zambia.
- ii) The production of 400 No. USBs (200 for each manual) for the RDA.
- iii) The launching of the new manuals at a half day workshop.

2.7 Project Management, Quality Control, Monitoring and Evaluation

2.7.1 General

We are well aware of the critical importance of adopting a sound approach to the management of the project as well as the need for undertaking stringent quality control, monitoring and evaluation procedures for a research-type project of the nature of the one proposed to be carried out in Zambia. These aspects are discussed below.

2.7.2 Project Management

Our proposed organisational structure for undertaking the project is presented above in Figure III-1. However, in terms of management of the project, we envisage the need for working closely, and in a structured manner, with the RDA, the TSC, AfCAP and local stakeholders. We consider the close involvement of the TSC as crucial to the success of the project. This committee, which comprises local roads experts from both the public and private sectors, is expected to:

- provide timely guidance to the Consultant during the development of the manuals to ensure that they take the local context into consideration
- enhance buy-in and ownership of the process and output. important to engender ownership of the project outputs.

In view of the above, we envisage the following project management structure that integrates and demarcates the roles of the key organisations involved in the process of developing the new manuals. We envisage that this partnership, through its involvement of key stakeholders in the joint delivery team, will maximise opportunities for technology transfer.

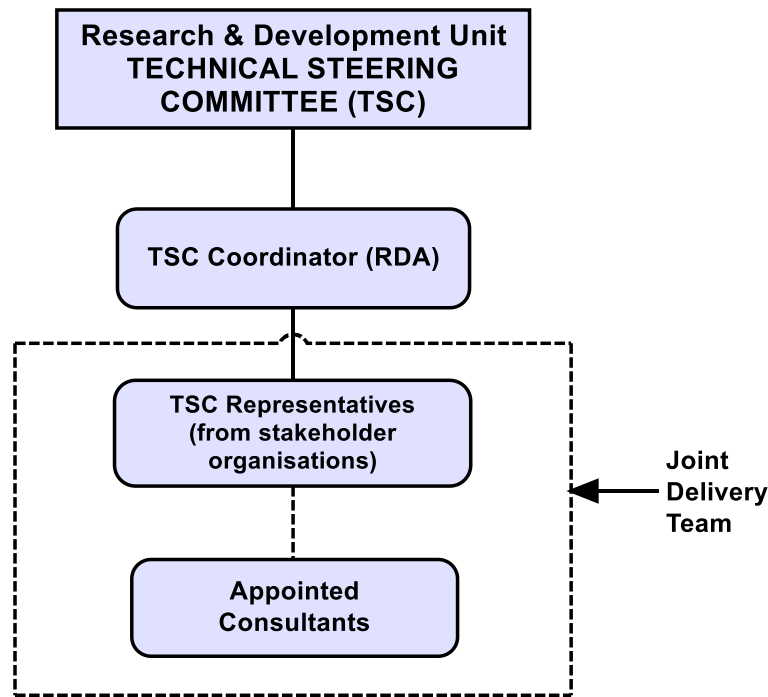


Figure 2-2: Proposed steering committee

3. WORK PROGRAMME

We have compiled a carefully conceived Work Programme that seeks to deploy the necessary professional resources in a manner that we believe produces the most cost-effective, time-effective and quality-effective service.

Table III-1 above presented the outline scoping of the project broken down by stage. In elaboration of that, table III-2 presents our detailed Work Programme that indicates the following:

- The timing, sequence and duration of the proposed tasks, taking into account travel time, including the number of personnel days proposed by activity.
- The identification and timing of major milestones (including deliverables) in executing the contract, including an indication of how the achievement of these would be reflected in the stipulated in the Terms of Reference.
- The deliverables against which payments will be made.
- The indicative number of working days required from each category of expert each month during the period of execution of the contract (ref. Table III-3) below.

C. INSTRUCTIONS FOR SUBMITTING APPLICATIONS

1. GENERAL

- i. All applications must be submitted electronically in PDF format and sent to the Project Director, Infra Africa (Pty) Ltd, e-mail address: mipinard@global.bw
- ii. All applications must include a cover letter (max. 1 page) that details the applicant's suitability for the job, an all-inclusive fee rate in Great British Pounds (GBP) and full contact details (telephone and e-mail).
- iii. All applicants must include:
 - a. a Resumé that highlights his/her general details as indicated in Annex I.
 - b. A Curriculum Vitae that highlights his/her key achievements in areas relevant to the position applied for (max. 6 pages).
 - c. A signed statement of exclusivity and availability (using the template in Annex I).

Note: The choice of selected applicant will be made on the basis of obtaining best value for money which will be established by weighing the technical quality against price on an 80/20 basis.
- iv. In submitting applications, the file name should provide the following information:
 - a. The reference code of the tender procedure (i.e. ZAM2060B0
 - b. The name of the applicant
 - c. Clearly state the position applied for
For example:
ZAM2060B-Another-Team Leader

2. DEADLINE FOR SUBMISSION OF APPLICATIONS

The deadline for submission of applications is **Friday 29th September 2017, 17:00 UK time.**

ANNEX I

Curriculum Vitae Template

Name of expert	Proposed position	Years of experience	Age	Educational background	Specialist areas of knowledge	Experience in the region	Languages and degree of fluency (VG, G, W)*

*VG – Very Good, G – Good, W –Working knowledge

CURRICULUM VITAE (MAX 6 PAGES)

Proposed role in the project:

Family name:

First names:

Date of birth:

Nationality: Civil

status:

Education:

Institution (Date from - Date to)	Degree(s) or Diploma(s) obtained:

Language skills: Indicate competence on a scale of 1 to 5 (1 - excellent; 5 - basic)

Language	Reading	Speaking	Writing

Membership of professional bodies:

Other skills: (e.g. Computer literacy, etc.)

Present position:

Years within the firm (if appropriate):

Key qualifications: (Relevant to the project)

Specific experience in the region:

Country	Date from - Date to

Professional experience

Date from - Date to	Location	Company & reference person (name & contact details)	Position	Description

Other relevant information (e.g., Publications)

STATEMENT OF AVAILABILITY:

I, the undersigned, hereby declare that I agree to participate with the tenderer < tenderer name > in the above-mentioned service tender procedure. I declare that

I am able and willing to work for the period(s) set for the position for which my CV has been included if this tender is successful, namely:

From	To	Availability
< start of period 1 >	< end of period 1 >	< full time/part time >
< start of period 2 >	< end of period 2 >	< full time/part time >
< etc. >		

I confirm that I do not have a confirmed engagement as key expert in another project, or any other professional activity incompatible in terms of capacity and timing with the above engagements.

I also declare that I am not in a situation of conflict of interest or unavailability and commit to inform the tenderer(s) of any change in my situation.

I acknowledge that I have no contractual relations with the Contracting Authority and in case of dispute concerning my contract with the Contractor I shall address myself to the latter and/or to the competent jurisdictions.

Name	
Signature	
Date	

Note: The project commenced on 1st September 2017 for a duration of 42 weeks to the 20th July, 2018.