THE UNITED REPUBLIC OF TANZANIA

NATIONAL AUDIT OFFICE

PERFORMANCE AUDIT REPORT ON THE QUALITY OF EXECUTED BITUMEN SURFACED ROAD WORKS IN URBAN AREAS

AS PERFORMED BY THE TANZANIA RURAL AND URBAN ROADS AGENCY (TARURA) UNDER THE PRESIDENT'S OFFICE - REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT

REPORT OF THE CONTROLLER AND AUDITOR GENERAL OF THE UNITED REPUBLIC OF TANZANIA

MARCH, 2020

THE UNITED REPUBLIC OF TANZANIA

National Audit Office

Vision

To be a highly regarded Institution that excels in Public Sector Auditing

Mission

To provide high quality audit services that improve public sector performance, accountability and transparency in the management of public resources

Core Values

In providing quality service, NAO shall be guided by the following Core Values:

Objectivity

To be an impartial entity, that offers services to our clients in an unbiased manner

We aim to have our own resources in order to maintain our independence and fair status

Excellence

We are striving to produce high quality audit services based on best practices

Integrity

To be a corrupt free organization that will observe and maintain high standards of ethical behaviour and the rule of law

Peoples' Focus

We focus on our stakeholders' needs by building a culture of good customer care, and having a competent and motivated workforce

Innovation

To be a creative organization that constantly promotes a culture of developing and accepting new ideas from inside and outside the organization

Best Resource Utilization

To be an organization that values and uses public resources entrusted to us in an efficient, economic and effective manner

PREFACE

Section 28 of the Public Audit Act No. 11 of 2008, mandates the Controller and Auditor General to carry out Performance Audit (Value for-Money Audit) for the purposes of establishing the economy, efficiency and effectiveness of any expenditure or use of resources in the Ministries, Departments and Agencies (MDA), Local Government Authorities (LGAs) and Public Authorities and other Bodies. The Performance Audit involves enquiring, examining, investigating and reporting, as deemed necessary under the circumstances.

I have the honour to submit to His Excellency, the President of the United Republic of Tanzania, Dr. John Pombe Joseph Magufuli and through him to the Parliament of the United Republic of Tanzania, the Performance Audit Report on the Quality of Executed Bitumen surfaced Road Works in Urban Areas in Tanzania. The main audited entities are the President's Office - Regional Administration and Local Government PO-RALG) and Tanzania Rural and Urban Roads Agency (TARURA).

The report contains findings of the audit, conclusions and recommendations that focus mainly on improving the quality of bitumen surfaced road works executed in urban areas in the country.

The President's Office - Regional Administration and Local Government (PO-RALG) and Tanzania Rural and Urban Roads Agency (TARURA) were given the opportunity to scrutinize the factual contents and comment on the report. I wish to acknowledge that the discussions with the President's Office - Regional Administration and Local Government (PO-RALG) and Tanzania Rural and Urban Roads Agency (TARURA) have been very useful and constructive.

My Office intends to carry out a follow-up audit at an appropriate time regarding actions taken by the audited entities in relation to the recommendations of this report.

After completion of the assignment, the office subjected the report to the critical reviews of Dr. Damas Nyaoro, Senior Lecturer

- University of Dar es Salaam and Eng. Thomas Mosso, former Director of Maintenance at TANROADS who came up with useful inputs on improving the output of this report.

This report has been prepared by Mr. Frank Nyoni - Team Leader, Eng. Pendael Ulanga-Team Member under the supervision and guidance of Ms. Esnath Henry – Ag. Chief External Auditor, Mr. George C. Haule – Assistant Auditor General and Mr. Benjamin Mashauri – Deputy Auditor General.

I would like to thank my staff for their commitment in the preparation of this report. My thanks should also be extended to the audited entities for cooperation extended to the audit team which facilitated timely completion of this audit.

Mr. Charles E. Kichere
Controller and Auditor General
The United Republic of Tanzania
March, 2020

TABLE OF CONTENTS

LIST OF TABLES AND FIGURES

LIST OF ABBREVIATIONS & ACRONYMS

AC	-	Asphalt Concrete
BoQ	-	Bill of Quantities
CC	-	City Council
DMDP	-	Dar Es Salaam Metropolitan Development Project
DP	-	Development Partners
DROMAS	-	District Road Management System
DSD	-	Double Surface Dressing
DUR	-	Directorate of Urban Roads
IA	-	Implementing Agencies
LGA	-	Local Government Authority
M&E	-	Monitoring and Evaluation
MC	-	Municipal Council
NCR	-	Non-Compliance Report
NTP	-	National Transport Policy
PO-RALG	-	President's Office - Regional Administration and Local Government
QAP	-	Quality Assurance Plan
QCP	-	Quality Control Plan
RFA	-	Request for Approval
RFB	-	Roads Fund Board
RRI	-	Road Ridding Index
SSRW	-	Standard Specifications for Road Works
SD	-	Surface Dressing
SDGs	-	Sustainable Development Goals

TANROADS	-	Tanzania National Roads Agency
TARURA	-	Tanzania Rural and Urban Roads Agency
TC	-	Town Council
TFV	-	Ten Percent Fines Value
TLC	-	Traffic Load Count
ToR	-	Terms of Reference
TSCP	-	Tanzania Strategic Cities Project
TSIP	-	Transport Sector Investment Programme
TZS	-	Tanzanian Shillings
UCS	-	Unconfined Compressive Strength
ULGSP	-	Urban Local Government Support Programme
WB	-	World Bank

EXECUTIVE SUMMARY

A road network is an essential component of growth and the economic development of a country[1]. An efficient utilization of resources in an economy is highly dependent upon the presence of good and easier road connection between production and consumption units. The road connection between producing and consuming units is mainly done through a presence of efficient road network that ensures smooth exchange of materials and other economic resources from one locality to another.

The road network in the country has been growing rapidly due to an ever-increasing demand for transport services that correlates with the growth of towns and cities. Currently, the National Bureau of Statistics estimates the road network to be at 86,472 kilometres nation-wide.

However, despite experiencing the growing road network, the country is facing a big challenge with regard to the quality of the bitumen surfaced road works executed particularly in urban and rural areas. In most cases the constructed roads do not sufficiently meet the required standards and specifications for road works and the workmanship of the executed works has to a large extent been unsatisfactory. According to a World Bank report of 2011 on Transport Development, the materials of decreasing quality are being used for both road construction and maintenance, leading to an ever-increasing frequency in the cycle of deterioration and the need for repair.

On this regard, the Controller and Auditor General decided to carry out a performance audit on this area in order to understand challenges encountered and come up with recommendations that might contribute towards construction of roads of high quality and that meet the required standards and specifications in order to improve access to safe, affordable, accessible and sustainable transport services in the country.

[1] Dr Jean Paul Rodrigue, Dr Theo Notteboom – "*Transportation and Economic Development"*

The main objective of the audit was to determine whether the PO-RALG through TARURA has effective mechanisms to ensure that the constructed bitumen surfaced roads in urban areas meet the specified quality standards for supporting the socio-economic development activities in the country.

The audit focused on assessing the effectiveness of quality control mechanisms in the whole cycle of road construction from project initiation, design, tendering, project execution and project closure.

Main Audit Findings

Existence of Bitumen surfaced Roads Constructed with Poor Quality

The audit revealed existence of some roads with poor quality in the bitumen surfaced road network throughout the country consists of some roads that are of poor and substandard quality. Annual maintenance report of TARURA of 2018/19 has indicated that 10 percent of road network which is paved in the country was in poor condition. This was evidenced by the trend of government expenditure in maintenance of road network which has increased by 43% from TZS 143 billion in 2015/16 to TZS 204 billion in 2018/19. We noted that the main reasons for existing poor bitumen surfaced roads were the use of inadequate road designs and poor supervision during the construction of the respective roads.

In addition to the status of road network, TARURA is not well equipped to track the status of road network in the country because of lack of an effective system for collecting data/information about the quality of their road networks. To collect information about the road network including aspects on quality of the road networks in various urban areas the government designated the District Road Management System (DROMAS). Since its establishment, this system has not managed to collect comprehensive information about the quality of roads skipping key information about existence of physical defects from road surface such as potholes, rutting, pavement failures, cracks and depressions which could affect the score of the road on

quality. On the other hand, the information that was available from DROMAS was not reliable as it was not updated. In addition, this system lacked credibility as it failed to capture information about the whole road network by the time of this audit.

Inadequate Designs and Specifications

A review of the different roads works executed in urban areas has indicated that most of the road works projects executed in urban areas were based on designs which were inadequate and had deficiencies with regard to complying with required standards and specifications.

Moreover, most of the reviewed road projects were constructed without having proper feasibility studies which is a key input in developing adequate road designs. The audit has noted that in the 12 visited LGAs and 38 road projects covered by the audit, only 26% of them were constructed basing on road designs developed after feasibility studies, while 74% of all road projects that were visited did not base on any feasibility studies. The audit team noted further that, the few conducted feasibility studies did not cover all key elements of feasibility studies leading to roads designs developed without key survey information about hydrological, topographical, environmental and social impact assessment.

Furthermore, the audit team noted the use of inadequate road designs during the execution of works which consequently led to design changes and subsequent project cost overruns which affected the value for money of the executed road works. From the 12 visited LGAs and 38 road projects we noted cost overruns of about TZS 6.5 billion ranging from TZS 10 million to TZS 1.8 billion per road project.

Additionally, the audit team noted that the presence of inadequate feasibility studies and subsequent road designs were a result of insufficient capacity by the in-house design teams at TARURA. Profession-wise, the 12 visited LGAs had only highway engineers available in their LGAs. There was no direct technical support for other key skills during feasibility studies or preparation of detailed road designs from Headquarters. Development of

feasibility studies or detailed roads designs required other key professions for specialised works like drainage works, materials/soil investigation, and environmental assessments. Also, there was no technical support as well on hydrological studies, survey works and social-impact assessments which are very key in developing quality feasibility studies and adequate road designs.

Inadequate enforcement of quality control procedures during the construction

The audit noted existence of weak enforcement of quality control and assurance procedures during the execution of road works. These weaknesses were observed at different stages of road construction projects as detailed below.

During Tendering for Road Works

The audit noted that the necessary attachments during tendering phase which provide estimates of the works quantities and provide guidance on the kind of works to be executed, materials to be used were not complete and correctly attached. Additionally, the typical drawings and other key attachments were not stamped as per the requirements of Road Geometric Design Manual.

Furthermore, the audit team found out that there was inadequate evaluation of contractors which led to selection of incapable contractors who failed to deliver the work on time and at the agreed timelines. Most of the evaluation reports did not indicate the number of projects undertaken concurrently by bidders at the time of bidding. The reports did not conduct extensive financial capacity analysis to be able to point out financially capable contractors. The audit further found out that evaluations were entirely relied upon the information submitted by contractors without conducting further post qualifications. Consequently, the weaknesses in evaluation of contractors led to procurement of works from incapable contractors who had different violations during works execution including absenteeism from site, carrying out works without key staff and dispossessing or complete abandonment of sites.

During Execution of Road Works

The audit team found out that, there was a weak mechanism for enforcing quality control mechanisms during the execution of road works. Among the major requirements just before the start of the projects is the submission of Quality Control Plans, Quality Assurance Plans and Method Statements to guide the execution of road works at the agreed standards. From the visited road projects only 7 out of 38 road projects equivalent to 18% of the visited projects had Quality Assurance Action Plans. Likewise, only 6 out of 38 road projects, equivalent to 16% of visited paved roads in 12 LGAs had Quality Control Plans. This implies that 82% and 84% of 38 visited road projects had no Quality Assurance and Quality Control Plans respectively.

Furthermore, the audit found out that the road works were executed under very minimal supervision of on-going road works particularly during execution stage. There was no formal tools and guidance in supervision of road works projects. The most essential communication for daily supervision including requests for inspections and approvals reports were very limited and very informal. Nevertheless, most of the projects that had requests for approvals and inspections were those under World Bank Financing. In the 12 LGAs that were visited an average engineer was managing a total of 6 projects including those of gravel road standards.

The audit also noted that some of the road works items were completed and subsequent works approved without required tests as per requirements of the standards. Essential tests like Spray Rate Tests, Spread Rate, Surface Regularities, Absolute Levels, Unconfined Compressive Strength Tests, Gradation and Bitumen Tests were infrequently conducted. The most uncommon tests were spread and spray rate tests whereby only 1 road project conducted the particular test while none of the roads did the Surface Regularities test out of the 8 visited roads with Double Surface Dressing (DSD) or Surface Dressing (SD). While for Asphalt Concrete (AC – 14) roads the most uncommon tests were surface regularities, Ten Percent Fines Value (TFV), Absolute levels and Bitumen Tests where 21 of the 30 road projects equivalent to 70 percent of roads conducted the relevant tests.

During Completion and Closure of Road Works

The audit team found out that substantially and finally completed projects were not properly closed. Out of the 38 visited road projects only 4 projects which is equivalent to 11% of the projects were adequately closed. The audit team noted substantially closed projects with snag lists containing outstanding items like access roads, walkways, cover slabs, road markings, road signs, and drainage works which are not allowable as per the Standard Specification for Road Works (2000). Moreover, the final inspections were not sufficiently conducted as they did not capture all defects and outstanding issues. Additionally, out of 38 road projects, only 8 road projects had prepared final accounts which were supposed to have been closed in order to settle all contractual matters before project completion.

Inadequate Monitoring and Evaluation of TARURA Quality Control Activities

The audit found out that M&E system at TARURA both at Headquarters and Regional Offices had weaknesses that led to insufficient execution of its roles in monitoring the quality of road construction in urban areas. The audit further noted that the Monitoring and Evaluation functions for quality control activities during road construction activities were not clearly spelt out in all of the guidelines and other documentations. In addition, the reviewed Monitoring and Evaluation plans revealed that key performance indicators did not address issues regarding quality of completed bitumen surfaced roads.

Inadequate Monitoring of TARURA's Performance in Controlling Quality of Road Works

The review of reports by PO-RALG and the data collected from TARURA has noted that there is inadequate implementation of the performance monitoring functions of TARURA which affects how PO-RALG monitor the performance of TARURA in controlling the quality of road works executed in urban areas. In addition, we reviewed the functions of both institutions and noted functional overlaps between them therefore creating accountability conflict. The overlapping functions revealed by the audit team included

establishment and maintenance of appropriate rural and urban road databank, provision of technical support, supervision, quality assurance and control, demarcation and protection of road reserves, carrying out engineering traffic and economic studies for maintenance and improvement of the road networks, and undertaking research or collaborating with any research organization with the view to facilitate the Agency's plan on development and maintenance activities.

Furthermore, the performance of TARURA in controlling the quality of executed road works in urban areas was not adequate. PO-RALG did not perform well on monitoring TARURA particularly on monitoring of adherence to set standards on maintenance and development works. Basically, PO – RALG did not conduct monitoring to check whether TARURA is meeting the agreed performance criteria as per Annual Performance Agreement. The monitoring done by PO-RALG focused and reported only on projects financed by development partners like Dar es Salaam Metropolitan Development Projects, Urban Local Government Support Programme and Tanzania Strategic Cities Project.

General Audit Conclusion

The audit generally concludes that the current mechanisms in controlling the quality of roads works in urban areas as performed by PO-RALG through TARURA are not sufficient to enable the construction of quality roads in urban areas. The existing system for quality control has no effective enforcement mechanisms to guarantee the execution of road works that are of desired quality. On the other hand, TARURA is lacking proper tools like laboratories and quality control and assurance manuals to aid them to sufficiently provide an assurance of quality during the execution of road works.

These weaknesses are affecting different levels of operations at TARURA which targets on ensuring that the constructed roads in urban areas are of high quality and therefore serves its organizational goal of providing sustainable and cost-effective maintenance and development of urban road networks to support the socio-economic development of Tanzania. Additionally, the quality assurance activities at TARURA are not conducted using

clearly stipulated guidelines which is minimizing the impact of assurance activities at LGA level which is concerned with the actual execution of road works.

Specific Conclusions

(a) Design and specifications prepared for use while executing the road works are not adequate to accommodate the needs and physical conditions existing in the areas where the road works are being executed;
(b) The current quality control mechanism available at TARURA HQ, Regional and Council levels for quality control of works in the execution stage do not sufficiently provide an assurance of the quality of the executed road works;
(c) The monitoring and evaluation of the quality control and assurance activities during execution of road works cannot guarantee the construction of road works at the desired quality; and
(d) PO-RALG is not sufficiently monitoring the performance of TARURA in executing their works.

Main Audit Recommendations

Recommendations to the President's Office - Regional Administration and Local Government:

1) Review and update of roles and functions so as to provide clear accountability on the use of resources by TARURA for development of district and urban road networks.

2) Improve monitoring of the development and maintenance projects so as to effectively address key performance indicators on quality of executed road works.

3) Develop annual action plans that will provide an assurance that the performance of TARURA in controlling the quality of road works is effectively monitored.

Recommendations to Tanzania Rural and Urban Roads Agency:

1) Improve the functionality and operationalisation of DROMAS in order to capture detailed information critical for assessing the quality of road works;

2) Strengthen supportive supervision to its council's offices so that effective feasibility studies are conducted and detailed road designs are effectively developed;

3) Establish a strong mechanism for developing and reviewing road designs for all road works;

4) Strengthen evaluation of tenderers for road works by appointing well experienced evaluation teams and conducting sufficient due diligences;

5) Develop and institute clear guidelines that are geared on establishing effective quality control and assurance mechanism in all stages of road works project cycle; and

6) Develop mechanism to ensure that road projects are properly closed and the subsequent activities during defects liability period are effectively executed.

CHAPTER ONE

INTRODUCTION

1.1 Background

A road network is an essential component for the growth and the economic development of a country[2]. An efficient utilization of resources in an economy is highly dependent upon the presence of good and easier road connection between production and consumption units. The road connection between producing and consuming units is mainly done through a presence of efficient road network that ensure smooth exchange of materials and other economic resources from one area to another.

As statistics from the Bank of Tanzania (BoT) and the National Bureau of Statistics issued in 2017 indicate, the transportation sector contributes about 15.6% of the real Growth Domestic Product (GDP) in the country and therefore presents a key sector in the growth of the economy.

In Tanzania, the road network is one among major infrastructures constituting the transportation sector, driving the economy and stimulating the growth of the emerging and established cities. A road network in Tanzania has been classified into three categories namely, *trunk roads*, *regional roads,* and *districts, urban and feeder roads*. All of three categories of roads make a total of 86,472 kilometres. Proportionately, out of the 86,472 kilometres, 15% are trunk roads, 24% are regional roads and the remaining 61% equivalent to 52,581 kilometres are district, urban and feeder roads.

Having recognized the importance of constructing and maintaining better roads network the government has assigned two agencies namely, Tanzania National Roads Agency (TANROADS) and Tanzania Rural and Urban Roads Agency (TARURA) to be the custodians of the trunk and regional roads and urban and districts roads respectively. These agencies have been tasked with the role

[2] Dr Jean Paul Rodrigue, Dr Theo Notteboom – "*Transportation and Economic Development"*

of ensuring that roads network is of high quality through construction and development of maintenance programmes for the whole roads network in the country.

Definition of Bitumen Surface Road

Bitumen is non-crystalline solid or viscous mixture of complex hydrocarbons that possess characteristic of agglomerating properties, softens gradually when heated and it is obtained from crude petroleum through refinery processes.[3] It is commonly used for road surfacing and roofing particularly when mixed with other materials like aggregates and sand.

When bitumen is mixed with other materials, the materials becomes bituminous consisting of crushed stones and forms a flexible layer as a wearing course when it is rolled. A road which has been constructed by applying these mixtures is referred to as a *bitumen surfaced road*. Bitumen Surfaced or Tarmac roads are one of the most common types of paved roads in the country especially in urban areas.

Bitumen surfaced roads are characterised by its consistency properties of material used for construction comparing to other types of paved roads. These characteristics include; durability, flexibility, resistance to (traffic loading, tear, skidding and worn-out/ravelling). Bitumen surfaced roads constructed with good quality have good riding quality, waterproof surfaces and resistance to surface defects i.e. horizontal shoving, depressions, rutting, corrugation, delamination, bleeding, surface cracks (transverse, crocodile, permanent deformation and potholes[4].

The mentioned above defects and characteristics of bitumen surfaced roads, will appear on the surface of tarmac roads with poor quality which likely poses defects and hence deterioration of pavement structure. These defects can be visually seen on completed bitumen surfaced roads with poor quality.

[3] SANS 4001-BT1:2016, South African National Standards

[4] Guidance Notes Catalogue of Road Defects (CORD)
; 2013

1.2 Motivation for the Audit

This performance audit has been motivated by the following factors;

(a) Implementation of United Nations Sustainable Development Goals

The 11th United Nations Sustainable Development Goal (SDGs) reiterates for the existence of sustainable cities and communities through provision of access to safe, affordable, accessible and sustainable transport systems for all. The goal specifically demands improvement in roads safety and expansion of public transport with special attention to the needs of the people.

This goal emphasises presence of efficient and effective maintenance of roads network and particularly urban road network. Tanzania as a country which ratified and agreed to implement this SDGs goal is therefore responsible in ensuring that it is effectively attained. This audit work contributes significantly in understanding of the challenges facing the urban and rural roads in Tanzania and helping the country to establish effective mechanisms for improvements of its road networks.

(b) The implementation of National Roads Transport Policy

The National Roads Transport Policy of 2003 admits that road transport is the most dominant mode of transport in urban and rural areas. However, most of the roads cannot cope with the rapid increase in traffic volume due to various factors including quality, quantity and insufficient capacities in terms of quality and quantity.

The capacity of roads to sustain the increasing volume of traffic is affected by a number of factors some of them being side parking, street vending and pedestrians who are compelled to walk on the carriageways as most of the walkways are full of parked vehicles and petty businesses. The reduction in roads capacity reduces the efficiency and impede traffic flows.

The medium- and long-term objective of National Transport Policy (NTP) is to bituminise all trunk roads while at the same time ensuring that all-regional as well as key district and urban roads are sufficiently rehabilitated and maintained to ensure smooth flow of traffic. The National Transport Policy (NTP) underlines the need for the private sector participation including the local communities in the planning and rehabilitation of the roads that pass through their areas.

(c) The presence of poor and unmaintained bitumen surfaced roads

The presence of poor and unmaintained bitumen surfaced roads has caused a significant expenditure of the taxpayer's money in maintaining the previously constructed roads and the construction of new roads to alleviate the challenge. For instance, budget speech for financial year 2017/18 by the Ministry of Works, Transport and Communication indicated that in 2017/18, an amount of 1.9 Trillion Shillings was allocated by the government for maintaining and improving the quality of roads network in Tanzania. This is a significant amount of funds that could have been used to maintain other infrastructures apart if the constructed roads were of good quality.

The review of UN Habitat Report of 2016 on managing rural urban linkages indicated that two thirds (62.7%) of Tanzania's roads were in poor condition against 12.8% which were in good condition. This motivated the government of Tanzania to initiate the Tanzania Strategic Cities Programme (TSCP) to improve urban infrastructure including roads in seven strategic cities.

(d) Poor network of Urban Roads

Poor network of urban roads is another common challenge facing the country and to a greater extent contributing to traffic jams due to obstruction from the available roads network. Poor quality of constructed roads has caused the constructed roads to have a shorter life span than anticipated.

As a result of poor quality, most of roads in urban areas become impassable and disconnected to other roads forcing vehicles and

other motor devices to use few remaining passable roads and thus creating persistent traffic jams. Researches done in 2016 by Journal of Sustainable Development in Tanzania has estimated that Dar es Salaam City alone is losing nearly TZS 1.4 trillion annually due to severe roads congestion and traffic jams.

Thus, the Controller and Auditor General decided to carry out a Performance audit on this area in order to understand challenges encountered and issue recommendations that might contribute in improving provision of access to safe, affordable, accessible and sustainable transport services in the country.

1.3 Audit Design

1.3.1 Audit Objectives

The main objective of the audit was to determine whether the President's Office - Regional Administration and Local Government (PO-RALG) through Tanzania Rural and Urban Roads Agency (TARURA) has effective mechanisms to ensure that the constructed bitumen surfaced roads in urban areas meet the specified quality standards in order to support socio-economic development activities.

Specific Audit Objectives

In order to address the main audit objective, the following were the specific audit objectives:

i) To assess the extent to which bitumen surfaced roads in urban areas are constructed in accordance with the set quality standards;

ii) To determine whether TARURA prepared adequate designs and specifications for executed bitumen surfaced roads in urban areas;

iii) To check whether TARURA has a working quality control mechanism for constructing bitumen surfaced roads in urban areas;

iv) To check whether TARURA has a working quality assurance mechanism for guiding road development at all phases.

v) To assess whether TARURA periodically monitors and evaluates its quality control activities for the construction of bitumen surfaced roads in urban areas; and

vi) To assess whether PO-RALG monitors and evaluates the performance of TARURA in controlling the quality of constructed bitumen surfaced roads in urban areas.

1.3.2 Scope of the Audit

The main audited entities are the PO-RALG and TARURA. This is because PO-RALG is responsible for oversight of road work activities and policy development/supervision on roads classified as district, urban and feeder roads. This includes ensuring that the quality control and assurance activities are properly instituted in all stages of roads management. The PO-RALG is also responsible for providing appropriate level of supportive supervision to TARURA.

Specifically, the audit focused on assessing the effectiveness of quality control mechanisms during project initiation, design, tendering, project execution and project closure phases. The audit also assessed the monitoring and evaluation function for construction activities and the supervision and performance monitoring of TARURA in controlling the quality of road construction activities in urban areas.

The audit covered the entire road network in urban areas in mainland Tanzania. This included all paved roads in urban or town areas; i.e. feeder roads, collectors, ring roads and by-pass roads.

The audit covered a period of four financial years from 2015/16 up to 2018/19 for assessing the performance of PO-RALG through TARURA in managing the quality of executed bitumen surfaced road works in urban areas.

1.4 Sampling, Methods for Data Collection and Analysis

The audit team applied different sampling methods for collecting data from the identified audited entities and analyse them to come-up with sufficient evidences with regard to the quality of constructed bitumen surfaced roads in urban areas. The audit team applied different sampling, data collection and analysis methods as explained below.

1.4.1 Sampling Methods

The assessment of quality control in executed bitumen surfaced road works was based on a sample of six (6) regions of mainland Tanzania. The 26 regions of Tanzania were first grouped into 6 clusters based on their geographical zones of Northern, Southern, Eastern, Western and Central Zone and Lake Zone. Then a random sampling technique was used to select one region from each of the 6 zones in order to provide a representative assessment of the quality control on executed road works in urban areas. The selected regions were Tanga, Dar es Salaam, Iringa, Mwanza, Dodoma and Mtwara.

Then from each region, a purposive sampling technique was used to select two urban LGAs based on the length of paved road network in a respective urban area. From each region, urban LGAs were ranked based on the length of their paved road and the first and second LGAs were selected. The following local authorities were purposively selected; Dodoma CC, Kondoa TC, Iringa MC, Mafinga TC, Mwanza CC, Ilemela MC, Mtwara MC, Nanyamba TC, Tanga CC, Korogwe TC, Ilala MC and Kinondoni MC as indicated in Table 1.1 below.

Table 1.1: Selected and visited LGAs by Regio

REGION	LGA		Paved Roads (Kms)	Ranking
Dar es Salaam	Ilala	MC	105.02	1
	Kinondoni	MC	140.77	2
Dodoma	Dodoma	CC	148.97	1
	Kondoa	TC	5.06	2
Iringa	Iringa	MC	30.62	1
	Mafinga	TC	4.58	2
Mtwara	Masasi	TC	3.80	3
	Mtwara/ Mikindani	MC	43.85	1
	Nanyamba	TC	6.74	2
	Newala	TC	-	4
Mwanza	Ilemela	MC	28.04	2
	Mwanza	CC	36.77	1
	Tanga	CC	96.44	1
Tanga	Korogwe	TC	6.22	2
	Handeni	TC	-	3

Source: *TARURA-DROMAS; Paved road network data*

1.4.2 Methods of Data Collection

The audit team gathered reliable and sufficient audit evidence to answer audit questions by using different methods namely, documents review, interviews and observation. The collected information were analysed using different methods to obtain facts and sufficient information regarding the overall performance of PO-RALG through TARURA in ensuring that the constructed bitumen surfaced roads in urban areas meet the required standards.

The methods of data collection that were used are detailed below:

(a) Documents review

Various documents were reviewed from the President's Office - Regional Administration and Local Government (PO-RALG) and Tanzania Rural and Urban Roads Agency (TARURA).

The review focused mainly on documents related to the available road designs and specifications for urban roads and the mechanism

for quality control and assurance during planning, tendering, execution and roads closure phases.

The documents reviewed were those containing information obtained within the selected audit timelines i.e. 2015/16 – 2018/19. Specifically, the documents reviewed included feasibility reports, design reports, Tender Documents, Project Plans, project Implementation Reports, Project Contract Documents, Test reports, supervision and monetary reports.

More details about the documents which were reviewed and the reason for reviewing them are found on ***Appendix 3***.

(b) Interviews

To be able to respond to the audit questions and provide adequate findings and conclusions against the audit objective, interviews were conducted. The purposes of interviews were to obtain more information about the planning, implementation and reporting of the road construction projects. The interviews were used to gain additional knowledge, clarifications and corroborate information obtained from documents and field observations.

The officials who were interviewed by the audit team were selected from PO-RALG, TARURA, 6 selected Regional Secretariats and 12 LGAs. At the PO-RALG Headquarters, the team interviewed: Head of Division, Infrastructure Development and Head of Section Urban Roads Infrastructure Development.

While at TARURA, the audit team interviewed Director of Urban Roads, Business Support and Administration, Managers responsible for Urban Roads Development and Budget, Regional Offices Coordinators, Council's Managers, Project Supervisors and Technicians.

From the LGAs, the audit team interviewed Council Engineers, Project Coordinators and other Engineers responsible for development and maintenance of roads works.

More details about the people who were interviewed and the reasons for being interviewed are found on ***Appendix 4***.

(c) Field Visits

As part of data collection methods, the team conducted site visits that enabled collection of data to substantiate or corroborate information obtained from interviews or document reviews. The team collected information from roads construction sites. The field site visits involved visual inspection of executed road works and physical measurements as a means of verification.

During the site visits, the audit team was observing the following:

i) Quality of the roads to determine if they were constructed basing on the original designs
ii) The technical works to determine the extent to which the completed or ongoing road works complied with the specified standards or manuals.
iii) Physical locations to determine the rationale for construction of the respective road at a respective location
iv) Type and nature of equipment used on site for the ongoing projects
v) Workmanship on the roads surfacing and structure of the completed works.
vi) Visual verification on compliance with standards and manuals of the visually observable works e.g. culverts, drainages, street lights etc.; and
vii) The quality of completed works to determine their compliance with BoQs.

In total 38 roads from the 12 LGAs were visited by the audit team. The audit team selected all the roads for those LGAs with less than two bitumen surfaced road projects, however for all other LGAs with more than one bitumen surfaced road project and falling within the scope, the following selection criteria were considered:

- The amount of fund (contract sum) of a particular road project where the highest contract sum was picked

- A funding package which had a higher number of road works than other packages

- A funding package which has been recently completed or ongoing but partly finished road works

1.4.3 Methods for Data Analysis

The collected information were analysed using both the qualitative and quantitative methods in order to obtain facts and sufficient information regarding the overall performance of PO-RALG through TARURA in ensuring that the constructed bitumen surfaced roads in urban areas meet the required standards.

a) Analysis of Qualitative Data

- Content analysis techniques were used to analyse qualitative data by identifying different concepts and facts originating from interviews or document reviews and categorise them based on its assertion;
- The extracted concepts or facts were either tabulated or presented as they are in order to explain or establish relationship between different variables originating from the audit questions;
- The recurring concepts or facts were quantified depending on the nature of data it portrays and
- The quantified information (concepts/facts) were then summed or averaged in spread sheets to explain or establish the relationship between different variables.

b) Analysis of Quantitative Data

- Quantitative information with multiple occurrences were tabulated in spread sheets to develop point data or time series data and relevant facts extracted from the figures obtained;
- The tabulated data were summed, averaged or proportionate to extract relevant information and relationships from the figures;
- The sums, averages or percentages were presented using different types of graphs and charts depending on the nature of data to explain facts for point data or establish trends for time series data and

- Other quantitative information/data with single occurrence were presented as they are in the reports by explaining the facts they assert.

1.5 Assessment Criteria

The criteria for the main audit questions and sub questions were based on the standards for road works, manuals, laws, policies, plans, reports, guidelines and best practices acceptable in road construction works. In general, the following criteria were used to assess the performance of PO-RALG and TARURA in managing the quality of constructed bitumen surfaced roads in urban areas.

Designs and Specifications of Executed Bitumen surfaced Roads

The Road Geometric Design Manual (2012) requires design of a road, or any part thereof, to be based upon factual data on the traffic volumes which the road will have to accommodate. The usual design controls are the design volume, which is the estimated traffic volume at a certain future year, design year i.e. 20-30 years for flexible pavement as well as consideration of the other vehicular measures.

The Standard Specifications for Road Works (2000) requires the quality of all elements of the works to be checked on a regular basis so as to ensure compliance with the specified requirement.

Quality Control and Assurance in Planning, Tendering, Execution and Project Closure

The Strategic Plan of TARURA requires development of appropriate project management and quality control procedures for maintenance and development works to ensure establishment of optimum environments for timely completion of the works.

Likewise, the Low Volume Roads Manual requires a presence of Quality Plan (QP) which shall demonstrate how the contractor will control the processes used during construction of the road in order to meet the requirements set out in the technical specifications.

The Standard Specifications for Road Works (2000) requires that quality of all elements of the works to be checked on a regular basis so as to ensure compliance with the specified requirements. Additionally, the standards require the contractor to submit to the engineer for examination, the results of all relevant tests, measurements and levels indicating compliance with the specifications on completion of every part of the work.

TARURA's Establishment Order establishes the Quality Control and Research Unit at TARURA which is responsible for development of quality assurance systems, planning and carrying out research and development activities.

The Standard Specifications for Road Works (2000) requires tests to be conducted on materials and workmanship during the progress of the works to ensure compliance with the requirements of the specifications.

The Low Volume Roads Manual requires quality control activities to include site inspections, field and laboratory testing.

Monitoring and Evaluation of TARURA's Quality Control Activities

As per its Strategic Plan, TARURA is required to have a monitoring plan which should consists of indicators and their descriptions, baseline and; targets values, for each indicator, data collection methods, means of verification, frequency of reporting and responsible person for data collection.

As per TARURA's Establishment Order, Directorate of Business Support Services is responsible for provision of expertise on monitoring and evaluation. Furthermore, Regional Coordination Offices are required to monitor and evaluate the implementation of rural and urban road works within their respective regions.

PO-RALG oversight on TARURA Quality control Activities

PO-RALG is required to monitor adherence of set standards in construction/building design and construction.

Basing on TARURA's Establishment Order, the responsibility to coordinate and monitor the construction and maintenance of rural and urban roads network is carried out by the President's Office-Regional Administration and Local Government (PO-RALG) through the Division of Infrastructure Development (DID).

Furthermore, TARURA's Establishment Order, requires TARURA to periodically provide performance reports to the Ministry (PO-RALG) and other relevant authorities.

1.6 Data Validation Process

To enhance validity and reliability of the audit findings, President's Office - Regional Administration and Local Government (PO-RALG) and Tanzania Rural and Urban Roads Agency (TARURA) were given an opportunity to go through the draft report provide their comments on the figures and information presented. The PO-RALG and TARURA confirmed on the accuracy of the information and figures presented in the report.

The information was also cross-checked and discussed with experts in the field of road construction to obtain their opinions and confirmation of the validity of the content and facts presented in the report.

1.7 Standards Used for the Audit

The audit was done in accordance with the International Standards of Supreme Audit Institutions (ISSAIs) issued by the International Organization of Supreme Audit Institutions (INTOSAI). These standards require that the audit is planned and performed in order to obtain sufficient and appropriate audit evidence to provide a reasonable basis for the audit findings and conclusions based on the audit performed.

1.8 Structure of the Audit Report

The remaining parts of the audit report covers the following:

- Chapter two provides a detailed system in managing the quality of bitumen surfaced road works in urban areas including actors and processes involved;
- Chapter three presents the audit findings on the performance of PO-RALG and TARURA in managing the quality of executed bitumen surfaced road works in urban areas and
- Chapter Four provides audit conclusions; and
- Chapter Five outlines recommendations which should be implemented in order to improve the quality of constructed bitumen surfaced roads in urban areas.

CHAPTER TWO

SYSTEM FOR MANAGING QUALITY OF EXECUTED BITUMEN SURFACED ROAD WORKS IN URBAN AREAS

2.1 Introduction

This chapter provides the description of the system for managing quality of bitumen surfaced road works executed in urban areas in Tanzania. It highlights the Policies and legal framework governing the management of quality of bitumen surfaced road works as well as the organization structure of the identified audited entities, key actors, their roles and responsibilities as well as their relationship in management and execution of bitumen surfaced road works in urban areas.

2.2 Policies and Legislations Governing Road Construction and Maintenance

2.2.1 National Transport Policy of 2003

The National Transport Policy of 2003 was formulated with a vision of having an efficient and cost effective domestic and international transport services to all segments of the population and sectors of the national economy with maximum safety and minimum environmental degradation.

Among other things the policy aims at *improving the capacity and quality of urban road infrastructure to accommodate the ever-growing roads traffic*. Furthermore, the policy takes into consideration the fact that fundamental requirement for effective transport system is an institutional framework which ensures that each fundamental element of transport is provided in an appropriate quality, quantity and form.

2.2.2 Legislations on Execution of Road Works in Tanzania

There are three legislations governing the execution of roads works in the country specifically those managed by PO-RALG. These are explained in the table below.

Table 2.1: Legislations Governing Road Works in Tanzania

Legislation	Objective/Provision(s)
The Roads Act, 2007	This act provides for roads financing, development, maintenance, management and other related matters. The Act stipulates the roles of the Minister responsible for the roads and roads maintenance in particular, the establishment of the road's authorities and its road boards to govern the management of public road network in Tanzania including national and district roads. Among other things, the Act provides for the general functions of road authorities and regional roads board. The Act specifically provides for powers that road authorities including TARURA possesses during execution of road works. The Acts demands the roads authorities to ensure to the safety of road users during design, construction, maintenance and operation and maintenance of a public road by providing side-walks, overhead bridges, zebra crossings and other related items.
The Executive Agencies Act 1997	The Executive Agencies Act is the basis under which TARURA was established through Government Notice No. 211 of May 2017.
The Roads Fuel Tolls Act, 1986	This Act imposes and provides for the collection of tolls on the vehicular use of public roads and for matters related to road and fuel tolls. The maintenance of bitumen surfaced roads in urban areas is dependent upon the funds collected under this Act through Road Fund Board. The Road Fund Board which collects funds under this Act allocate 30 percent of its collection after deducting administrative expenses for maintenance of rural and urban roads through TARURA.

***Source**: Roads Act, 2007, Executive Agencies Act 1997, Roads Fuel Tolls Act, 1986*

2.2.3 Strategies for the Development and Maintenance of Bitumen surfaced Roads in Urban Areas

In addition to the National Policies and laws, the government has established some strategies for enhancing development and maintenance of bitumen surfaced roads in urban areas. These are stipulated in the **Transport Sector Investment Programme (TSIP-II)**

Transport Sector Investment Programme (TSIP - II)

The Transport Sector Investment Programme (TSIP) was formulated in 2012 as part of the implementation strategies of the National Development Vision 2025. Furthermore, TSIP is intended to provide major inputs to the National Strategy for Growth and Reduction of Poverty (NSGRP or MKUKUTA as it is popularly known).

Among the objectives of TSIP II there are some which have direct impact on road sector and they include:

i) Carrying-out timely maintenance on the transport infrastructure
ii) Facilitating the mobilization of local and international resources to speed up transport infrastructure development in an integrated manner; and
iii) Enhancing efficiency of transport services internationally, nationally and locally in order to contribute to the economic growth.

2.3 Roles and Responsibilities of Key Stakeholders

In order to assess the system for maintenance of bitumen surfaced roads in Tanzania the audit team identified three entities as key organisations in ensuring that urban roads network is kept at a high quality through regular maintenance. The key actors identified include: President's Office - Regional Administration and Local Government (PO-RALG) and Tanzania Rural and Urban Roads

Agency (TARURA) and Roads Fund Board of Tanzania (RFB) and the Ministry of Works, Transport and Communication.

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

The President's Office - Regional Administration and Local Government is the overseer of the LGA's Roads infrastructures development. Specifically, the PO-RALG is responsible for coordination and monitoring of maintenance and development of LGA's Roads infrastructure. It oversees full routine and recurrent maintenance of all roads and cross drainage structures such as spot improvement, periodic and reactive maintenance and re-installation of bridges, culverts and drifts.

PO-RALG Strategic Plan 2016/17-2020/21

The Infrastructure Development Division under PO-RALG is operationally guided by its 5 years Strategic Plan 2016/17-2020/21 which has 5 main objectives. As per PO-RALG Strategic Plan, the division has the main role of coordinating, supporting and facilitating a national overview of infrastructure maintenance and development within LGAs in collaboration with Regional Secretariats and TARURA. Among the 5 objectives of PO-RALG Strategic Plan, Objective H, *"Industrialisation and local economic development promoted at all levels of PO-RALG*" is responsible for addressing its roles in managing the quality of executed bitumen surfaced road works in urban areas.

The objective H of the Directorate of Infrastructure Development (DID) has four targets and six indicators, however the first objective and third objective are operationally responsible for addressing the quality of executed road works in urban areas. The Division has targeted to maintain LGAs roads to fair and good condition from 34,402 km to 55,000 kilometres of roads to be maintained and rehabilitated by June 2021.The other target is to revive and roll out DROMAS with its indicator of ensuring the roads monitoring system in place and being functional.

2.3.2 Tanzania Rural and Urban Roads Agency (TARURA)

Tanzania Rural and Urban Roads Agency (TARURA) is an executive agency under the President's Office - Regional Administration and Local Government (PO-RALG) established under Section 3(1) of the Executive Agencies Act 1997 by order published in Government Notice No. 211 dated May 2017 and was inaugurated on July 2017.

The main functions of TARURA in relation to development and maintenance of bitumen surfaced roads are to:

i) Develop and maintain rural and urban road networks;
ii) Carry out engineering traffic and economic studies for the maintenance and improvement of the road network;
iii) Establish, maintain and update road management systems;
iv) Undertake procurement and management of contracts for design, maintenance, emergency repairs, spot improvements, rehabilitation, upgrading and construction of roads;
v) Establish and maintain appropriate rural and urban road databank;
vi) Negotiate agreement with private sector entities to facilitate financing and development of selected roads in accordance with guidelines prescribed by the Minister; and
vii) Adopt harmonized approach on technical standards for the promotion of the sustainable rural and urban roads networks;

TARURA Strategic Plan 2016/17 – 2020/21

TARURA is operationally guided by its 5 years Strategic Plan which has six main objectives. Under the six main objectives, the main objective for urban roads improvement is "Rural and Urban Road Network Improved" has direct attention on urban roads improvement. This objective has two strategies that are directly addressing the improvement of urban roads. The first strategy is on construction of and maintenance of urban and rural roads network. The second strategy is on improvement of the quality of road works. These two strategies are overseen by the Directorate of Urban Roads (DUR).

2.3.3 Organization Structure of TARURA

TARURA is headed by the Chief Executive Officer who is reporting to the Permanent Secretary of PO-RALG. The Organization has three Directorates reporting to the Chief Executive Officer. Those are the Directorate of Rural Roads, Urban Roads and Business Support Services. The structure also includes the Regional Office Coordinators who reports directly to the Chief Executive Officer.

Among the three Directorates, the audit focused on assessing the operations of Directorate of Urban Roads as it is the main directorate responsible for development and maintenance of urban roads in Tanzania. This Directorate is also headed by a Director who has two Managers under his supervision. These are the Managers responsible for Development of Roads Infrastructure and the one responsible for Maintenance of Urban Roads Infrastructure. This Directorate is also responsible for ensuring good quality of executed bitumen surfaced road works in rural and urban areas.

2.3.4 Roads Fund Board

The Parliament of the United Republic of Tanzania enacted the Roads Toll Act (Amendment No. 2) in December 1998 and established the Roads Fund and the Roads Fund Board with the following provisions:

a) To collect all funds collected from road tolls imposed on diesel and petrol, transit fees, heavy vehicle licenses, vehicle overloading fees or from other sources;
b) To collect all funds collected as roads tolls;
c) To finance for the maintenance and emergency repair of classified roads and cover the related administrative costs in Mainland Tanzania in accordance with approved operational plans made by TANROADS and TARURA; and
d) To provide finance for the road development and related administration costs in accordance with the plans and budgets approved by the Parliament.

Therefore, the Roads Fund Board allocates and monitors funds disbursed to the executing agencies such as TARURA for the maintenance of bitumen surfaced roads executed throughout the country.

2.3.5 Ministry of Works, Transport and Communication

The Ministry is responsible for overseeing the entire road sector in the country through the formulation of policy and development of guidelines to guide the development and maintenance of road network in the country. On the other hand, through Road Fund Board, the Ministry is also responsible for mobilising resources for development, maintenance and rehabilitation of national road network including the district roads network managed by TARURA.

Moreover, the Ministry of Works, Transport and Communications (MoWTC) in collaboration with PO-RALG, is responsible for ensuring that urban and rural road networks are developed, maintained and rehabilitated. This function is facilitated by the roles played by the two Ministries; MoWTC which is responsible for mobilising resources and developing guidelines and manual guiding the execution of road works, and PO-RALG which is responsible for coordinating, programming and monitoring the utilisation of resources.

2.4 Parameters for a Good Quality Bitumen surfaced Road Works

In Tanzania, the bitumen surfaced road works are executed within some established parameters to ensure good quality. Within such parameters systems for quality control and assurance in construction and maintenance of roads have been articulated.

System for Quality Control and Assurance at TARURA

The roles of quality control and assurance are centred around the project implementation stages for roads construction activities. These stages include *feasibility study*, *detailed design stage*, *tendering phase*, road works *execution phase*, *project closure and completion*, and *operation and maintenance* and *rehabilitation*

stage which is a final stage setting a new stage of another round of feasibility study for a maintenance/rehabilitation of an existing road or development of a new road.

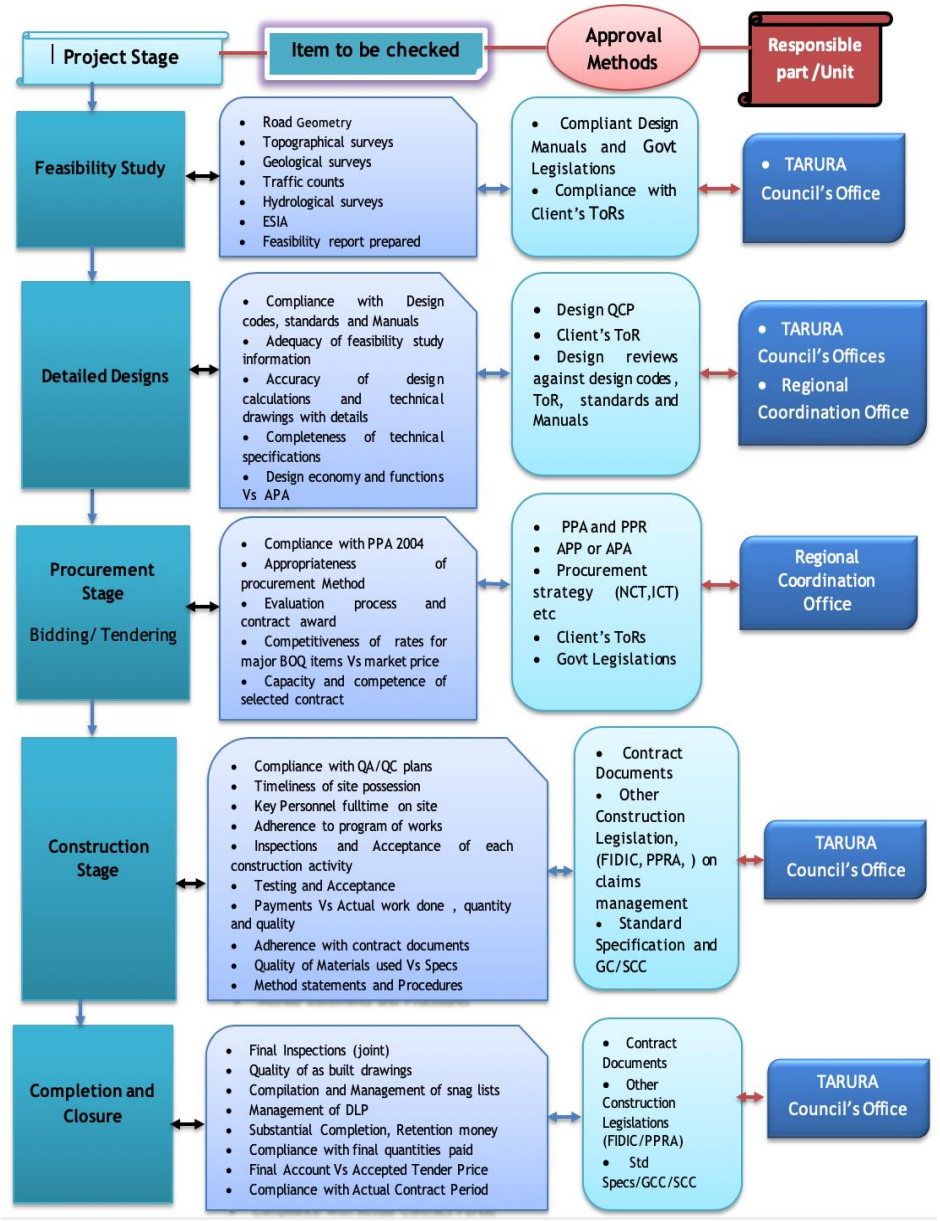
Quality Assurance is a part of quality management system focused on providing confidence that quality requirements will be fulfilled as per standards and specifications (ISO 9000:2015). To ensure the good quality works, a Quality Assurance Plan (QAP) is prepared which is comprising of a precise and simple description of tests procedures and necessary forms for records and presentation of results is prepared.

Quality Control is a process of monitoring the quality of the executed works and materials used on site through conducting routine tests and inspections[5] for each road work activity. Quality Control is concerned with actual measurements, testing or supervision of contractor's works either by inspection of each unit or by sample testing. Quality Control Plan is prepared by a contractor and indicates how the quality of executed works and materials is going to be achieved throughout the project execution.

The main elements of Quality Control and Assurance Framework are as depicted in the flow chart presented in Figure 2.1.

[5] Standard Specifications for Road Works (2000)

Figure 2.1: Elements of Quality Control and Assurance for road works



***Source**: Auditors' Analysis*

2.5 Resources for Development and Maintenance of Urban Road Network

The development and Maintenance of Urban Road Network is dependent upon financial and human resources mobilised by PO-RALG and TARURA and channelled to implement road development, maintenance and rehabilitation of the national and district roads. The resources are mobilised at different magnitudes and from different sources as detailed below;

2.5.1 Human Resources at TARURA

The Structure for execution of TARURA'S responsibilities consists of three major levels of operations including headquarters, Regional Offices and District Councils Offices. According to the Annual Staff Establishment Report of TARURA, the total number of staff at TARURA is 1219 of which 79 staff are working at Headquarters, 188 at Regional Coordination Offices and a total of 951 at Councils offices.

The staff includes different professions from Engineers, Procurement Offices, Technicians, Social Welfare Officers and ICT Officers among others. The distribution of staff at TARURA is shown in Table 2.2.

Table 2.2: Distribution of staff at TARURA by professions.

Profession	No. of Staff	Percentage out of Total
Engineers	380	31
Technicians	334	27
Surveyors	5	0.5
Procurement Officers	41	3
Social Welfare Officers	2	0.2
Economists	3	0.3
ICT Officers	9	1
Administrative & Other Support Staff	445	37
TOTAL	**1219**	**100**

***Source**: TARURA's Staff Summary 2019*

Table 2.2 shows the distribution of staff at TARURA basing on their professions responsible for road works. The most dominant profession is engineering which is making 31% of the total number of staffs at TARURA. This is followed by Technicians who comprise of 27% of all staff at TARURA. Administrative and other support staff forms 37% of all staff at TARURA distributed at headquarters and 184 LGAs where TARURA has established council offices.

Also, each region has an average number of 7 staff at the level of regional coordination offices and an average of 7 staff as well at the level of council offices with most of them being engineers and technicians. Cadres such as Procurement Officers, Social Welfare Officers, Economists, ICT Officers and Administrative Officers are mostly based at the Head and Regional Offices. The Directorate of Urban Roads (DUR) has a total of seven staff at the headquarters level who are responsible for development and maintenance of urban roads infrastructure.

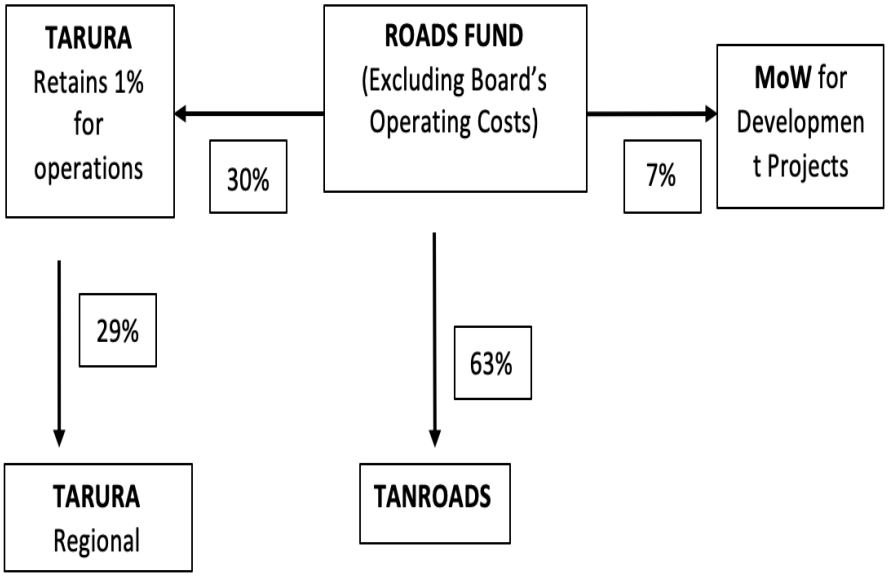
2.5.2 Financial Resources for Development and Maintenance of Urban Roads Network

Financial resources for development and maintenance of roads are mainly mobilised from the government and development partners. The government finances roads development and maintenance through the Road Fund Board which sets a proportion of 30% of their roads levies to finance the activities of TARURA. The flow of funding and the allocated resources for road development, maintenance and rehabilitation is detailed below.

Funding for Development and Maintenance of Urban Roads

The Urban Roads maintenance is financed by the Roads Fund Board which is collected from the identified sources as per Road Acts. The Funds are distributed to four institutions including TARURA which gets 30 percent of the collected funds, The Roads Funds itself remains with 10 percent of the collected funds to finance its administrative functions, TANROADS which gets 63 percent S to finance the construction and maintenance of Trunk and Regional Roads and the Ministry of Works which is given 7 percent of funds disbursed to finance its development activities.

Figure 2.2: The flow of funds from Roads Fund Board to Implementing Agencies



Source: *RFB Annual Evaluation of Implementing Agencies Performance (2019)*

Budget for Development and Maintenance of Urban Road Network

TARURA prepares an annual budget for maintenance, and rehabilitation of roads under their jurisdiction. The budget is released by the Road Fund Board to finance all road works projects in urban and rural areas. Table 2.3 presents the budget and provides the extent to which the funds were released compared to the actual budget in 2017/18 and 2018/19 financial years.

Table 2.3: Overall Annual Budget for Financial Year 2017/18 and 2018/19

FY	Planned Budget Maintenance Works (Billion TZS)	Released Funds (Billion TZS)	Deficiency (Billion TZS)	% age of released funds
2017/2018	247	229	18	93%
2018/2019	243	204	39	84%

Source: *Agreement between TARURA and Road Fund Board*

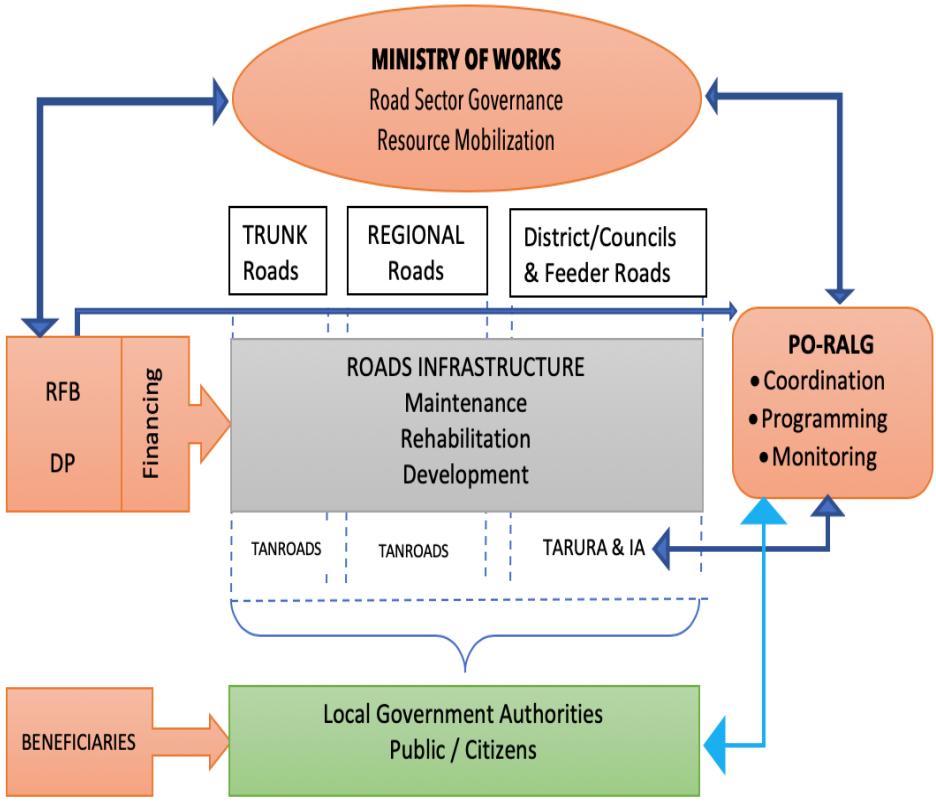
Table 2.3 indicates that TARURA has been receiving more than 80% of funds to cover for the activities that were planned. For the past two years that it has been into operation, TARURA was allocated with an average of 88.5 percent of the total funds it needed to execute its plans.

2.6 Relationship between Different Stakeholders

The development, rehabilitation and maintenance of roads in Tanzania involve the roles of many stakeholders. However, the main stakeholders who are directly involved in the national road network are TANROADS and TARURA who are the two agencies responsible for execution of development, maintenance and rehabilitation of the national road network.

To ensure smooth operations and efficient implementation of roads development and maintenance plans, the responsibilities of each of the two main agencies have been articulated. Basing on the existing frameworks, TANROADS which is responsible for all Trunk and Regional roads while TARURA which is responsible for all Rural, Urban and Feeder Roads or sometimes known generally as district roads. The beneficiaries of the executed works in different levels include Local Government Authorities and citizens in general. The relationship among the different stakeholders in the maintenance, rehabilitation and development of roads in the country is illustrated in figure 2.4.

Figure 2.3: Relationship between different stakeholders



Source: *Auditors' Analysis, 2019*

CHAPTER THREE

AUDIT FINDINGS

3.1 Introduction

This chapter presents findings of performance audit on the quality of the bitumen surfaced roads in urban area executed by Tanzania Rural and Urban Roads Agency (TARURA) under the President's Office – Regional Administration and Local Government (PO-RALG). In particular, the findings focused on the extent of quality of executed bitumen surfaced roads in urban areas both on-going and completed road works. The quality of executed bitumen surfaced road works was assessed throughout the project implementation cycle comprising the planning/feasibility study, procurement, construction and completion and closure stages.

The findings from the analysis of data collected by the audit team from different sources are presented and discussed below.

3.2 Existence of bitumen surfaced roads constructed with sub-standard quality.

TARURA is expected to provide reliable and with high quality road network passable at all weather as required by TARURA's Strategic Plan (2016/17 – 2020/21). However, the audit team noted presence of bitumen surfaced roads with poor quality constructed by the LGAs and TARURA in the six selected and visited regions.

Reviews of TARURA Annual Maintenance Report for the financial year 2017/18 indicated that 10% the paved road network in the country was in poor condition as of June 2017. The same reports indicated that out of 10 percent paved roads which were in poor condition, 70 percent of them were found in urban areas.

However, according to the Sector Report of the Ministry of Works, Transport and Communication in 2016 most of the roads in good and fair conditions deteriorated quickly to poor conditions

because of poor quality during construction and lack of maintenance. The extent of maintenance and rehabilitation of those roads were an indicator of the status of the constructed roads.

The general statistics on the condition of the paved roads in the country is as shown in **Table 3.1**

Table 3.1: Road Condition as of June 2019

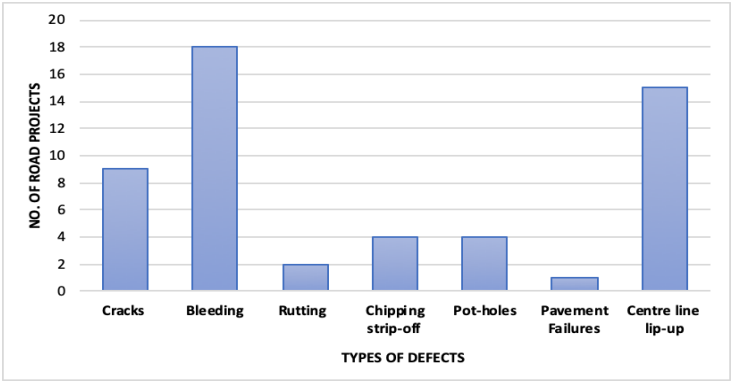
Surface Type	Road Condition						Total	
	Good		Fair		Poor			
	Km	%	Km	%	Km	%	Km	%
Paved Roads	1,026.27	70	283.37	20	139.91	10	1,449.55	100

***Source**: TARURA's annual maintenance report for the financial year 2017/18*

Table 3.1 indicates that up to June, 2019, the country had 1,449.55Kms of bitumen surfaced roads network of which 70% were in good condition and 20% fair and 10% poor condition.

However, contrary to the above given data, the site visits as were conducted by the audit team in the 12 selected LGAs as shown in Figure 3.2 found out that 50% of the constructed bitumen surfaced roads had several deficiencies.

Figure 3.1: Roads Defects/deficiencies observed during site visits.



***Source**: Project Correspondence Files from 12 visited LGAs, Visual inspection 2019*

Figure 3.1 indicates the extent of major defects from the visited roads with bleeding and centre-line lip-up being the most common type of defects. The audit team noted that 30 out of 38 road projects that were completed or were at completion stage had different types of physical defects as depicted by Figure 3.1. The most common types of defects were bitumen bleeding on the road surfaces (refer ***Appendix 5***).

Based on the reviews of correspondence files of different road projects from the visited LGAs, the client involvement in the daily project supervision particularly on road (TARURA) projects which did not involve consultants was very minimal even in the critical stages of the road works execution. There was little supervision in the laying of critical roads layers including sub-base, G15, G7, CRR and C1 layers[6]. Most of the correspondences and reports were noted during the time of testing where contractors were supposed to submit test results for the executed works. Photo 1 shows chipping strip off as one of the types of defects observed in one of the roads that were visited in Iringa region.

***Photo 1: Chipping strip-off as one of the defects along Don-Bosco Mawelewele Road in Iringa** MC.*

[6] G7,G15 : Natural gravel materials of California Bearing Ratio 7,15, Crushed Stone (CRR) and (C1): natural gravel materials mixed with cement with strength greater than 1MPa

3.2.1 Ineffective system used for collection of information for quality of executed roads

In order to effectively identify and therefore conduct proper road work interventions, TARURA was supposed to have well established tools to collect information regarding the quality and condition of their road inventory in order to use the information as input during the planning stage.

However, the audit team noted that, the system for collecting information about the condition of existing bitumen surfaced roads was not effective and timely updated. This was found from the reviews of data printout from DROMAS (District Road Management System) which did not include quality of executed bitumen surfaced roads in urban areas. The system had not been upgraded overtime for capturing all quality information of executed and existing bitumen surfaced road works in weighing whether particular road is of; good, fair or poor condition with respect to its quality parameters.

Additionally, interviews held with TARURA officials from Head Quarters responsible for the management of DROMAS and officials from 6 visited regions indicated that collected DROMAS data were not sufficiently used for planning of road maintenance interventions for urban roads. Also, the data presented to the audit team for scrutiny did not capture information on quality of roads which could help TARURA to plan for new interventions of bitumen surfaced roads constructed in urban areas.

Ineffective data collection tool for information fed into DROMAS

The audit team noted inconsistency of data collection tools used during inventory surveys for data fed into DROMAS. The data collection tool was prepared upon Council manager's discretion and not as per DROMAS. On the other hand these data collection tools (form /checklist) did not include quality aspects for particular roads surveyed rather the quality was measured based on visual observations.

Interviews held with TARURA officials revealed that, the condition surveys had been conducted on a judgemental basis on the speed of vehicle due to its Road Roughness Index (RRI). Vehicles had been used as tools for deciding whether the road was in poor, fair or good condition. It was further noted that, 3 out of 12 visited LGAs only a notebook was used for recording conditional survey data during surveys as seen in Table 3.3 below. The requested condition survey files had limited and undetailed data which also did not include quality aspects for the surveyed roads.

The analysis of the availed inventory forms from the 12 visited LGAs noted some inconsistencies as they did not have parameters to measure the road's quality. This was due to lack of customised inventory forms and checklists that could have captured all the relevant information regarding the quality of the bitumen surfaced roads. The content analysis of different forms availed to auditors are as shown in **Table 3.2** below.

Table 3.2: Content Analysis of Inventory forms

Selected Visited LGAs	Use of inventory forms/tools		Inventory form /checklist for quality parameters of paved roads								
	Yes	No	Pot hole	Cracks	Corrugation	Rutting	Depressions	Shoving /Heaving/ Bleeding	Joint reflection	Ravelling	Pavement failure /crocodile
Dodoma CC		✓	x	x	x	x	x	x	x	x	x
Kondoa TC		✓	x	x	x	x	x	x	x	x	x
Ilala MC	✓		✓	✓	x	x	x	x	x	✓	✓
Kinondoni MC		✓	x	x	x	x	x	x	x	x	x
Iringa MC		✓	x	x	x	x	x	x	x	x	x
Mafinga TC	✓		✓	✓	✓	✓	X	X	X	X	X
Mwanza CC	✓		✓	✓	✓	✓	X	X	X	X	X
Ilemela MC		✓	x	x	x	x	x	x	x	x	x
Tanga CC		✓	x	x	x	x	x	x	x	x	x
Korogwe TC		✓	x	x	x	x	x	x	x	x	x
Mtwara MC		✓	x	x	x	x	x	x	x	x	x
Nanyamba TC		✓	x	x	x	x	x	x	x	x	x

***Source**: Inventory survey files from visited LGAs and Auditors Analysis*

From Table 3.2, it is indicated that 9 out of 12 visited LGAs had no checklists and inventory forms for collection of information of the roads. Further, the collected information did not include quality

of completed bitumen surfaced roads as a result incompletely collected data were fed into DROMAS.

In addition, through interviews and document reviews done at LGA's level, inventory data collection for DROMAS was mainly done using notebooks and other none specific formats. As a result, some of the defects were overlooked and not fed into the system.

3.2.2 Unreliable information from DROMAS

The Audit team noted that the collected information was not reliable due to the mode used to collect the information. Interviews held with TARURA's Council Managers from visited LGAs revealed that the data collected was not reliable. This was due to the ineffective mode of collecting information, whereby the formations and condition of road depended on the speed of vehicles used during inventory survey. For example; roads with speed of vehicle above 55 kilometres per hour (kph) were categorised as good condition, speed of 55-40 kph as fair and below 40kph as road with poor condition. This indicated that, the tool prepared was only for riding quality of particular roads. As the result, the quality aspects could not be covered.

3.2.3 Insufficiently collected information of bitumen surfaced roads

In order to evaluate and properly categorise roads condition, TARURA was supposed to have proper information collected from properly designed tools.

However, the audit team noted that, the data which was fed into DROMAS was solely based on riding quality of particular roads. This was done during visual observations depending on the speed of vehicle used during road condition surveys. This methodology did not capture the physical condition of road in respect to quality aspects.

Furthermore, the assessment criteria on categorisation of road conditions was based on road riding index (RRI) which did not provide enough information about the quality of executed bitumen

surfaced roads. The roads which were surveyed had a lot of defects which were not well captured by relying on roads riding quality and the respective RRI index.

3.3 Ineffective Quality Control and Assurance Unit

TARURA has established a Quality Control and Research Unit which has been given the responsibility of establishing quality assurance systems, planning and carrying out research and development activities. Additionally, one of the key functions as per its Strategic Plan 2016/17-2021 is to provide technical support, supervision, quality assurance and control. However, TARURA's performance in providing technical support, quality control and assurance services has not been sufficient.

Despite having conflicting accountability between *quality control and assurance* roles as depicted by Table 3.3, TARURA has not been performing sufficiently in all of the three roles i.e technical supervision, quality control and quality assurance.

Table 3.3: Accountability Overview of Quality Control and Assurance

TARURA Establishment Order	Assigned Functions as per Order	TARURA Strategic Plan	Actual Activities by Established Unit	Unperformed Roles
Establish Quality Control and Assurance Unit	Establish Quality Assurance Systems, Planning and Carrying Out Research and Development Activities	Provide Technical Support Quality Assurance and Control	Quality Assurance	• QA System • Technical Support • Quality Control • Research and Development

***Source**: TARURA Establishment order, Strategic Plan, TARURA's Quality Verification reports*

Technical Support and Supervision

The audit team has noted that there has been a limited number of technical supervision visits to the regional coordination offices and LGA offices which was expected to provide a proper guidance to technical staff in regional coordination and Council offices. The audit team found out that there were no proper plans on how many technical visits shall be done quarterly or annually and to which regions or LGAs. As a result, it was not possible to establish to what extent TARURA has achieved its objectives in conducting the technical supervision visits.

Additionally, the audit team did not find any feedback or technical correspondences resulting from the technical visits done by responsible staff from Headquarters. In all of the regions the only evidence for technical visits was the visitor's logbook which did not capture any technical matters arising from their visits such as site instructions or issues regarding quality control.

Quality Control

The audit team noted that, there was no quality control functions from the headquarters level at the quality control and assurance unit. There was neither reports nor evidence of quality control activities for ongoing road works executed in LGAs. Additionally, the audit team did not find any guidance from TARURA on how the quality control functions can be achieved at the level of Councils where bitumen surfaced road works are being executed.

Quality Assurance

Our review of the quality verification reports revealed that the reports contained a substantial number of checks for quality assurance although, the coverage was limited in two aspects. The quality verification activities covered only development projects funded by development partners but they did not cover the road works primarily undertaken by TARURA. The verification activities therefore did not provide an assurance on quality for all the

bitumen surfaced road works activities conducted by TARURA using Roads Fund monies.

In addition to that, the verification reports did not have a proper means of closing their findings and providing way forward for non-complied items. From the review of the verification reports, it was found that the verification team remained silent in some of the projects despite having failed items. For instance, the verification team had found some failed tests and other non-complied items along Doma-Msongozi, Msongozi-Magali and Mtanana-Makwawa roads but the report was silent on what actions to take or recommendations to give regarding the failed tests.

But also, in some of the road projects, improper advice was given which was not actionable by the time of verification i.e recommendation to compact well depression and rutting along Doma Msongozi road was not practical while the road project was already completed and handed over.

On the other hand, there was no means of re-verification for the issued recommendations for all items that failed during verification visits. This is despite the fact that 15 of the 16 verified projects had a substantial number of findings that affected the quality of road works executed ranging from uncleared debris, vegetation, workmanship, road depressions, rutting, cracks and failed concrete strength tests. The report ended by only providing instructions without providing means of re-verification despite criticality of some of the findings.

Consequently, the weaknesses in providing proper guidance on executing quality control during execution of road works has created a supervision gap that has caused a presence of road works projects that do not sufficiently meet the quality requirements and stipulated standards.

3.4 Inadequate Designs and Specifications for the executed road works

The Strategic Plan of TARURA 2017/18 – 2020/21 requires TARURA to ensure that feasibility studies are conducted and detailed designs are prepared. The feasibility studies and detailed designs were expected to serve as valuable inputs during the development of geometric road designs, geotechnical designs, drainage designs and detailed designs so that the constructed roads serve the intended purposes and at the intended road capacity. However, the review of the different road works executed in urban areas have indicated that, feasibility studies conducted were not sufficient and subsequent road designs prepared were been inadequate. The weaknesses with regard to the feasibility studies and other aspects related to the design and specifications for the executed road works are analyzed below.

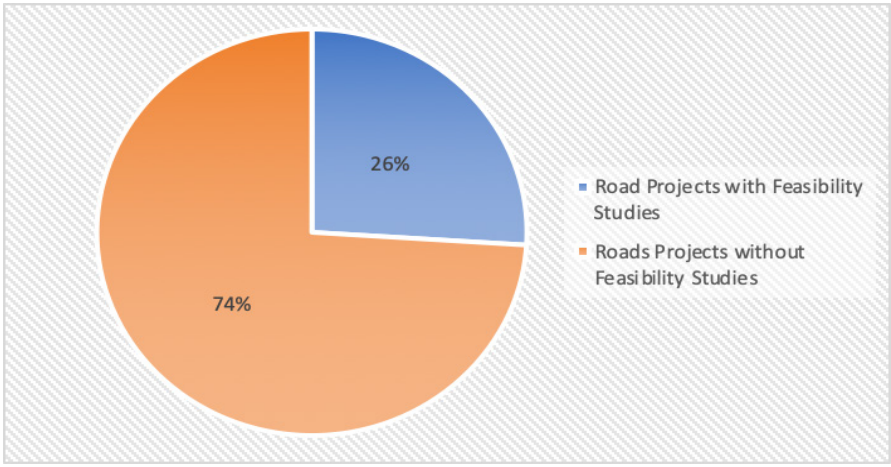
3.4.1 Inadequate Feasibility Studies

The Strategic Plan of TARURA 2017/18 – 2020/21 requires TARURA to ensure that feasibility studies are conducted and detailed designs are prepared. This is also the requirement of the Roads Geometric Design Manual (2012) chap 9.1.4 Which requires the following studies to be conducted as part of feasibility study, i.e.; geometric design, geological or soil investigation, topographical surveys, traffic counts, hydrological surveys, need assessment or conditional surveys of defects (rutting, roughness and surface defects)[7] and environmental and social impact assessment.

However, reviews of design reports and tender documents from 12 selected and visited LGAs indicated insufficient number of road projects that undergone feasibility studies as shown in **Figure 3.2**).

[7] Tanzania Road Geometric Design Manual (2012)- MoW; chap 9.1.4

Figure 3.2: Percentage of road projects that undergone Feasibility Studies



***Source**: Final Design reports, tender documents and correspondences from 12 selected and visited LGAs*

Figure 3.2 shows that only 10 out of 38 roads projects in urban LGAs which is equivalent to 26 % of the road projects from the 12 visited LGAs had undergone feasibility studies, while the remaining 28 projects equivalent to 74% did not undergo the required feasibility studies (refer to ***Appendix 6***).

According to the interviewed officials from TARURA, the decision on whether to carry-out the feasibility study or not in most of the road projects depended on the scale of the works to be executed. If the scale of the road works to be executed was small then the detailed designs were done skipping the feasibility studies while for large scale road works, it was agreed that feasibility studies should be conducted.

Furthermore, the analysis of the few conducted feasibility studies indicated that not all of the components that were supposed to be covered during the feasibility study were sufficiently addressed. Key components that constitute as inputs of the road designs were skipped (refer to ***Appendix 7)***. In addition, key factors for road construction like availability of construction materials sources and their gradation, soil types and depth, groundwater conditions, hydrology, drainage stability and the location of shifting channels

were not considered in the fewly conducted feasibility studies that were reviewed by the audit team.

Similarly, the review of the road projects indicated that feasibility studies were not conducted even in relatively large projects costing more than TZS 1 billion. Lack of feasibility studies subjected the executed road projects into a risk of cost variations and other budgetary dynamics which was a common reason for most of the delayed road projects.

Table 3.4: Large projects with no feasibility studies

LGA	Name of Project	Budget (Billion TZS)
Kinondoni MC	Sala Sala - Africana Kinzudi Phase I and II	1.2
Ilala MC	Buguruni Mnyamani Road	2.5
Dodoma CC	Emmaus African Dream	1.3
Dodoma CC	Martin Luther - Swaswa	1.4
Ilemela MC	Kabuhoro - Ziwani Road	1

***Source**: Contract Documents from 12 selected and visited LGAs*

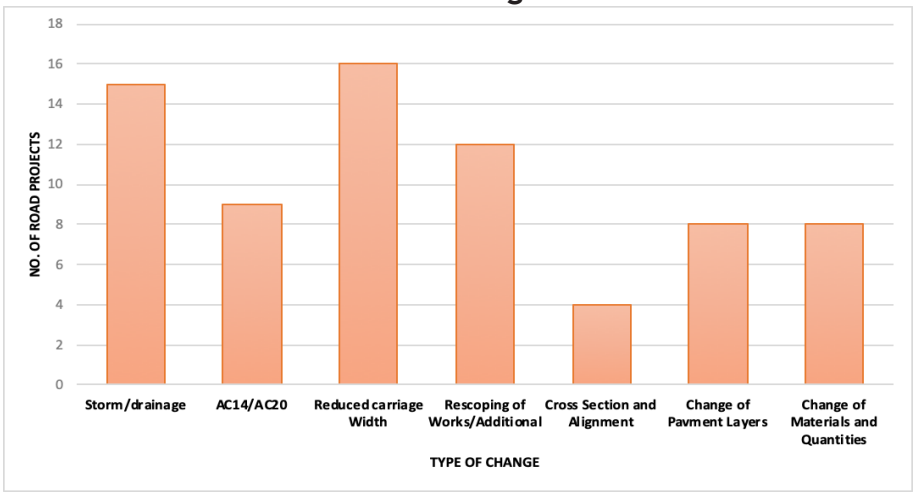
Table 3.4 indicates that feasibility studies were not conducted to some road projects with significant amount of funds and budget. The review of the road work projects executed in the 12 visited LGAs has indicated that 5 projects in 4 LGAs had a budget of more than 1 billion and deserved to have properly done feasibility studies to guide their design and execution. However, these projects did not have proper feasibility studies and were executed based on in-house knowledge on the roads and provided a limited number of information to guide development of a detailed design.

3.4.2 Availability and use of inadequate road designs

The overall quality of roads depends mainly on the quality of road designs which determines the road physical formation of the road when it is completed. In order to accomplish this, TARURA was supposed to have deployed sufficient resources in order to ensure that adequate designs are prepared so as to guarantee road works of high quality.

The audit team found out that, there was a problem of inadequate designs of bitumen surfaced roads in some of the visited LGAs leading to several changes for different road components. This brought about a number of variations and affected several project elements including the pace at which the roads were constructed and against the estimated project costs. Road components which were frequently changed included: storm water drains, Asphalt concrete (AC14/AC20), reduced carriage way, re-scoping of works or additional, cross sections and alignments, changes of pavement layers and changes of materials and quantities. These changes resulted to increase of construction cost amounting to TZS 1.628 Billion (refer ***Appendix 8*** for more details on the changes that occurred). The details of extent of change of each of the component are provided in figure 3.3.

Figure 3.3: Major Design Changes Resulting from Inadequate Road Designs



***Source**: Review of Road Designs and Correspondences from 12 visited LGAs*

Figure 3.3 indicates different types of design changes as a result of inadequate road designs. From 12 visited LGAs, 16 out of 38 selected and visited roads have undergone changes due to shortage of road widths. This implies that 42% of bitumen surfaced roads were constructed without considering the originally designed road widths. This happened because the designs were not conducted in respect to physical site conditions.

Officials from TARURA acknowledged that constructed roads were lacking required road width due to shortage of corridor width which could not accommodate all required road features as per original design. For example, major road width changes were made to Hoza –Ramia road from 11m to 9m which resulted to omission of pedestrian walkways. However, there was no design reviews conducted.

Likewise, 15 of 38 road projects which is equivalent to 39 percent of selected and visited bitumen surfaced roads in 12 LGAs were subjected to discarding / omission, improvement/addition and re-scoping of storm water /subsurface drainage as well drainage structure. For example, as a result of inadequate original design, the TSCP Package 6 in Dodoma City Council had additional storm water drains which resulted to addendum of up to TZS 1.797 Billion. This was due to inadequate original designs.

Consequently, major changes on carriageway width and subsurface drainage works occurred as a result of shortage of corridor width and raised water table respectively. The most changed road design was the Tegeta Nyuki road work which had a total of 8 major changes which had a significant impact on the contract sum by increasing from the original TZS 1.99 Billion to the current TZS 2.97 Billion. This change however was not re-advertised as per the public procurement regulations which require any increment above 15% of the original contract price to be re-advertised and that a new procurement should be initiated. In general, most of the implemented designs were not similar to the originally prepared road designs with some having minor and others having major changes (Refer ***Appendix 9***).

The analysis of minutes of the site meetings and road designs indicated that TARURA was using typical drawings in preparing road designs and did not prepare customized roads designs which reflect the actual site conditions. This was observed in almost all of the road projects which were designed in-house and was identified as among the major causes of major design changes which had an impact on the contract sum. The audit found that most of the changes were done during project implementation. It

is in this phase where several design changes were requested by contractors and approved by the Project Managers.

On the other hand, there were inadequate hydrological surveys for road projects where feasibility studies had been conducted. The feasibility study reports were mostly covering traffic counts and soil investigations. There were very few cases covering topographical, geological, social, environmental and hydrological surveys are crucial because if conducted they could have indicated areas with water logged and highest water table prior to detailed design of bitumen surfaced roads.

Further analysis has indicated that the changes made on the design of pavement layers were also a result of insufficient information provided in feasibility studies and designs. This was revealed from the reviewed project geotechnical and materials report of executed development projects (DMDP & TSCP) which did not show areas or locations with waterlogged or with higher water table levels.

For instance, the reviewed design reports of DMDP projects in Kinondoni MC pointed out that Bwawani sub-ward roads were waterlogged and prone to flooding during rainy season. As a result, the sections were covered with 500mm thick sand blanket and rock fills to control the rise of underground water to the pavement layers.

Furthermore, road designs of DMDP and TSCP under LGAs which were carried out by consultants had also encountered deficiencies in their designs. This was indicated in the design review reports conducted by the supervising consultant. For instance, the wearing courses for all packages designed were below the requirements as shown in **Table 3.5** below.

Table 3.5: Comparison of original and revised wearing courses for different road projects in the visited LGAs

LGA	TSCP / DMDP Project ID	Original Drawings (mm)	BOQs (mm)	Original Design AC 14 or 20 thickness (mm)	Revised design AC14 thickness (mm)	Reasons for Change from 30mm to 40mm or 50mm
Kinondoni MC	DMDP Package 6	30	40	30	40	Noncompliance with or out of P&MDM[8]
Mwanza CC	TSCP Package 4	30	50	30	50	Noncompliance with or out of P&MDM
Ilemela MC	TSCP Package 1	30	40	30	50	Noncompliance with or out of P&MDM
Ilala MC	DMDP Package 1	30	40	30	40 / 50	Noncompliance with or out of P&MDM
Tanga CC	Package 4&5 TSCP Tanga CC	30	30	30	40	Noncompliance with or out of P&MDM
Korogwe TC	ULGSP ; Hoza - Ramia	30	50	30	50	Noncompliance with or out of P&MDM
Mtwara MC	TSCP Package 5	30	30	30	50	Non-compliance with or out of P&MDM

***Source**: Final Design report, contract documents, Correspondences and Design Review from 12 visited LGAs.*

Table 3.5 indicates that 7 visited bitumen surfaced road projects were designed contrary to the standards and design manuals. Thus, original designs were below the requirement whereby 30mm thickness of Asphalt Concrete was provided contrary to the Pavement and Materials Design Manual (1999) Table 10.13 pg. 10.18. Table 10.13 within the Manual provides the requirements for Asphalt Concrete mix rof AC14 between 40mm – 60mm thick layer. The original 30mm asphalt concrete layer was very thin and contrary to the design manuals and standards.

[8] Pavement and Materials Design Manual of 1999-MoW and design standards

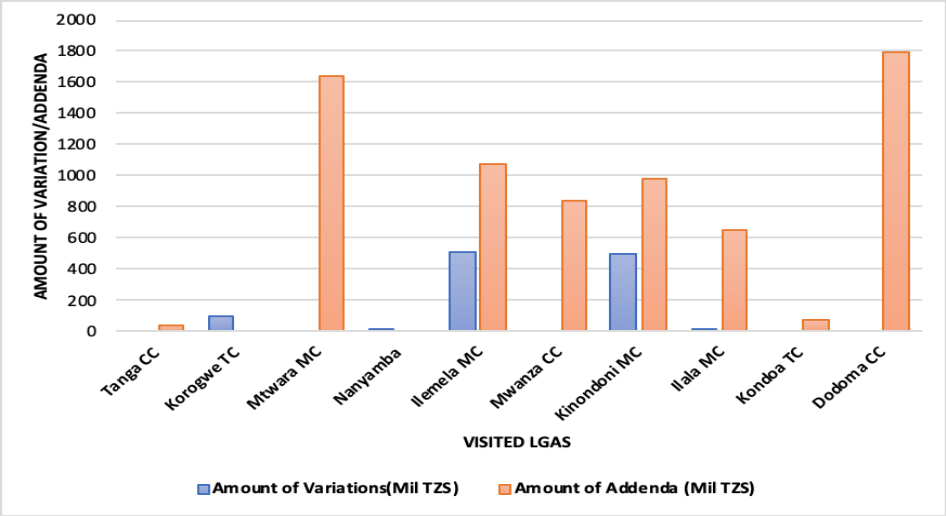
Consequently, there is a high risk that a 30mm thick asphalt layer would lead to difficult controls on site in terms of degree of compaction, layer thickness and failure on rutting resistance. The reviewed project correspondences and design review reports recommended to increase the thickness of AC14 from 30mm to 40mm and 50mm respectively as shown in **Table 3.5**. These inadequate designs led to different design changes, cost variation and cost overruns as indicated in **Sub section 3.3.3** below.

3.3.3 Presence of addendums and variations

According to Section 3.7.1 of the Tanzania Road Geometric Design Manual (2012) requires conduct of surveys of vital influence on designs, on production of quantities and cost estimates and finally on execution of the work. However, through reviews of tender and contract document it was revealed that, all drawings attached for tendering process as final drawings were not stamped and approved by client as required by the Road Geometric Design of 2012 chap 11.

Through reviewed project correspondences and contract documents the audit team further revealed that project cost overruns which led to addendums and variations were due to inadequate original designs (refer to ***Appendix 10)***. This was because most of the designs were typical on similarities and nature of projects. The designs carried out by the design consultant did not comply with the Pavement and Materials Design Manuals and Standards (refer to Table 3.4 above). The addenda and variations were a result of two major reasons one being lack of feasibility study which led to execution of road works with inadequate designs and the second reason being project variations and addenda due to inadequate designs are shown in Figure 3.4 below.

Figure 3.4: Addenda and variations which resulted from inadequate road designs



Source: *Project Documents and Correspondences from 12 visited LGAs*

Figure 3.4 indicates that there has been a substantial amount of additional funds which are a result of variations and addendum from the visited roads projects. Each bar in the figure represents the total amount of variation per LGAs summing up all of the funds in a particular year. According to the conducted analysis, Dodoma CC had the highest amount of addenda out of the 12 LGAs. This was contributed by an addendum of the TSCP Road project package 6 in Dodoma CC which had an addendum of TZS 1.797 billion after having some storm water drainage works added in their revised design followed by another TSCP Project at Mtwara MC having an addendum of TZS 1.49 billion.

Generally, the analysis indicates that that 10 out of 38 visited road projects were completed with addenda and 7 out of 38 visited road projects were completed with variations. This has resulted into projects cost overrun or an additional cost ranging from 1**0** million to **1.8** billion Tanzanian Shillings. The review of design documents and BoQs, showed that the variations and addenda were a result of inadequate designs resulting from inadequate feasibility studies.

3.3.4 Inadequate Capacity for Carrying out In-house Designs for Road Works

To facilitate the preparation of road designs at lower level in LGAs, TARURA has adopted a method by which a team of registered engineers at LGAs prepares designs for road works which are considered to be of low scale to avoid incurring additional costs by inviting external consultants. However, the audit team has noted that the in-house design teams in the visited LGAs did not have sufficient capacity to carry out detailed designs at its desired quality due to different factors described below:

a) ***Human resources capacity***

The audit team has noted that the available human resources at LGAs did not meet the specified standards to form a team that can could sufficiently develop detailed designs at the required levels. Based on the Pavement and Materials Designs Manual a design team required to develop the roads design should include diverse number of skills among others; including; civil/highway engineering (pavement structures, drainage works or hydrology, material, major structures and surveying works). In addition, the design team should also comprise other skills specifically on environmental impact assessment and social-impact assessment to enable the development of adequate road design. However, the audit team has noted that most of the LGAs did not have a sufficient support from Headquarters for the particular assignments. The assessment of availability of key skills for carrying-out feasibility studies and developing detailed road designs showed deficiencies as depicted in Table 3.6;

Table 3.6: Availability of key staff for developing road designs at the visited LGAs

Profession	No. of LGAs with a Respective Category of Profession
Highway Engineers	12
Drainage Engineers	0
Materials Engineers	0
Environmental Engineer	0
Quantity Surveyor	1
Sociologist	0
Hydrologist	0

***Source**: Visited LGA's Staff Roster*

Table 3.6 indicates that the available team of required professionals in LGAs did not meet the required standards for undertaking feasibility studies and developing adequate and detailed road designs. The audit team noted lack of diverse professions enough to conduct the proper feasibility studies. All of the 12 visited LGAs had only civil cum highway engineers and lacked other key experiences and expertise necessary for undertaking feasibility studies. In addition to the 12 highway engineers there was only one quantity surveyor in the 12 LGAs while missing all other remaining professions.

b) Lack of roads designs knowledge and skills

The audit team noted that there was a limited knowledge and skills for developing quality designs. Most of the registered engineers from the visited LGAs indicated a lack of enough skills to develop designs and supervise the bitumen surfaced road construction projects. On the other hand, the audit team noted that there was a limited availability of standards and manuals at the disposal of the engineers in the visited LGAs. Most of the LGAs did not have copies of standards and manuals to refer during the design development and projects supervision.

Furthermore, interviews conducted with officials from the visited LGAs noted that some of the engineers had inadequate experience and background in designing paved roads. Prior to the establishment of TARURA; most of the engineers were engaged in constructing gravel roads under LGAs and therefore had a limited experience on bitumen surfaced or paved roads.

c) Lack of important design tools

The audit team noted further that LGAs did not have sufficient tools for undertaking adequate feasibility studies to facilitate developing adequate road designs. Observation of LGA's stock of tools indicated that important tools to facilitate feasibility studies and other forms of collection of information during the preparation of detailed designs were missing. Among the common missing tools included ordinary tools for extraction of trial pits, GPS Locators, dump levels, levelling stuffs, chain rod, pegs, latest software etc. Additionally, most of the LGAs did not have laboratory facilities to enable key investigations of soil and other construction materials during the feasibility studies and detailed designs.

3.3.5 No Quality Review of In-House Design for Road Works

To satisfy the desired quality level, a road design has to be reviewed by additional external reviewer who may provide alternative opinions or improve the current design.

However, the review of the in-house design prepared in the visited LGAs indicated presence of weaknesses in reviews of the in-house road designs were not effectively reviewed. Through the interviews conducted with TARURA officials, it was noted that the designs were informally reviewed at regional level by the procurement teams. However, there was no formal channel showing how the review was done and how the changes or comments resulting from the reviews were worked upon.

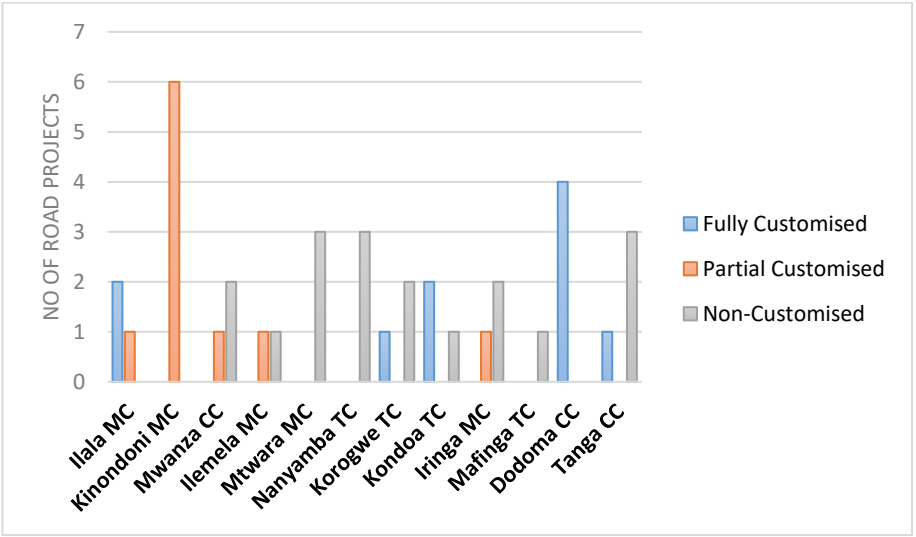
On top of that, officials from the visited LGAs did not have sufficient understanding of what are designs and design reviews. In all 12 of the visited LGAs, the in-house designs submitted to

auditors from 12 visited LGAs were not carried out or insufficiently done. This was due to lack of design information like; soil investigations, traffic counts, traffic analysis, topographical and hydrological surveys.

3.3.6 Inadequate customization of road specifications

As per the guidelines issued by TARURA, LGA Offices were supposed to customize the standard specifications for road works (2000) so that they are reflected in their contract's documents particularly in BoQs. The specifications were supposed to be reflected in the special conditions of works and bills of quantities to guide the execution of road works in urban areas. However, the review of contract documents and particularly bills of quantities and specifications for different road projects has noted that the specifications for road works were not well customized and the specifications for road works were not sufficiently reflected in the contracts.

Figure 3.5: Customization of Standard specification of Road Works, (2000) and Manuals for Road Works in Selected LGAs



***Source**: Contract Documents, Correspondences from 12 visited LGAs*

Figure 3.5 indicates that customisation of standards and manuals for road works were not sufficiently done as per the requirements.

Out of the 38 road projects that were visited, 18 road projects equivalent to 60% had not customised the required design manuals and standards for road works. The road contract documents for bitumen surfaced/paved roads were attached with maintenance manuals. Furthermore, 10 of the road projects equivalent to 33% had partially customised the road specifications and manuals. For instance, Series 2000, 3000 and 6000 of the SSRW (2000) for Tegeta Nyuki and Buguruni Mnyamani roads in Kinondoni and Ilala MCs respectively were not correctly reflected in the contract particularly BoQs and specifications used were different specifications from those of SSRW (2000)

On the other hand, LGA offices had insufficient number of staff for supervision of on-going road projects which resulted into inadequate supervision of executed paved roads in their areas of jurisdictions contrary to project contract documents. For instance, through document review of Contract Number AE/092/2017-2018/KOTC/W/04 from Kondoa TC the audit team noted that, road bed preparation had zero quantities. The road bed preparation item was not included in BoQs and Specifications contrary to Standard Specification of Road Works of 2000, series 3000. This was due to inadequate customization of specifications and evaluation of tenderers which could have prompted to having zero items in comparison with designs and drawings attached in tender documents. This led the contractor to quote for new rates for road bed preparation activities.

3.5 Weaknesses noted during tendering

According to Road Geometric Design Manual (2012) of the Ministry of Works and Transportation (MoWTC) Chapter 11 requires approved drawings after reviews submitted as stamped final design drawings. As a means of quality control during tendering stage, TARURA was expected to prepare accurate, complete tender documents using appropriate and acceptable standard tender documents in order to receive competitive tenders as per set standards by PPRA and in compliance to PPA especially here.

However, we noted that, attached drawings were incomplete and found out that typical drawings were used during tendering. The

drawings submitted for tender documents were not approved as per the requirement of the Road Geometric and Design Manual. For instance, the attached drawings were only plan and profiles typical road cross sections which were not enough for tenderers to verify the accuracy and adequacy of quantities provided into BoQs.

As a result, the funds were not enough to complete the road projects regardless of re-scoping of works due to lack of enough corridors for the required road width. This was a result of road designs which were not developed by using actual site data. The attached typical drawings did not reflect the physical situations at site during the implementations as a result of inadequate needs assessment conducted.

3.5.1 Inadequate Evaluation of Contractors for Road Works

Tender evaluation team plays an important role in the procurement of contractors who would execute the planned road works. The availability of strong evaluation team that would enhance the procurement of strong and capable contractors is very key in constructing roads that meet the required standards and specifications.

The review of tender evaluation reports indicated that qualified bidders were not sufficiently analysed to arrive at the best possible contractor to undertake the works. The analysis did not indicate the number of road projects undertaken by a particular contractor at the time of bidding. The number of road projects undertaken by a contractor had an impact on their performance. The larger the number of road projects undertaken concurrently the more likely the contractor may underperform. But, on the other hand, there was no extensive analysis on the financial capacity of the contractors particularly their cash flow. The analysis done by the evaluation teams did not sufficiently indicate the cash in and cash out flow for the selected contractors to establish whether the contractors had a financial distress as a result of running multiple projects. This was observed for most of the selected contractors who were in financial constraints for most of the times and therefore frequently raising interim payment certificates.

Furthermore, there were no reports of post qualification evaluation for the qualified contractors. The evaluation reports did not report about the performance of qualified contractors in other similar projects and whether they had any performance problems in those projects. The evaluation reports reported only on the ownership of the equipment but did not go further to evaluate the availability of the said equipment for works when they are needed. The review of the evaluation reports and site meeting minutes has indicated that contractors may own the equipment but they may not be readily available for works when they are needed.

Furthermore, the review of evaluation reports had indicated an absence of verification of the availability of key personnel for the company and the projects. The evaluations entirely relied on the information submitted by the contractors on the availability of key personnel.

Based on the interviews conducted with TARURA officials from the visited LGAs, the audit team has noted that some of the evaluation teams were not composed of sufficient number of professions to be able to select capable contractors who would effectively execute roads at high standards. The audit team noted that some of the evaluation teams did not include financial experts who would be able to effectively point out financially capable contractors which is among the key aspects in ensuring that high quality roads are built. Additionally, some of the evaluation teams did not include professional engineers to be able to technically select contractors who sufficiently meet technical requirements.

3.5.2 Inadequate quality assurance during the procurement process

According to Low Volume Roads Manual 17.6.3, Tender documents are required to explicitly state the requirement that the contractor must present his project Quality Plan that he/she intends to follow during the execution of road work. The availability of Quality Assurance and Quality Control Plan provides and guarantees the compliance with specifications and standards.

However, from the tender documents that were reviewed, it was found out that, tender documents availed during the procurement process did not include the Quality Assurance and Quality Control Plans. Contractors did not attach QCP which is a guidance for TARURA in developing Quality Assurance Plan.

Through the reviews of tender documents of selected projects for Financial Year 2015/16-2018/19, the audit team noted inadequate quality reviews for submitted tender documents from tenderers. This was because of inadequate controls to tender evaluation process which could have noticed the requirements of the tender documents.

A further scrutiny of tender documents by the audit team revealed that due diligences were not done sufficiently. The evaluation of contractors was entrusted as per submitted attachment to tender documents, but the actual site situation was different. For instance, several issues were noted during the review of road project documents which could impair the quality of the road works. These include:

- Absence of technical staff at site during the construction for the on-going road projects;
- Several replacements of staff;
- Low capacity of contractors due to absence of required equipment for specific activities carried-out on site;
- Inadequate financial capacity of contractors which led to late delivery of road projects; and
- Absenteeism of contractors on site without notice.

Generally, reviews of the road projects by the audit team revealed a number of challenges and issues in tendering processes that negatively affected the quality of construction works for the bitumen surfaced roads in the visited LGAs as indicated in **Table 3.7**.

Table 3.7: Contractual violations for different contractors in the visited projects

LGAs	Name of a road Project	Major Weaknesses noted	Implications
Kondoa TC	Upgrading of Kondoa Township Roads	Absenteeism of contractor on site	Delay of projects and cost overrun
Ilala MC	Buguruni – Mnyamani Road	Missing key staffs and equipments	Delay of project and poor quality of executed works
Kinondoni MC	Changanyikeni - Shule Road	Missing key staffs on site while ongoing project	Poor quality of completed work as seen in the photo along Changanyikeni Shule road
Mtwara MC	Sinani-Mkwawa II-Jamhuri to Boma, Ligula Hospital-Mongowela	Contractor awarded but not possessed site	Cost of Procuring New Contractor
	Sinani-Mkwawa II-Jamhuri to Boma, Ligula Hospital-Mongowela	New Contractor Terminated	Costs implications of Termination
Korogwe TC	Hoza- Ramia Road at Korogwe TC	Contractor for AC 14 Road not owning or leased asphalt sprayer	Costs due to delayed works
	Hoza- Ramia Road at Korogwe TC	Subcontracted Contractor had a broken Asphalt Plant	Costs due to delayed works

Source*: *Project Correspondence Letters from project files

Table 3.7 indicates that contractors have been violating contractual agreements as they execute their contractual obligations at different perspectives. The most common violation was the fact that most of contractors had very little or none of the key personnel submitted during tendering phase being involved in the project.

Works correspondence letters have indicated that most of the road projects were executed in absenteeism of key personnel who are very critical in ensuring that executed road works conform to standards and are of desired quality. Work activities were done without approval and in compliance with agreed technical specifications and standards.

Consequently, road projects were frequently delayed and costs overrun in terms of variations and addenda were frequently

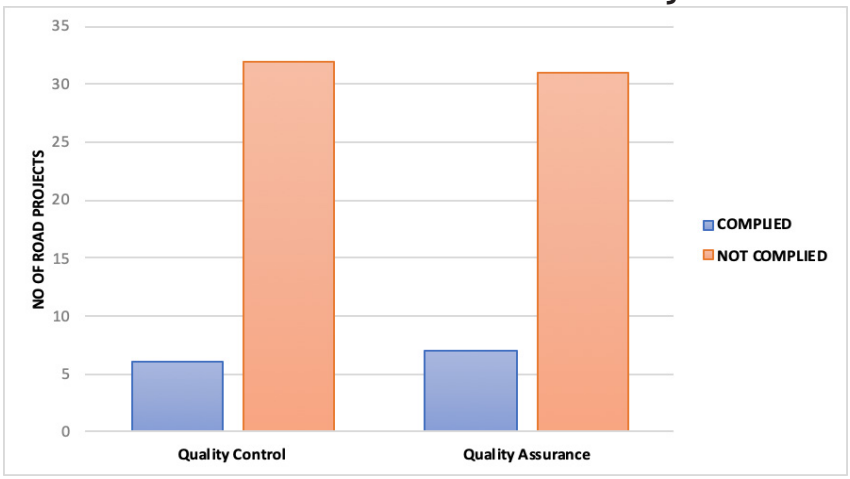
observed in the visited road projects as depicted in Table 3.8 above.

3.6 Inadequate Quality Control during the execution of bitumen surfaced road works

According to TARURA Strategic Plan Section 1.1(iii), the Agency is required to develop appropriate project management and quality control procedures for maintenance and development works that provide the optimum environment for timely completion of the works with required quality and standards. However, the audit team has noted that TARURA did not have an effective quality control mechanism for the execution of bitumen surfaced roads in all the stages.

TARURA was expected to prepare appropriate management and quality control procedures and plans that could have addressed control mechanism at all stages of project implementation. However, through road projects document reviews in 12 visited LGAs, it was found that there was little compliance in projects with regard to preparation of Quality Control Plans (QCP) and Quality Assurance Plans (QAP). Figure 3.10 shows the status of compliance for roads projects with respect to developing QCP and QAP.

Figure 3.6: Availability of Quality Control and Quality Assurance Plans for visited Projects



***Source**: Project Correspondences, Contract Documents*

Figure 3.6 indicates that only 7 out of 38 road projects equivalent to 18% of the visited projects had quality assurance action plans. Likewise, only 6 out of 38 road projects, equivalent to 16 percent of visited paved road projects in 12 LGAs had quality control plans ***(refer Appendix 11)***.

This implies 82% and 84% of 38 visited road projects had no quality assurance plans and quality control plans respectively. The quality of executed paved roads was insufficiently controlled by project supervisors as a result, executed roads had inadequate quality. This was observed during the site visit whereby the audit team witnessed the use of wrong construction materials as aggregates for CRR and Asphalt Concrete layer as shown in Photo 2 below.

***Photo 2**: Coral limestone aggregates used for wearing course mined from the wrong sources as per original design. (Photo taken by auditors on 15th January 2020)*

On the other hand, only 4 out of 12 visited LGAs had enforced contractors to develop the quality control plans for their ongoing works as a means to ensure that road works are executed within the acceptable quality standards. While 7 out of 12 visited LGAs had quality assurance plans for works and material testing.

Consequently, the absence of quality control and assurance plans as well as method statement resulted into absence of non-conformance reports which were supposed to indicate the extent to which the contractors have complied or non-complied to the quality control plans and method statements submitted earlier.

Additionally, there were no reports on enforcements of specifications and standards regarding compliances and non-compliances whereby corrective measures could have been applied. As a result, failed material tests were not rejected and corrected accordingly.

3.6.1 Inadequate quality control of designs

In order to guarantee the quality of developed road designs TARURA was supposed to have laid down proper system for quality control of the developed in-house road designs. However, the review of project documents and tender documents indicated that TARURA had no quality control of their in-house designs for executed bitumen surfaced roads in urban areas.

Despite lacking proper quality control mechanism, TARURA was conducting in-house designs with the use of partial information gathered through traffic counts and general geological information of specific bitumen surfaced roads. There was no evidence to indicate whether activities were carried out and quality control was done on adherence to design requirements for bitumen surfaced roads. Interviews held with TARURA Officials from the visited selected regions revealed that, the design of some roads were inadequate done. This was due to low capacity of TARURA to developing designs of road works.

Consequently, the designs were carried-out without verifications on site. Hence, unrealistic designs which were not implementable during the execution of works. This was verified during the site visits conducted by auditors whereby the design drawings did not match with the actual executed works on site as per Table 3.8.

Table 3.8: Constructed Bitumen surfaced roads which does not match with original design specifications

Name of Project	LGA	Design carriageway width (m)	Actual constructed carriageway width (m)	Design Reviews
Kondoa Township Roads 1.26km	Kondoa TC	7	6	x
Kondoa Township Roads 1.3km	Kondoa TC	7	6	x

Name of Project	LGA	Design carriageway width (m)	Actual constructed carriageway width (m)	Design Reviews
Buguruni-Mnyamani Road	Ilala MC	7	5.8-6.0	x
Changanyikeni - Shule Road	Kinondoni MC	7	6	x
Shimbony Road	Kinondoni MC	7	6	x
Hoza - Ramia Road	Korogwe TC	11	9	x
Rehabilitation of Mwanza CC Roads	Mwanza CC	7.0	6.5-7.0	x
Don Bosco Mawelewele Road	Iringa MC	7.5	6.0	x

***Source**: Projects files for financial years 2015/16-2018/19*

Table 3.8 indicates that 8 road projects were constructed with short carriage width as compared to original width shown in the design. The reason provided from the interviews held with TARURA officials visited LGAs was lack of corridor (right of way) to provide room for construction of full width as per design. This indicates that designs were not done based on the physical site conditions. As a result, the carriageway constructed was not wide enough to accommodate all features as per design.

For instance, corridors for the constructed roads were not enough to accommodate side drains, street lights and road signs as a result of lacking actual site data. This led to additional work and addendum due to lack of detailed information prior to design.

Furthermore, Buguruni – Mnyamani and Changanyikeni- Shule roads lacked shoulders, side drains, road signs due to lack of road reserve to construct other features. The road projects at Mtwivila – Darajani and Mawelewele in Iringa Municipality lacked shoulders and walkways because of having a narrower potential carriage way as per physical site conditions.

Despite changes made, there were neither documentations nor design reviews conducted. A review of correspondences also indicated a lack of revised BoQs which could have minimised the contract price due to omitted design features. As a result, some of road projects were completed with variations and addenda despite the shortage in carriage width. This was resulted from lack of design quality control during the planning.

On the other hand, the road design specifications at Korogwe TC was changed after the proposal from the community leaders to extent road length and reduce road width in order to connect it with another town road which was just few meters away from the ending point of the current road.

3.6.2 Inadequate Enforcement of Quality Control Procedures

Section 2.5 of the Operational Guidelines for District Roads Maintenance requires TARURA to agree on the quality standards, performance targets and as per work programs for all road maintenance and developments in accordance with the approved Annual Operational Plan and particular attention was given to the design standards, quality control, workmanship, contract periods and costs.

The physically constructed roads were expected to have reflected the actual design approved and as per signed contract. This could have been achieved only by establishing effective quality control mechanism during the implementation of road projects. However, the audit team noted that there was no quality control mechanisms were established and agreed between TARURA and contractors for establishing better quality of the constructed bitumen surfaced roads contrary to what Section 2.5 of the Operational Guidelines for District Roads Maintenance stipulates.

Further, reviews of contract documents and site correspondences for selected projects for the period from 2015/16 to 2018/19, revealed lack of agreed quality standards and progress of works targets as per work programmes. Similarly, work programmes for particular road projects were not revised as required.

The “Request for Approval or Request for Inspections” was treated as quality control Plan contrary to Low Volume Roads Manual 17.6.3 which requires contractors to submit quality plan (QP) to be reviewed and approved by the client/supervising engineer. This was because of lack of experience in contracts management regarding quality control of executed bitumen surfaced roads by TARURA staff. As a result, the completed road projects had no working quality control mechanism.

A further review of the project files indicated that Quality Control Plans were only found for road projects funded by the World Bank under TSCP, ULGSP and DMDP. However, the Quality Control Plans were not accompanied by their corresponding Quality Assurance Plans which were supposed to guarantee that the road works are executed in compliance with the indicated quality plans.

Inadequate supervision of bitumen surfaced road works

According to Standard Specification for Road Works 2000 Clause 1205, TARURA on a regular basis is required to check the quality of all elements of the works so as to ensure compliance with the specified requirements. Also, TARURA was required during the progress of work to conduct tests on materials and close supervision to ensure compliance with the requirements of the agreed technical specifications. However, interviews held with TARURA officials from the 12 selected and visited LGAs acknowledged that, the supervision was insufficiently done due to inadequate number of staff at LGA level.

Likewise, reviews of selected road projects correspondence files revealed existence of inadequate supervision for ongoing and completed bitumen surfaced road projects. This was because of inadequate number of staff as well as lack of agreed supervision plans or mechanism. For instance, the submitted request for approvals to TARURA were not counter signed and also submitted after activities had been completed. This was not a relevant tool for supervision of road works as it was not approved at all stages of execution of bitumen surfaced roads. For example, Changanyikeni - Shule project letter ref no

TRR/KMC/U.21/2VOL1/3 dated 06th March 2019 pointed out that site correspondences were not approved accordingly due to lack of key personnel on site for ongoing works which could have been approved stage by stage.

Table 3.9: Number of engineers per road work projects supervised

LGA	Available number of Engineers for projects Supervision (A)	Number of ongoing roads work projects up to time of audit (B)	Ratio A:B
Ilala MC	1	27	1:27
Kinondoni MC	2	16	1:8
Ilemela MC	1	8	1:8
Korogwe TC	1	6	1:6
Mwanza CC	2	12	1:6
Kondoa TC	1	5	1:5
Tanga CC	1	5	1:5
Dodoma CC	2	7	1:4
Iringa MC	2	7	1:4
Mafinga TC	1	3	1:3
Mtwara MC	1	2	1:2
Nanyamba TC	1	2	1:2

Source: *LGAs' Staff Roster, M&E reports*

Table 3.9 indicates that there was un-even distribution of engineers compared to the number of road projects that they were supervising. Based on the available staff at the 12 visited LGAs, the audit team noted that, on average each of the engineers was supervising a total of 6 projects in one financial year. The audit team noted that some of the extreme cases particularly at Ilala MC which had only one engineer responsible for supervising a total of 27 road projects followed by Kinondoni and Ilemela Municipal Councils which had an average of 8 road projects per one engineer. The lowest ratio for workload was noted at Nanyamba and Mtwara

MCs which had 2 projects only being supervised at the time of the audit.

Consequently, we noted that supervision of bitumen surfaced road works was done on ad hoc basis. It was further noted that the approvals for the daily works on sites required to assure the quality of completed works were delayed for about 3 to 4 days. This implies that most of the executed work was not approved according to the existing specifications and standards. The study found out that delays in approval of the site works were caused by the huge workload shouldered by the supervising engineers who were also assigned to carry-out other duties like inventory and supervisions of maintenance work for gravel roads. As a result of inadequate supervision, some of the completed road works were done without effective quality checks.

For instance, through the site visits that were conducted the audit found out visible and physical extensive longitudinal and transverse cracks and bleeding for completed *Changanyikeni to Shuleni road in Kinondoni Municipal Council* ***(as seen in photo 3 below)***, whereby the road is still under Defect Liability Period. It was expected that if the road project had regularly supervised it could have been free from these extensive defects. This was due to lack of Quality Assurance and Quality Control Plan set prior to the commencement of the road project.

Furthermore, interviews held with TARURA officials from Kinondoni Municipal Council confirmed that, supervision had not been effectively done due to inadequate number of engineers responsible for inspection and supervision of road projects that were underway.

Photo 3: Longitudinal and transverse cracks observed along Changanyikeni-Shule Road (Photo taken by auditors on 26th Sept 2019)

Inadequate inspections for ongoing works

We noted that, TARURA did not conduct inspections on the executed bitumen surfaced roads on a regular basis contrary to Standard Specification for Road Works of (2000) Section 7200. In addition, only 3 out of the 38 road work projects had developed Requests for Approvals (RFA) as a supervision tool, however the respective requests for approvals were inconsistent with different formats from one LGA to another. Furthermore, the RFAs were not signed accordingly to validate the inspection approval prior to the commencement of the next activity.

Another weakness found with respect to inspection is that the inspection work was not conducted at specified regular intervals contrary to clause 7207 of Standard Specification for Road Works of (2000) (SSRW) which requires engineers at regular intervals to inspect and test materials of completed work to assess compliance with the specified requirements, and, where applicable the various specified criteria for acceptance or rejection of the works have been applied.

Further, we noted that, TARURA had no quality control plans applied during construction of bitumen surfaced roads. Contractors requested for inspection of their on-going road works, however TARURA did not counter sign the request to validate the participation and witness the completed works.

Furthermore, through the interviews held with TARURA Officials from the 12 visited LGAs it was revealed that, inspections were not done regularly due to lack of appropriate staff responsible for inspection of on-going works. This implies that some works were carried-out without testing and approval as per stipulated specifications and standards.

Inadequate testing and acceptance

According to Standards for Road Works (2000) clause 7207, TARURA was supposed to conduct tests in line with testing frequencies and sample and lot sizes for routine testing selected by the Engineer's (Consultant or TARURA). Also, all sections of completed road works to be submitted to the Engineer for routine inspections and testing, and the contractor not to construct any work on top of sections of completed work before being advised by the engineer of the outcome of his tests and inspection. Similarly, the contractor was supposed to submit the on-going and completed works for inspection and testing based on required testing frequencies as required by Standard Specifications for Road Works of 2000 clause 7100 and 7200 table 7105/1, 7110/1, 7110/2, 7205/2 and 7205/3 respectively.

Based on the requirements of SSRW (2000) for a bitumen surfaced road (DSD or AC 14) to be completed, 8 major tests are supposed to have been conducted prior to substantial completion. The tests include field density tests, spray rate tests (spread rate tests for DSD/SD), compaction tests, TFV, surface regularities, absolute levels, bitumen, and UCS tests. However, the audit team noted that some of the road works items were completed and subsequent works approved without required tests as per requirements of the standards. Our assessment of the status regarding conduct of some of the major tests is given in Table 3.10 which indicates some of

the missing tests which were necessary to be done but were not done.

Table 3.10: Status of compliance with regard to testing of completed works in the visited roads.

Status of Conducting Tests	Double/Surface Dressing (DSD)										Asphalt Concrete - 14							
	Field Density Tests	Spray Rate Test	Compaction Tests	Spread Rate Test	TFV	Surface Regularities	Absolute Levels	UCS Test	Gradation Tests	Bitumen Tests	Field Density Tests	Surface Regularities	Compaction Tests	TFV	Gradation Tests	UCS Test	Absolute Levels	Bitumen Tests
Conducted	8	2	8	1	0	0	0	0	0	0	21	9	30	9	9	16	9	9
Not Conducted	0	6	0	7	8	8	8	8	8	8	0	21	0	21	21	14	21	21
TOTAL	**8**										**30**							

***Source**: Test Results, Project Progress Reports of Road Works Projects.*

Table 3.10 indicates that, some of the roads were completed without having key tests conducted and subsequent approvals for works issued. Among the DSD Roads that were visited, the most common test which was being conducted was Field Density Test, while the most uncommon tests were Spread Rate and Surface Regularities whereby these particular tests were conducted to only one road while none of the road projects conducted the Surface Regularities test out of the 8 visited roads with DSD or SD surface.

On the other hand, the roads that were constructed at AC 14 standards were not being tested regularly. The most common test done to these roads was the Field Density Test and/or Compaction Test whereby these particular tests were conducted to all roads. The most uncommon tests for AC14 roads were Surface Regularities, TFV, Absolute Levels and Bitumen Tests whereby 21 of the 30 road projects equivalent to 70% of road projects did not conduct those particular tests.

Consequently, we noted that most of the visited road projects lacked assurance on whether they met the required standards and

specifications or not. Lack of quality assurance implies that most of these roads face a subsequent risk for encountering major defects within a short period of time after the completion of projects. For instance, Changanyikeni - Shule Road in Kinondoni MC as previously indicated and Samora-Mashine tatu road in Iringa MC encountered severe longitudinal and transverse cracks immediately after their completion and there has been no immediate efforts to address them inspite of being indicated in the snag-list at substantial completion. Also, Hoza - Ramia road at Korogwe TC encountered severe longitudinal and transverse cracks at substantial completion stage and there have been no efforts to address them.

Furthermore, the audit team assessed the capacity of TARURA to conduct the required tests by using their own established laboratories. The audit team found out that, TARURA had limited capacity by TARURA for testing materials and works for bitumen surfaced roads works particularly for LGAs which were far from the designated regional offices where TANROADS Laboratories were to be found. The audit team noted that the established laboratories by TARURA did not have the required capacity to conduct the necessary tests for bitumen surfaced roads. Table 3.11 shows the status of available laboratories with their testing capacity in the 12 visited LGAs.

Table 3.11: List of Laboratories under TARURA with their testing capacity

LGA	Availability	Registration Status	Soils/ Gravel	Aggregates	Concrete	Bitumen	Asphalt concrete
Dodoma CC	1	X	✓	✓	✓	X	X
Kondoa TC	0	NA	NA	NA	NA		
Ilala MC	1	X	✓	✓	✓	✓	✓
Kinondoni MC	1	X	✓	✓	✓	✓	✓
Iringa MC	0	NA	NA	NA	NA		
Mafinga TC	0	NA	NA	NA	NA		
Mwanza CC	1	X	✓	✓	✓	X	X
Ilemela MC	1	X	✓	✓	✓	X	X
Korogwe TC	0	NA	NA	NA	NA		
Tanga CC	1	X	✓	✓	✓	X	X
Mtwara MC	1	X	✓	✓	✓	X	X
Nanyamba TC	0	NA	NA	NA	NA	NA	NA

***Source**: Auditors' analysis from TARURA's LGA's Performance Reports*

Table 3.11 indicates that all laboratories from the visited TARURA LGA offices had a limited testing capacity due to either non-registration or non-availability of tools to conduct the respective tests. Out of the 12 visited LGAs, 7 had materials laboratories. However, they were not registered by Engineers Registration Board (ERB) which grants them a licence to conduct the tests. Furthermore, out of the 7 available laboratories only 2 had the capacity of testing quality of works and materials on bitumen surfaced roads particularly bitumen and asphalt concrete materials and the remaining 5 laboratories had no tools to conduct testing for bitumen surfaced road works.

Consequently, the contractors working on road projects under TARURA were necessitated to carry-out tests in external laboratories such as those owned by TANROADS, TBS and Private Lab firms. This was accompanied by other risks of integrity and

quality of the results due to non-involvement of both parts (client and contractor) during sampling, transportation and testing itself. As a result, materials used for most of the executed bitumen surfaced road works were not frequently tested as it could have delayed the completion of road projects. Tests were done once as part of verifications after road works have been completed.

On the other hand, there were questionable results submitted by contractors who did their tests in private labs due to different matters of irregularities. Irregularities ranged from non-approval by Materials Engineers, non ERB stamped results, dates of testing earlier than dates of sampling and lack of comments or remarks from the test results. On a critical incidence, the tests for road projects at Ilala MC that was executed during financial year 2017/18 were done by unregistered laboratory (C-Lab) which did not have a valid practising licence during that year.

Lack of non-compliance reports (NCRs)

Clause 6414 of SSRW (2000) sets a criterion for compliance with requirements which must be in line with routine inspection and quality control done by the engineer specified in clause 7200 of SSRW (2000). TARURA was expected to ensure measures or rectification or demolition of all rejected activities, elements and items which were not complied with specifications and standards.

Although, the audit team noted that failed (out of specs) items of completed works were approved despite being non-compliant with specifications and standards, the project supervisors did not provide non-compliance reports to assure that the defective work was corrected, tested and complied with standards.

In addition to that, TARURA was required to comply with the requirements of standards for concrete works specified for 28 days characteristic strength which is stipulated in clause 7205 for full acceptance as well as clause 7207 for conditional acceptance. Section 6414 (b) provides that the rejected non-complied concrete should be decided whether to remove or leave in place by triggering reduction of payment by structural failure analysis for the intended use of particular structure.

However, our review of the test results noted several failed concrete tests which did not comply with specifications and standards. However, there was no evidence to whether measures were taken for a particular poor quality of works despite the approval. This was due to the lack of project quality assurance.

Inadequate Management of Project completion and closure

Clause 1210 of the Standard Specification for Road Works (2000) requires a taking over certificate to be issued only in respect of duly completion of the following road activities;

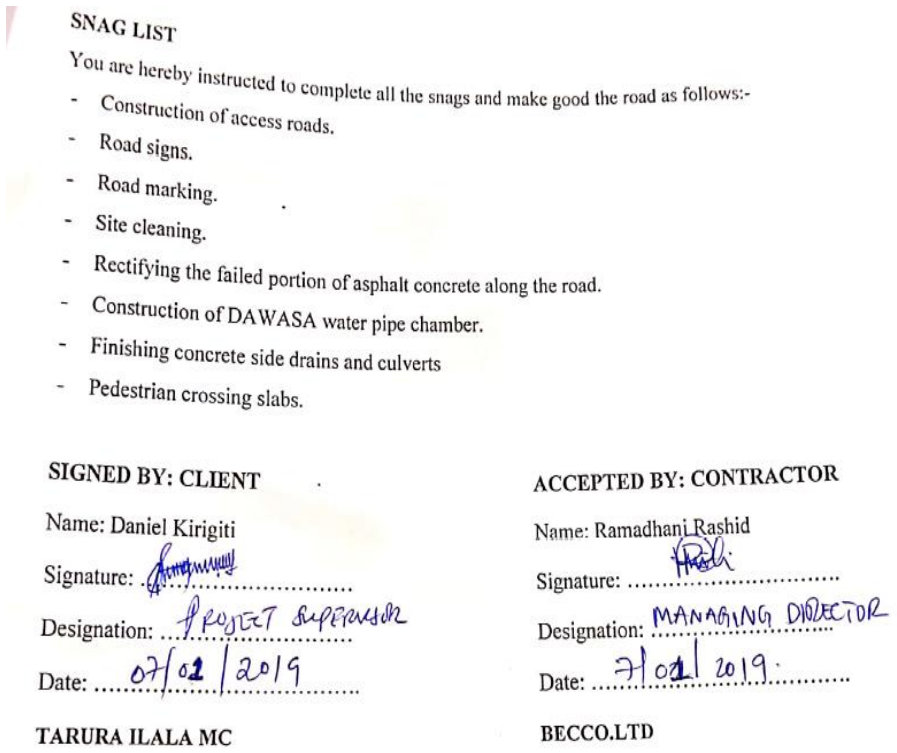
- the gravel wearing course (seals, asphalt or concrete pavement);
- all above-ground and subsoil drainage structure;
- all fencing;
- the finishing-off of medians and slopes of cuts, fills;
- all the necessary road signs and road-surface markings;
- all guard-rails; and
- all structures.

Likewise, Sub clause 53.1 of the General Conditions of Contract requires the certification for completion to be decided by the Project Manager (Consulting Engineer) upon the completion of works.

We noted that, completed projects were not properly closed. Out of the 38 visited road projects only 4 road projects which is equivalent to 11% of the road projects were adequately closed. Among the requirements of a proper closure of the road project was the preparation of final accounts and ensuring that all works paid for in the BoQs are completely done and observable defects have a clear plan of correction.

On the other hand, 89% of the visited road projects were inadequately closed. The audit team noted substantially closed projects with snag lists containing items which are not allowable as per SSRW (2000) such as construction of access roads, road signs, crossing slabs, side drains, walkways etc. This was because

of the lack of contract management knowledge and ignorance on adherence to contractual agreements. It was further noted through the review of project correspondence files that, the final inspection for taking over was not conducted for completed projects. This was evidently observed from the final and substantial (practical) payments certificates. Nevertheless, final inspections were not sufficiently conducted as they did not capture all the defects and outstanding issues as seen in the excerpts below:



SNAG LIST

You are hereby instructed to complete all the snags and make good the road as follows:-

- Construction of access roads.
- Road signs.
- Road marking.
- Site cleaning.
- Rectifying the failed portion of asphalt concrete along the road.
- Construction of DAWASA water pipe chamber.
- Finishing concrete side drains and culverts
- Pedestrian crossing slabs.

SIGNED BY: CLIENT

Name: Daniel Kirigiti

Signature: .....

Designation: PROJECT SUPERVISOR

Date: 07/02/2019

TARURA ILALA MC

ACCEPTED BY: CONTRACTOR

Name: Ramadhani Rashid

Signature: .....

Designation: MANAGING DIRECTOR

Date: 7/02/2019

BECCO.LTD

An excerpt of a snag lists of Buguruni – Mnyamani Road snapped from Practical completion inspection and issuance of substantial certificate.

,Package:Upgrading/Rehabilitation of COTC &Senegal Road and Construction of Concrete paved Commuter Bus stand at Mikindani including Loading and Offloading Bus Bays ,Mashujaaa Public Park,Tilla Park and Maduka Makubwa Children Playgrounds,Extensions of Chuno Road to Port Road and Construction of Vigaeni-Mtepwezzi Stand alone drain,Skip pads and Chuno Market.

TSCP PACKAGE 5: Mtwara Mikindani Municipaliy

Snag List

Status as on15 January 2020

S/No	Description	Location	Planned Completion Date	Remarks
A	**Mikindani Bus Stand**		15/02/2020	
1	Drain around the shops			
2	Earth drain chanelisation			
3	Water tower Finishing works			
4	Toilet finishing work			
B	**Extension of Senegal Road to Join Chuno Road**		29/02/2020	
1	Joint Sealing			
2	Side drains			
3	Kerbstone Installation			
4	Chamber covers			
5	Walkways			
6	Removal of construction waste			
C	**Chuno Road**		29/02/2020	
1	Side drain	CH: 0+360 - 1+130 CH:1+525 - 2+449		
2	Walkway	CH:0+150 - 2+449		
3	Access Roads (8Nos)	CH 1+800LHS CH:1+750 RHS,LHS CH:1+012 LHS& RHS CH:0+365LHS, CH:0+360 RHS CH:0+170RHS		
4	Kerbstone	CH:0+360 - 2+449		
5	Cover slabs for U drain			
6	Round about			
D	**COTC Road**		15/02/2020	
1	Removal of construction waste			
2	Access Roads			
E	**Mikindani Approach Road**		15/02/2020	
1	Joint sealing			
2	Crack sealing	0+ 400km - 0+ 540km		
F	**Tilla Park**		15/02/2020	
1	Land scaping	Grass and shrubs		
2	Electric finishing works			
3	Garbage wall finishing			
4	Children playground			
5	Water works finishing			
G	**Maduka Makubwa Park**		15/02/2020	
1	Water works finishing	pump for over head tank		
2	Rectification of septic tank			
3	Electrical work finishing			
4	Land scaping	Grass and shrubs		
H	**Mashujaa Park**		29/02/2020	
1	Gate Installation			
2	Swimming pool finishing & changing room			

An excerpt of a snag list of TSCP Package 5 in Mtwara MC as extracted from joint inspection for substantial completion of works and issuance of Taking Over Certificate minutes.

The first excerpt shows an example of a snag list containing items which were not supposed to be included in the snag list including construction of access roads, road marks, road signs and concrete side drains and culverts and pedestrian crossing slabs.

On the other hand, excerpt 2 shows another snag list for Package 5 of TSCP projects in Mtwara MC. The excerpt shows a significant number of outstanding items were considered as a snag list of

items and substantially closure certificates were issued prior to bitumen surfaced roads projects. The outstanding items from BOQ included access roads, walkways, cover slabs for open channel drains, road markings, road signs and drainage work contrary to standard specifications for road works of 2000.

Consequently, improperly closed road projects left the road surface with unclosed defects and prone to additional damages and therefore reducing the lifecycle of the constructed roads. Additionally, road works without proper features brings a huge risk to the safety of pedestrians and other road users. Photo 4 below shows one of the road projects completed and handed over without road marking and road signs at Tanga CC.

Photo 4: Sahare road without road marks and signs captured in Tanga CC by Auditors on 16th January 2020

Furthermore, 4 of the 38 road projects prepared final accounts after their Defect Liability Periods were completed. This implies that 89 percent of the 38 visited bitumen surfaced roads projects were financially inadequately closed. As a result, there were no evidence to whether these projects were economically completed which is contrary to Clause 55(1) of the General Conditions of

Contract which requires detailed final accounts to be prepared with the amount that would be paid under the contract before the completion of the Defect Liability Period.

3.7 Inadequate Monitoring and Evaluation of Quality Control Activities

In order to check whether the policy objectives and strategic targets are being achieved at all levels of implementation, the availability of strong and efficient Monitoring and Evaluation system is necessary. We assessed the available system for monitoring the quality control activities for executed bitumen surfaced roads at both all levels; management level and implementation levels at both PO-RALG and TARURA. We noted several weaknesses which are described in the following sections.

3.7.1 Insufficient Monitoring of TARURA Quality Control Activities

The strategic plan of TARURA requires the Agency to conduct monitoring and evaluation of the road construction activities so as to guarantee the achievement of its objectives in roads construction with regard to alignment to quality specifications and standards. However, the audit team noted that M&E activities at TARURA, at both Headquarters and Regional Office levels had weaknesses that led to insufficient execution of its roles in bitumen surfaced road construction.

Lack of clarity on Monitoring and Evaluations Roles of TARURA

According to section 2.3.3(i) of TARURA Establishment Order the Directorate of Business Support services is required to provide expertise in monitoring and evaluations. However, the audit team noted that, Monitoring and Evaluation activities were conducted by different directorates within TARURA.

For instance, the Directorate of Business Support and Services carried-out M&E activities and compiled their reports. Likewise, TARURA regional coordination offices conducted monitoring and evaluation of implemented road works by LGAs under their areas

of jurisdictions as required by TARURA's Establishment Order Section 2.3.10. These reports were submitted to the Directorate of Urban Roads. This indicates that, TARURA has not clearly stipulated the roles and responsibilities for carrying-out M&E activities at different levels. This resulted into a duplication of efforts on M&E activities conducted by TARURA head quarter by different Directorates as well as regional coordination offices.

However, we noted inconsistences in the reviewed M&E reports of the financial year 2015/2016-2018/19 prepared by different regions. This was due to lack of reporting mechanism and harmonised format which could have captured all the important issues regarding the quality of the executed bitumen surfaced roads in respective urban areas. As a result of inconsistent reporting formats, most of M&E reports from regional coordinators were not addressing issues covered in the Strategic Plans and Performance Agreements for the fiscal year 2017/18 and 2018/19.

Inadequate plans for conducting M&E of Quality Control activities in bitumen surfaced road projects

TARURA had inadequate monitoring and evaluation plan for quality control activities for the executed bitumen surfaced roads. According to TARURA's Strategic Plan section 4.7.1 TARURA was required to have a monitoring plan which should consist of indicators and indicator description, baseline value for each indicator; indicator target values, data collection, means of verification, frequency of reporting and responsible person for data collection for assessing the quality control activities in the execution of road works.

The audit team noted several efforts made by TARURA on conducting M&E as evidenced by M&E reports available at the Head Quarters and Regional Offices. However, the checklist provided by TARURA head quarter for conducting M&E did not include quality issues for on-going and executed roads. Through interviews held with TARURA officials we noted that, TARURA had an approved M&E plan which could have captured all quality control activities. However, the M&E Plan did not address technical issues regarding the quality of the executed bitumen surfaced roads. Through the

reviewed M&E reports for the period 2015/16 - 2018/19 the audit team noted inconsistencies in reporting due to lack of customised plans from works which could have stipulated means of data collections and reporting mechanisms.

Likewise, key performance indicators reported in the M&E reports did not fully address quality issues for the executed bitumen surfaced roads. The reported contents of M&E reports included only financial and physical progress of work executed. As a result, key performance indicators for quality issues that were captured during conducting M&E activities were not included in the report.

Lack of Key Performance Indicators regarding quality of bitumen surfaced roads in urban areas

Section 4.7.1 of TARURA Strategic Plan requires TARURA to have a monitoring plan which should consist of indicators and indicator description, baseline value for each indicator; indicator target values, data collection, means of verification, frequency of reporting and responsible persons for data collection. TARURA was expected to have key performance indicators which address quality of executed roads in urban areas as well as in rural areas.

However, reviewed M&E Plans revealed that key performance indicators did not address issues regarding quality of the completed bitumen surfaced roads. This was due to low priorities given by TARURA regarding the quality of the executed bitumen surfaced roads. As a result, M&E reports did not capture issues regarding quality of the executed bitumen surfaced roads in urban areas.

Insufficient Corrective Measures for Matters regarding Quality of Bitumen Surfaced Roads raised during M&E activities

TARURA was expected to take corrective measures for issues arose during conducting M&E activities. On the contrary, no follow up reports on actions taken for issues which were risen during the conduct of M&E activities. The main reason for the failures as provided by the TARURA interviewed officials was lack of adequate

personnel with the expertise needed for conducting M&E from the head quarter to the regional level.

It was noted from document reviews that non-complied issues rose during conducting of M&E and quality verification processes for executed bitumen surfaced roads were not closed by taking corrective measures. This was due to lack of a mechanism set for mitigation measures to be taken for matters regarding quality of completed works raised during the time of conducting M&E. As a result, the impact of M&E could not be recognised as most of the issues raised at foremost quarter were yet to be resolved until the next quarter.

3.7.2 Inadequate Monitoring of TARURA's Performance in Controlling Quality of Road Works.

While performing its roles of controlling the quality of executed road works in urban areas, PO-RALG as an oversight ministry monitors the performance of TARURA in fulfilling this function. In order to fulfil this function, PO-RALG undertook different activities to ensure that roads infrastructure constructed in urban areas meet the desired quality and are of specified standards.

Based on the PO-RALG approved roles and functions, the Ministry is required to oversee the national plans and coordinate the national level resource allocation in urban infrastructure development, conducting monitoring and evaluation of urban infrastructure development and maintenance, preparing and enforcing annual performance agreements, providing advice on the use of affordable building materials and technology, monitor adherence of set standards in construction designs and works. However, the review of Annual Performance Reports by PO-RALG and data collected from TARURA has noted that there was ineffective implementation of these functions which affects the role of PO-RALG in monitoring TARURA's function in controlling the quality of road works being executed.

Conflicting Functions between PO-RALG and TARURA

Both the PO-RALG and TARURA operate according to their approved functions which are undertaken in order to fulfil their roles as per their establishments. The functions of TARURA are stipulated in its Establishment Order as published in May 2017. However, the review of functions for both institutions has indicated that there are some of the functions which are intersecting between each other and therefore creating accountability conflict. The intersecting functions include establishment and maintenance of appropriate rural and urban road databank, provision of technical support, supervision, quality assurance and control, demarcate and protect roads reserve, carrying out engineering traffic and economic studies for maintenance and improvement of the road network, undertake research or collaborate with any research organisation with the view to facilitate the agency's plan development and maintenance activities. These functions appear in different wording for both institutions and therefore creating conflicting accountability particularly in quality control and assurance of the executed road works in urban areas.

Table 3.12: Intersecting roles between PO-RALG and TARURA

PO-RALG's Functions	TARURA's Functions
To strengthen roads infrastructure data management systems in LGAs	Establishment and maintenance of appropriate rural and urban road databank
Provide technical support and expertise to build up LGAs competencies in all aspects of roads infrastructure	Provision of technical support, supervision, quality assurance and control
To facilitate and coordinate feasibility studies, design and impact assessment on infrastructure in LGAs	Carrying out engineering traffic and economic studies for maintenance and improvement of the road network
Conduct research on appropriate technologies, preparing and disseminating operational guidelines and methodologies on management and implementation of roads infrastructure	Undertake research or collaborate with any research organisation with the view to facilitate the agency's plan development and maintenance activities
Conduct M&E of Urban Roads Infrastructure Development and Maintenance	Monitor and Evaluate Implementation of Urban and Rural Road Works through Regional Coordination Offices

Source: *Approved Functions of PO-RALG and TARURA*

Inadequate performance monitoring on quality of executed road works by TARURA

Based on its approved functions, PO-RALG as a Ministry responsible for the oversight of TARURA is supposed to monitor the performance of TARURA, specifically on its roles in ensuring that the constructed bitumen surfaced roads in urban areas meet the required standards and specifications. However, through the review of performance reports of PO-RALG, the audit team noted that monitoring of the performance of TARURA in controlling the quality of executed road works in urban areas was not sufficiently done.

The audit team also noted three main aspects of monitoring of which PO-RALG has not been performing well. One of the aspects is monitoring of compliance to the set standards on maintenance and development works. The performance reports by PO-RALG did

not indicate if PO-RALG is monitoring the adherence of set standards as stipulated in their functions. Secondly, PO-RALG was supposed to conduct monitoring visits to the activities undertaken by TARURA in order to check if it is meeting the agreed performance criteria as per Annual Performance Agreement (APA) signed between the Ministry and TARURA. However, the reviewed progress reports indicated that projects which were monitored are only those financed by development partners particularly the World Bank. These projects included DMDP, TSCP and ULGSP.

CHAPTER FOUR

AUDIT CONCLUSION

4.1 Introduction

This chapter provides a conclusion of the audit. The basis for drawing the conclusions are the overall and specific audit objectives and corresponding findings as presented in chapter one and three of this report respectively.

4.2 General Conclusion

We conclude that the current mechanisms in controlling the quality of roads works in urban areas as performed by PO-RALG through TARURA is not sufficient to enable the construction of quality roads in urban areas. The existing system for quality control has no effective enforcement mechanisms to guarantee the execution of road works that are of desired quality. On the other hand, TARURA is lacking proper tools like laboratories and quality control and assurance manuals for providing an assurance of quality during the execution of road works.

These weaknesses are affecting different levels of operations at TARURA which targets on ensuring that the constructed roads in urban and rural areas are of high quality and therefore serves its organizational goal of providing sustainable costs effective maintenance and development of rural and urban road networks to support the socio-economic development of Tanzania. Additionally, the quality assurance activities at TARURA are not well guided by tools which is minimizing the impact of assurance activities at LGA's level which is concerned with the execution of road works.

4.3 Specific Audit Conclusions

The following are the specific audit conclusions:

4.3.1 Designs and Specifications of bitumen surfaced roads

Designs and specifications prepared for use while executing the road works are not adequate to accommodate the needs and physical conditions existing in the areas where the road works are being executed. The prepared road designs did not meet the actual needs of the road conditions of the areas where they are going to be implemented. The capacity of teams vested with development of the road designs was not sufficient enough to guarantee the development of adequate roads designs which will not result to significant changes during execution of road works.

The currently prepared designs were accompanied by a number of deficiencies including none-approvals by respective design engineers, using incomplete information without required surveys and other preliminary information and missing attachments for drawings, plans and profile which resulted into significant changes during road execution. There is an absence of proper quality review system at TARURA Councils offices which has caused the preparation and finalisation of the incomplete roads designs. On the other hand, there is no proper system for collecting information and other details including feasibility studies and surveys which constitutes as inputs during development of road design. The prepared designs have led to incremental changes in contract sums and therefore increasing costs to the government. The execution of roads works was accompanied by lags in customising for specifications for road works as per SSRW (2000) and therefore affecting the quality of road works in different road works projects visited.

4.3.2 Weak performance in controlling quality of road works during execution

The current quality control mechanisms available at TARURA headquarters, regional and council levels for quality control of the works in execution stage do not sufficiently provide an assurance

of the quality for executed road works. The current system in controlling the quality of road works is weak embedded with shortcomings in inspection of works. The regular supervision activities are not adequate to prevent non-compliances in standards and specifications to guarantee the needed quality. The conducted tests in road works do not sufficiently provide an assurance on the quality of tested items.

There has been a lack of unified mechanism of checking for the quality of road works executed in the LGAs. The projects supervisors have been using different tools for checking the quality while other road projects were supervised without having quality control and assurance means. The few available quality control and assurance plans are not well enforced and reported. In totality there is no working quality control mechanism at TARURA due to absence of proper guidelines on executing quality control activities.

4.3.3 Inadequate Performance of TARURA in Monitoring and Evaluating its Quality Control Activities

The monitoring and evaluation of the quality control and assurance activities during execution of road works cannot guarantee the construction of road works at the desired quality. The currently available plans for monitoring and evaluation are framed to monitor the general activities of TARURA as an entity however, there is no plans that specifically monitor its performance on controlling the quality of its road works. The available M&E plans do not contain items that are set to check technical aspects in road works including compliance to standards and specifications which derivatively check the attainment of quality road works.

The accountability in monitoring and evaluation placed to the directorates of urban roads and business support services are not well defined to provide assurance to the quality control activities of TARURA. There has been a low priority with regard to monitoring the quality of executed bitumen surfaced road woks particularly on setting and monitoring of key performance indicators.

4.3.4 Inadequate Monitoring of TARURA's Performance by PO-RALG

There is no proper separation of roles and therefore lack of clear accountability between PO-RALG and TARURA in controlling the quality of executed bitumen surfaced roads in urban areas. There has been intersecting functions which creates conflicting accountability and therefore leading to risks of weak or none performances.

PO-RALG is not sufficiently monitoring the activities of TARURA particularly on controlling the quality of its road works. The M&E tools are not addressing the core indicators in checking whether the executed road works are done in conformance to acceptable standards and specifications.

PO-RALG does not monitor the performance of TARURA in executing their works. The monitoring activities of PO-RALG are not comprehensive to cover all the activities of TARURA on development or maintenance of roads network where quality aspects are checked.

CHAPTER FIVE

AUDIT RECOMMENDATIONS

5.1 Introduction

The audit findings and conclusion pointed-out weaknesses in the management of quality control activities during the execution of road works in urban areas. Areas for further improvements have been identified in the preparation of road designs, supervision of road works activities and the closure of road projects for bitumen surfaced roads executed in urban areas.

In order to improve the quality of executed bitumen surfaced road works in urban areas we generally recommend the improvement of how the supervision activities are carried out in both cases when there is TARURA representative or when TARURA is directly responsible for supervision of road works. In order to improve the quality of bitumen surfaced roads developed, maintained or rehabilitated in urban areas the recommendations are specifically addressed to President's Office - Regional Administration and Local Government and Tanzania Rural and Urban Roads Agency.

5.2 Specific Recommendations

5.2.1 Recommendations to PO-RALG

The President's Office - Regional Administration and Local Government should:

1. Review and update their roles and functions so as to provide clear accountability on the use of resources by TARURA for development of district and urban road networks; and

2. Improve monitoring of the development and maintenance projects so as to effectively address key performance indicators on quality of executed road works.

3. Develop annual action plans that will provide an assurance that the performance of TARURA in controlling the quality of road works is effectively monitored.

5.2.2 Recommendations to TARURA

The Tanzania Rural and Urban Roads Agency should:

1) Improve the functionality and operationalisation of DROMAS in order to capture detailed information critical for assessing the quality of road works;

2) Strengthen supportive supervision to its Council offices so that feasibility studies or detailed designs are effectively conducted to provide adequate road designs;

3) Establish a strong mechanism for developing and reviewing road designs for all road works;

4) Strengthen evaluation of tenderers for road works by appointing well experienced evaluation teams and conducting sufficient due diligences;

5) Should develop and institute clear guidelines that are geared at establishing effective quality control and assurance mechanism in all stages of road works projects cycle; and

6) Should ensure that road projects are properly closed and the subsequent activities during defects liability period are effectively executed.

REFERENCES

1. Dr. Jean Paul Rodrigue, Dr. Theo Notteboom – "*Transportation and Economic Development*".
2. Guidance Notes Catalogue of Road Defects (CORD) 2013
3. https//en.m.wikipedia.org
4. Ministry of Works, Transport and Communication: 2019; "Road Fund Board Annual Evaluation of Implementing Agencies Performance – 2019".
5. Ministry of Works, Transport and Communication: RFB; "Agreements between TARURA and Road Fund Board of Fiscal Years 2017/18-2018/2019".
6. President's Office - Regional Administration and Local Government: "Performance Agreement between PO-RALG and Tanzania Rural and Urban Roads Agency for Fiscal Year 2017/2018-2018/2019".
7. Tanzania Rural and Urban Roads Agency Annual Maintenance Report for the Financial Year 2017/18
8. Tanzania Rural and Urban Roads Agency Monitoring and Evaluation Reports of Fiscal Year 2017/2018-2018/2019".
9. Tanzania Rural and Urban Roads Agency Strategic Plans of Fiscal Year 2016/17-2020/21.
10. Tanzania Rural and Urban Roads Agency: DROMAS (District Road Management System) "
11. United Republic of Tanzania: 1986; "The Roads Fuel Tolls Act, 1986".
12. United Republic of Tanzania: 1997; "Executive Agencies Act 1997".
13. United Republic of Tanzania: 1998; "Road Toll Act (Amendment No. 2) in December 1998".
14. United Republic of Tanzania: 2002: "National Roads Transport Policy of 2002".
15. United Republic of Tanzania: 2003; "National Transport Policy of 2003"

16. United Republic of Tanzania: 2007; “The Road Act, 2007”.
17. United Republic of Tanzania: 2014: President’s Office-Regional Administration and Local Government; “Operational Guideline for District Roads Maintenance (2014)”.
18. United Republic of Tanzania: 2016: President’s Office - Regional Administration and Local Government; “Low Volume Roads Manual (2016)”.
19. United Republic of Tanzania: Ministry of Works, Transport and Communication: 1999; “Pavement and Material Design Manual (1999)”.
20. United Republic of Tanzania: Ministry of Works, Transport and Communication: 2000; “Standard Specifications for Road Works (2000)”.
21. United Republic of Tanzania: Ministry of Works, Transport and Communication: 2012; “Road Geometric Design Manual (2012)”.
22. United Republic of Tanzania: President’s Office - Regional Administration and Local Government: May 12, 2017; “Tanzania Rural and Urban Roads Agency Establishment Order published in Government Notice No.211 dated May 12, 2017; inaugurated on July 02, 2017”
23. United Republic of Tanzania: Ministry of Works, Transport and Communication: 2017/2018: “Budget Speech for Financial Year 2017/18”.

APPENDICES

Appendix 1: Responses from the audited entities

This part provides details on the overall comments from the two audited entities and their responses for comments, action to be taken and implementation timeline for each of the issued recommendation.

Appendix 1a: Responses from President's Office - Regional Administration and Local Government (PO - RALG)

SN	RECOMMENDATIONS	COMMENT(S)	ACTIONS TO BE TAKEN	TIMELINE
1	Review and update their roles and functions so as to provide clear accountability on the use of resources by TARURA for development of district and urban road networks.	PORALG realizes importance of reviewing and updating the roles and functions of TARURA in order to provide clear accountability on the use of resources for development projects.	• The functions of TARURA are stipulated in Executive Agency (CAP 245) Order for establishment of TARURA as published in Government Notice No. 211 on 12/05/2017 section 3.6, • For roads development projects, Permanent Secretary PORALG signs Annual Performance Agreement with TARURA CEO for road works in each financial year. PORALG through DID monitors the performance and reports to PS who further reports to Roads Fund Board on implementation each quarter, • For better performance of TARURA, the organization structure is under review	The timeline depends of the Authority to approve the Organization Structure and appoint Ministerial Advisory Board Members. For Annual Performance Agreement it is done annually

SN	RECOMMENDATIONS	COMMENT(S)	ACTIONS TO BE TAKEN	TIMELINE
			and waiting approval from higher Authorities, • Currently the Chairman of MAB has been appointed and once the members are appointed the supervision of roles and functions of TARURA will be improved. • For PORALG, the main role after TARURA establishment is coordinating, monitoring and ensuring that policy issued are adhered to. The role of PORALG is outlined in the proposed PORALG structure which have been submitted to PIC. Every quarter PORALG reports to RFB on implementation of the projects.	
2	Improve monitoring of the development and maintenance projects so as to effectively address key performance indicators on quality of executed road works.	PORALG is conduction monitoring of works executed by TARURA and include findings and recommendation of monitoring reports in each quarterly progress report.	PORALG will improve monitoring road works to ensure that performance indicators are achieved as stipulated in Annual Performance Agreement for Development Project. In LGAs with development projects, PORALG will also monitor maintenance works on sample basis.	By 30th June, 2020

SN	RECOMMENDATIONS	COMMENT(S)	ACTIONS TO BE TAKEN	TIMELINE
			In order to improve monitoring and since most of the works are financed by Roads Fund PORALG has requested Roads Fund Board Experts to provide monitoring training using value for money tools through letter with ref. no. AE.35/488/01/56 dated 27th November, 2019. RFB has agreed and will set the dates for training. Furthermore, PORALG will purchase equipment for quality control checks such as rebound hummer.	
3	Develop annual action plans that will provide an assurance that the performance of TARURA controlling the quality of road works is effectively monitored.	It is important to develop annual action plan that will provide assurance of performance of TARURA in controlling the quality of works.	The Action Plan has been developed and will be updated and submitted to NAO Performance Auditors.	By 20th April, 2020

Appendix 1b: Responses from Tanzania Rural and Urban Roads Agency

SN	RECOMMENDATIONS	COMMENT(S)	ACTIONS TO BE TAKEN	TIMELINE
1	Improve the functionality and operationalisation of DROMAS in order to capture detailed information critical for assessing the quality of road works.	Currently DROMAS captures contract progress in terms of works executed and amount paid to the contractor in the Contract Management module. In order for DROMAS to capture information critical for assessing quality of road works, the following will be done: (a) Finalize the Construction Site Monitoring (CSM) module of DROMAS (b) Introduce in the DROMAS a window for Quality Control (QC) which will be able	TARURA through DROMAS Developer to Fix all System bugs/ errors which have been registered in TRELLO, a shared facility for communicating errors between TARURA and the Developer.	Before June 2020
			Complete transfer of knowledge from the Developer to DROMAS Team at HQ	Before June 2020
			DROMAS Team at HQ to train council Users and DROMAS Custodians at regions	Before December 2020
			Quality Assurance System be included in Contract Documents	After July 2020
			Coding of the DROMAS to accommodate the QC window.	Before June 2021

SN	RECOMMENDATIONS	COMMENT(S)	ACTIONS TO BE TAKEN	TIMELINE
		to capture the following: - i. Lab tests status for Roads and Structures works ii. Site Availability of Key technical personnel for both the Contractor and the Employer iii. Availability of Quality Management Plan		
2	Strengthen supportive supervision to its Council offices so that feasibility studies or detailed designs are effectively conducted to provide adequate road designs.	As of now Manager under the supervision RECS are responsible of carrying out feasibility studies and detailed engineering designs while faced with shortage of staff, skills and facilities; To address this, The	Conduct training needs assessment to TARURA HQ (HQ, Regions and Councils) All staffs at regions and council levels who will need to be trained based on training need assessments to be	By October 2020 -By October, 2020

SN	RECOMMENDATIONS	COMMENT(S)	ACTIONS TO BE TAKEN	TIMELINE
		Agency is considering to undertake training needs assessment to identify gaps and apply recommended interventions.	conducted will receive the required training from the staff of the consulting unit to be established	
3	Establish a strong mechanism for developing and reviewing road designs for all road works.	Currently the agency has design review team formed at TARURA HQ to perform design reviews and is being assisted by employed individual consultants (bridge design expert and transport economist). To ensure strong mechanism for review of designs for road workers, The agency is on the process of establishing Engineering Consulting Unit for Engineering Design.	Ensure the consulting unit is registered by ERB Complete necessary preparation for registration by ERB	By December, 2020 By November, 2020

SN	RECOMMENDATIONS	COMMENT(S)	ACTIONS TO BE TAKEN	TIMELINE
4	Strengthen evaluation of tenderers for road works by appointing well experienced evaluation teams and conducting sufficient due diligences.	We have already conducted trainings particularly on evaluation area to procurement staff, user department and nominated evaluator from 26 Regions and TARURA HQ staffs. Also we have already conducted TANePS training to all HPMU's from 26 regions and TARURA HQ PMU's staff.	Continue conducting training on procurement and tender evaluation to TARURA staffs Conduct more training on TANePs to TARURA PMU staffs.	By July-August 2019. By December, 2019.
5	Should develop and institute clear guidelines that are geared to establishing effective quality control and assurance mechanism in all stages of road works projects cycle.	Auditor's recommendation is accepted. TARURA will establish an effective QC/A mechanism in all stages of its projects cycle	• Establishment of QC/A guidelines • Training and dissemination of the guideline	March 2021
6	Should ensure that road projects are properly closed and the subsequent activities during defects liability period are effectively executed.	Introduce In-house Tailor-Made Trainings in Contract Management at Regional Levels	Capacity Building in Contract Management	Continuous

Appendix 2: Audit Questions and Sub-Questions used during Audit

This part provides details of the main audit questions and the sub questions.

Audit Question 1	***Are bitumen surfaced roads in urban areas* constructed in accordance to the set quality standards*?***
Sub-Audit Question 1.1	*Does TARURA has a sufficient information on the roads network condition with poor quality*
Sub-Audit Question 1.2	*Does TARURA has a proper system for capturing condition of the bitumen surfaced roads in urban areas?*
Audit Question 2	***Are designs and specifications for bitumen surfaced roads construction activities executed in urban areas adequate?***
Sub-Audit Question 2.1	*Does TARURA conduct sufficient needs analysis in order to develop relevant road designs?*
Sub-Audit Question 2.2	*Does TARURA develop the relevant designs for bitumen surfaced roads construction works in urban areas?*
Sub-Audit Question 2.3	*Does TARURA customize the road specifications for its bitumen surfaced road works executed in urban areas?*
Sub-Audit Question 2.4	*Does TARURA disseminate road designs and specifications to its implementing agencies?*
Sub-Audit Question 2.5	*Does TARURA enforce the adherence to road designs and specifications for road works executed in urban areas?*
Audit Question 3	***Are quality control mechanisms in the construction of bitumen surfaced roads (in all stages of contract implementation) in urban areas working effectively as planned??***
Sub-Audit Question 3.1	*Does TARURA has a proper Quality Control and Assurance Plan for executed bitumen surfaced roads in urban areas?*
Sub-Audit Question 3.2	*Does TARURA effectively execute the Quality Control Plan in all stages of contract?*
Sub-Audit Question 3.3	*Does TARURA enforce the execution of quality control plan at all stages of contract?*
Audit Question 4	***Does TARURA periodically monitors and evaluates its quality control activities for bitumen surfaced roads works in urban areas?***

Sub-Audit Question 4.1	*Does TARURA has a proper M&E framewrosk for monitoring quality control and assurance mechanisms?*
Sub-Audit Question 4.2	*Does TARURA has a proper plan for conducting ME activities for assessing quality of bitumen surfaced roads in urban areas*
Sub-Audit Question 4.3	*Does TARURA has Key Performance Indicators which addresses quality of bitumen surfaced roads in urban areas?*
Sub-Audit Question 4.4	*Does TARURA take corrective measures for matters regarding quality of tarmarc roads raised during monitoring activies?*
Audit Question 5	***Does PO-RALG periodically monitors and evaluates the performance of TARURA in controlling the quality of constructed bitumen surfaced roads in urban areas?***
Sub-Audit Question 5.1	*Does PO-RALG monitor the performance of TARURA in controlling the quality of bitumen surfaced roads in urban areas?*
Sub-Audit Question 5.2	*Does PO-RALG regularly reviews policies and guidelines related to quality control activities as conducted by TARURA?*
Sub-Audit Question 5.3	*Does PO-RALG has proper criteria for assessing the performance of TARURA in managing the quality of constructed bitumen surfaced roads*
Sub-Audit Question 5.4	*Does PO-RALG effectively supervises the follow up and reporting mechanism for the operations of TARURA in controlling the quality of constructed bitumen surfaced roads in urban areas?*

Appendix 3: Documents reviewed and reasons for review

This part provides details about the list of documents which were reviewed and the reasons for reviewing them

Documents	Reasons for the Review
Design and Specifications • Feasibility Studies • Adopted Urban Road Designs • Customised Standards and Specification for Urban Roads works • Reports on the Reviews for Road Designs and Specifications	To assess the extent to which needs analysis are conducted prior to development of road designs To assess the extent to which the road specifications are customised based on the different conditions for executed road works To assess the extent to which the implementing agencies are disseminated with roads designs and specifications
Tendering Process • Annual Procurement Plans • Tender Documents	To check the extent to which tendering process captured issues regarding quality and undergone quality reviews in compliance with client's requirements and TORs
Project Plan • Strategic Plans • Development Plans	To check the extent to which plans for execution of bitumen surfaced roads works considers quality issues.
Project Implementation Reports • Project Progress Reports • Project Correspondences	To assess the extent of adherence to project preliminary activities Check whether the quality aspects were addressed during the planning phase To assess whether the progress reports addresses the quality aspects
Roads Projects Contract Documents • Form Agreements • Letter of Acceptance • General condition of contracts • Specific Conditions of Contracts • Design reports • Bill of quantities • Drawings	To assess the relevance, completeness and accuracy of developed roads construction projects with reference to quality perspectives To check whether the implemented works are being done in accordance with the specifications in terms of quality To check whether designs address issues regarding quality with compliance to design manual, codes and standards To check whether designs considered safety issues

Documents	Reasons for the Review
Supervision and Test Reports • Field Tests Reports • Lab Test Reports • Material Tests reports	To verify whether there was a compliance in standards and specifications during the execution of roads construction projects

Source: *Auditors' Analysis (2019)*

Appendix 4: List of Officials interviewed and reasons for being interviewed

This part provides details of the officials that were interviewed from both PO-RALG, TARURA and LGAs and the reasons for interviewing them.

Entity	Person Interviewed	Reason for being interviewed
PO-RALG	i. Head of Division – Infrastructure Development ii. Head of Section - Urban Roads Infrastructure Development Section	Clarification on different issues observed from document reviews and site visits at TARURA Provision of additional information on reviewed documents and visited sites Clarify performance or technical issues raised by auditors in the current strategies and implementation of projects by TARURA Provide any other clarification on matters arising from the reviewed documents
TARURA	i. Director of Urban Roads ii. Director of Business Support and Administration iii. Budget Manager iv. Manager of Urban Roads Development Section v. 7 Regional Office Coordinators vi. 12 Project Managers vii. 38 Project Supervisors viii. 12 Councils Office Manager ix. 12 Councils Engineers	Confirm or explain information from documents reviewed; Give facts to relevant information in cases where information in the formal documents were lacking or missing; and Provide a clear picture of control mechanism

Entity	Person Interviewed	Reason for being interviewed
		available to ensure quality of constructed bitumen surfaced roads is observed.
LGAs	i) 9 Council's Engineers ii) 9 Project Coordinators for TSCP, DMDP, ULGSP	To obtain clarification about the status and progress of the projects To provide clarification about matters observed in the course of execution of the WB funded projects

***Source**: Auditors' Analysis (201*

Appendix 5: Extent of occurrence of defects and other key neglected road works noted from recently completed road works

This part provides details of the types of defects that were noted from the visited LGAs and other key road works neglected from recently completed road projects

Selected LGA	Total Number of visited roads	Good	Finished with Severe Defects	No. of Roads noted with severe defects during site visits							
				Cracks	Bleeding	Rutting	Shortage width	Lack of road signs	Lack of road markings	Pavement	Centreline li-up
Dodoma CC	4	1	3	1	1	1	1	3	3	0	1
Kondoa TC	3	0	3	0	3	0	3	3	3	0	2
Ilala MC	3	0	3	0	2	0	2	2	0	0	1
Kinondoni MC	6	1	5	2	2	0	3	4	4	0	1
Iringa MC	3	0	3	2	2	1	2	2	2	1	2
Mafinga TC	1	0	0	1	0	0	0	1	1	0	0
Mwanza CC	3	1	2	0	0	0	3	2	2	0	0
Ilemela	2	1	1	0	1	0	2	1	1	0	1
Tanga CC	4	0	4	0	3	0	3	3	3	0	4
Korogwe TC	3	0	3	2	3	0	3	2	2	0	2
Mtwara MC	3	0	3	1	1	0	3	3	3	0	1
Nanyamba TC	3	2	1	0	0	0	0	3	3	0	0
TOTAL	**38**	**19**	**30**	**9**	**18**	**2**	**25**	**29**	**27**	**1**	**15**

***Source**: Site visits observations, Progress Reports, Snag lists*

Appendix 6: Status Regarding Conduct of Feasibility Studies for the Visited Projects

This part provides details of the status of conducting feasibility studies for each of the visited road project in the 12 LGAs and the reasons for not conducting the study.

LGA	Road Project	Financier	Feasibility Study	Reason for not conducting feasibility study
Dodoma CC	Upgrading of Emmaus - African Dream Road (1.4 Km)	RFB	Not done	Limited funds
Dodoma CC	Upgrading of Dodoma CC Roads to AC14 (Area D)	RFB	Not done	Limited funds
Dodoma CC	Periodic Maintenance of Martin Luther-Swaswa Road Phase III (1.85 Km)	RFB	Not done	Limited funds
Dodoma CC	Upgrading of Kondoa Township Roads (1.26km)	RFB	Not done	Limited funds
Dodoma CC	Upgrading of Kondoa Town Roads (0.64Km) to Bitumen	RFB	Not done	Limited funds
Dodoma CC	Package 6 of TCSP Project at Dodoma CC	WB	Done	--
Nanyamba TC	Upgrading of Nanyamba Town Road (1km)	RFB	Not Done	Limited funds
Mtwara MC	Periodic Maintenance along Raha Leo, Magomeni Dukuduku and Namkwacha Roads	RFB	Not Done	Limited funds
Mtwara MC	Package 5 TSCP Mtwara CC: Upgrading/Rehabilitation of Mtwara MC Town Roads	WB	Done	--
Mafinga TC	Periodic Maintenance of Mafinga Town Road	RFB	Not Done	Limited funds
Iringa MC	Rehabilitation of Don Bosco - Mawelewele Roads at Iringa MC	WB	Done	--
Iringa MC	Rehabilitation of Mtwivila-Darajani (1.0 Km) roads to Tarmac Standards (DSD)	RFB	Not done	Limited funds

LGA	Road Project	Financier	Feasibility Study	Reason for not conducting feasibility study
Iringa MC	Periodic Maintenance Works along Mawelewele Road to DSD (2 Km)	RFB	Not Done	Limited funds
Iringa MC	Rehabilitation of Samora Mashine Tatu - Mkwawa Road	WB	Done	--
Mwanza CC	Periodic/Routine Maintenance along Mwanza City Council tarmac Roads (Overlay)	RF	Not Done	Limited funds
Mwanza CC	Upgrading/Rehabilitation of Thagaafa and Mkanyenye roads to asphalt concrete standards.	RF	Not Done	Limited funds
Mwanza CC	Package 4: Additional works, constriuction of landfill at Buhongwa and Upgrading/ Rehabilitation/Improvement of Mtakuja, Sukuma, Umoja, Machemba, Pamba Roads and Lumumba Street.	WB	Done	--
Ilemela MC	Package 1: Upgrading/Rehabilitation of Makongoro Junction-Mwaloni, Sabasaba – Kiseke – Buswelu and Isamilo –Mji mwema Roads and Construction of skip pads	WB	Done	--
Ilemela MC	Upgrading of Kabuhoro – Ziwani Road (1.5 Km) to Double Surface Dressing in Ilemela Municipality	RF	Not Done	Limited funds
Korogwe TC	ULGSP: Upgrading of Roads to Asphalt Concrete at Korogwe TC (0.565 Km)	WB	Done	--
Korogwe TC	Upgrading of Market 1 and Market 2 to Bitumen standard (0.76)	RFB	Not Done	Limited funds
Tanga CC	Periodic Maintenance of Taifa Road in Tanga City	RFB	Not Done	Limited funds
Tanga CC	Package 4 TSCP Tanga CC: Upgrading of Nguvumali, Jamatkhan, Street 8	WB	Done	--
Tanga CC	Periodic Maintenance of Sahare Phase 1&2 roads in Tanga City	RFB	Done	--

***Source**: Road Project Correspondence files, Feasibility Reports, TARURA's LGA's Progress Reports*

Appendix 7: Status of Feasibility Studies undertaken for various road projects

This part provides the status of road projects which undergone the feasibility studies including the extent of coverage for each of the major component of a feasibility study.

LGA	Project Name	Road geometry (vertical and Horizontal)	Soil Investigations/ Geological survey	Hydrological Surveys	Topographical surveys	Traffic Counts	Condition surveys for existing roads	Environmental Impact assessment	Detailed Design reports	Drawings	Engineer's estimates	BOQs
Dodoma CC	Dodoma City Roads to Asphalt Concrete	x	x	x	x	✓	✓	x	x			✓
	Emmaus – African Dream		x	✓	x	✓	✓	x	x			x
	Martin Luther – Swaswa 1.85Km Road Phase III in Dodoma City	x	x	✓	x	✓	✓	x	x			x
	Dodoma Municipal Roads to AC 14 (40mm) Mashariki Avenue 1.2 Km, Lindi Avenue road 0.35 Km and Wajenzi Area D road 1.8 Km	x	x	x	x	✓	✓	x	x			x
	TSCP Package 6; Upgrading of ring road at Dodoma CC	✓	✓	✓	✓	✓	✓	✓	✓			✓
Kondoa TC	Kondoa Township Roads 1.26 Km from Gravel to Bituminous Standard (DSD) at Kondoa Town Council	x	x	x	x	x	✓	x	x			✓
	Kondoa Town roads 0.64 Km to Bitumen Standards	x	✓	x	x	✓	✓	x	x			x

LGA	Project Name	Road geometry (vertical and Horizontal)	Soil Investigations/ Geological survey	Hydrological Surveys	Topographical surveys	Traffic Counts	Condition surveys for existing roads	Environmental Impact assessment	Detailed Design reports	Drawings	Engineer's estimates	BOQs
	Upgrading of Kondoa Town Roads 1.3 Km to Bituminous Standards	x	x	x	x	x	✓	x	x			x
Ilala MC	Baracuda – Tabata Chang'ombe Road (0.5 Km)	x	x	x	x	✓	✓	x	x			✓
	Buguruni – Mnyamani Road (2.3Km)	x	x	x	x	✓	✓	x	x			✓
	Package 1: DMDP; Rehabilitation of selected local roads in Ilala MC	✓	✓	✓	✓	✓	✓	✓	✓			✓
	Package 5: DMDP	✓	✓	✓	✓	✓	✓	✓	✓			✓
Kinondoni MC	Various Roads (AC) and Bridges in Kinondoni MC (PM of Masjid Quba) Road	✓	✓	✓	✓	✓	✓	✓	✓			✓
	Various Roads (AC) and Bridges in Kinondoni MC (PM Changanyikeni-Shule Road 2.2 Km) phase 1: (0.7 Km)	x	x	x	x	✓	✓	x	x			✓
	PM of Tegeta Nyuki Road	x	x	x	x	✓	✓	x	x			✓
	PM of African Kinzudi – Sala sala road	x	x	x	x	✓	✓	x	x			✓
	Upgrading of Shymbonyi Road	✓	✓	✓	✓	✓	✓	✓	✓			✓
	DMDP Package 6	✓	✓	✓	✓	✓	✓	✓	✓			✓
Iringa MC	Rehabilitation of Don Bosco - Mawelewele Roads at Iringa MC	x	x	x	x	✓	✓	x	x			✓

LGA	Project Name	Road geometry (vertical and Horizontal)	Soil Investigations/ Geological survey	Hydrological Surveys	Topographical surveys	Traffic Counts	Condition surveys for existing roads	Environmental Impact assessment	Detailed Design reports	Drawings	Engineer's estimates	BOQs
	Rehabilitation of Mtwivila-Darajani (1.0 Km) roads to Tarmac Standards (DSD)	x	x	x	x	✓	✓	x	x			✓
	Periodic Maintenance Works along Mawelewele Road to DSD (2 Km)	x	x	x	x	✓	✓	x	x			✓
	Rehabilitation of Samora Mashine Tatu - Mkwawa Road-ULGSP	✓	✓	✓	✓	✓	✓	✓	✓			✓
Mafinga TC	Periodic Maintenance of Mafinga Town Road	x	✓	x	x	✓	✓	x	x			✓
Mwanza CC	Periodic/Routine Maintenance along Mwanza City Council tarmac Roads (Overlay)	x	x	x	x	✓	✓	x	x			✓
	Upgrading/Rehabilitation of Thagaafa and Mkanyenye roads to asphalt concrete standards.	x	x	x	x	✓	✓	x	x			✓
	TSCP; Package 4: Additional works, constriuction of landfill at Buhongwa and Upgrading/ Rehabilitation/Improvement of Mtakuja, Sukuma, Umoja, Machemba, Pamba Roads and Lumumba Street.	✓	✓	✓	✓	✓	✓	✓	✓			✓
Ilemela MC	Package 1: Upgrading/Rehabilitation of	✓	✓	✓	✓	✓	✓	✓	✓			✓

LGA	Project Name	Road geometry (vertical and Horizontal)	Soil Investigations/ Geological survey	Hydrological Surveys	Topographical surveys	Traffic Counts	Condition surveys for existing roads	Environmental Impact assessment	Detailed Design reports	Drawings	Engineer's estimates	BOQs
	Makongoro Junction-Mwaloni, Sabasaba – Kiseke –Buswelu and Isamilo –Mji mwema Roads and Construction of skip pads											
	Upgrading of Kabuhoro – Ziwani Road (1.5 Km) to Double Surface Dressing in Ilemela Municipality	x	x	x	x	✓	✓	x	x			✓
	Upgrading of Kabuhoro – Ziwani Road (1.5 Km) to Double Surface Dressing in Ilemela Municipality - LOT 2	x	x	x	x	✓	✓	x	x			✓
Tanga CC	Package 4 TSCP Tanga CC: Upgrading of Nguvumali, Jamatkhan, Street 8	✓	✓	✓	✓	✓	✓	✓	✓			✓
	Periodic Maintenance of Taifa Road in Tanga City	x	x	x	x	✓	✓	x	x			✓
	Periodic Maintenance of Sahare Phase 1&2 roads in Tanga City	x	x	x	x	✓	✓	x	x			✓
	Periodic Maintenance of 1.14 km Mwabonde Road (overlay)	x	x	x	x	✓	✓	x	x			✓
	Periodic maintainance of Taifa Road Lot 1	x	x	x	x	✓	✓	x	x			✓
Korogwe TC	Upgrading of Market 1 and Market 2 Roads to Bitumen standard (0.76)	x	x	x	x	✓	✓	x	x			x

LGA	Project Name	Road geometry (vertical and Horizontal)	Soil Investigations/ Geological survey	Hydrological Surveys	Topographical surveys	Traffic Counts	Condition surveys for existing roads	Environmental Impact assessment	Detailed Design reports	Drawings	Engineer's estimates	BOQs
	ULGSP: Upgrading of Roads (Ramia –Hoza) to Asphalt Concrete at Korogwe TC (0.565 Km)	✓	✓	✓	✓	✓	✓	✓	✓			✓
	Upgrading of Kibo-Mama Nko Road to Bitumen Standard 1.1Km	x	x	x	x	✓	✓	x	x			x
Mtwara MC	Periodic Maintenance along Raha Leo, Magomeni Dukuduku and Namkwacha Roads	x	x	x	x	x	✓	x	x			x
	Package 5 TSCP Mtwara CC: Upgrading/Rehabilitation of Mtwara MC Town Roads	✓	✓	✓	✓	✓	✓	✓	✓			✓
Nanyamba TC	Upgrading of Nanyamba Town Road (1km)	x	x	x	x	x	✓	x	x			x
	Kinondoni – Dinyecha Road	x	x	x	x	x	x	x	x			x

Source: *Project Correspondence files (2019), TARURA'S LGA's Progress Reports*

Appendix 8: Quantification of impact of Design Changes

Road Project	Respective Change of Works /Road	Reason for changes	Effect on Funds	Use of Savings	Impact on Contract Price	Original Amount	Final Amount	Approval
Iringa ***(Don bosco-Mawele-wele)***	***Reduced*** Road Length from 1.5 to 1.44	Inadequate design	Reduce budget by 11,800,000	Increase Earthworks and CRR worth 22,000,000	Increase by 3.58%	592,481,800	614,481,800	Formal Approvals followed (REC-TARURA)
Korogwe ***(Hoza-Ramia)***	***Reduce*** Width (from 11m-9m) ***Increase*** Length from 0.565km-0.685km)	Proposal from Community Leaders to extend in order to connect it with the another Road	Reduce Budget by **91,351,970**	***Idle***[9]	Reduce by 11%	Corrected sum **(829,328,204.75)**	737,976,234	Council Tender Board through Coordinator ULGSP
Korogwe **Kibo-Mama Nko**	***Increase*** Earthworks	Inadequate design	Increase amount by 91,813,390	No savings	Increase by 10%	612,715,200	704,528,590	VO-1 Approved by Regional Coordinator
Kinondoni **Tegeta Nyuki Road**	***Reduce*** Wearing Course (AC) by 1.06km ***Increase*** Earthworks (Black	Inadequate design	Increase Contract Amount by 997,298,725	No Savings	Increase by 50%	1,992,187,215	2,969,485,940	No approval No Variation orders *No Addendum*

[9] This fund is available awaiting to be re allocated to another project

	Cotton and Subsoil Drainage)							
Kinondoni **Changanyikeni Shule Road**	***Reduce*** Earthworks ***Increase*** Drainage works	Inadequate design	Reduce Contract Price by 2,869,176	Increased drainage works	Reduced by 0.3%	961,392,075	958,522,899.7	No approvals No Variation Orders issued
Ilala Buguruni Mnyamani Road	***Reduced*** Road Width ***Increase*** Subsurface Drainage Works	Inadequate design Poor contract Management	Increase Contract Price by TZS **644,554,022.90**	***Idle***[10]	Increase by **25.5%**	2,522,597,803.75 Revised: 3,167,151,826.65	2,604,356,255.84	Addendum No 1

Source: Review of Projects correspondences from 12 selected and visited LGAs, 2019.

[10] Despite the increase in the contract price, there was idle fund of TZS 562,795,570.81

Appendix 9: Design Changes Resulting from Inadequate Road Designs

This part provides details of the number of road design changes and the type of changes that were executed as a result of inadequate original designs developed from the visited LGAs.

LGA	Project Name	Number of Major Design Changes	Major changes
Dodoma CC	Package 6 TSCP	2	• Changes of storm water drains • Extension of 20m Kikuyu Itega to connect with TARURA road
Ilala MC	Buguruni-Mnayamani	6	• Reduction of Road Width, • Reduction of Drainage Structures both RHS and LHS
	Package 5: DMDP Ilala MC	2	• Wearing course AC 14 from 30mm to 40mm thick • Open Drains to covered drains
	Package 1: DMDP Ilala Municipal Council	3	• Change of Asphalt Concrete thickness from 30mm to 50mm. • Carriage widths due to shortage of corridor widths • Open drains to closed drains
Kinondoni MC	Tegeta Nyuki road	8	• Subsurface Drainage Works • Treatment of Black cotton soil • Rescoping • Increased use of un-plasticized PVC Pipes in Subsoil Drainage Systems • Gabions Work: Increase of Filter Fabrics • Change of Amount of Rock Fill Material on Improved Subgrade Layers • Additional Crushed Stones Concrete Aggregates for Drainage structures
	Package 6: DMDP Kiondoni MC	6	• Additional of major structures of chama cha walimu and Uporoto road • Drainage works of chama cha walimu and uporoto road

LGA	Project Name	Number of Major Design Changes	Major changes
			• Drainage work mkato road • Changes of embankment of Tibaijuka road by 0.5m to accommodate flood levels • Improvement of Drainage of Kijitonyama ward roads (Salma Kikwete road) • Changes of wearing course thickness AC14 from 30mm to 40mm thickness for all roads
	Masjid Quba Road	3	• Replacement of subgrade unsuitable materials (rock fill) • Subsoil drainages • Additional of major structures (Box Culvert)
	Mabatini Road	3	• Lined drains • Pavement layers and pavement type some sections • Drainage
Mtwara MC	Package 5: TSCP Mtwara MC: Upgrading/Rehabilitation of Mtwara MC Town Roads	4	• Change of Designs of Storm Water Drains • Change of Alignment for Storm Water Drainage • Use of CRS instead of CRR for construction of Base Course • Prefabricated Culverts
Iringa MC	Periodic Maintenance along Mawelewele Roads at Iringa MC	3	• Shifting from Existing Road Alignment • Pedestrian Crossing Lines • Stone Pitched Water Drainages
Tanga CC	Package 4: TSCP; Upgraing/Rehabilitaion/ Improvement of Nguvumali 2 Road, Jamatkhan Road, Street No 8, Feeder drains to duga and Mabawa and	2	• Asphalt Concrete thickness (Asphalt Wearing Course) from 30mm to 40mm • Carriage width varying depending on the availability of corridor widths on streets

LGA	Project Name	Number of Major Design Changes	Major changes
	New Bus stand and Lorry parking area.		
Korogwe TC	ULGSP: Upgrading of Roads to Asphalt Concrete at Korogwe TC (0.565 Km)	4	• Discarding Construction of Pedestrian Walkways • Extension of Road Length • Change of Road Width from 11m to 9m • Discarding RHS Drainage Structure
Ilemela MC	Kabuhoro – Ziwani Road	2	• Changes of G15 Quantities from 720 m^3 to 1387m^3 due to underestimation during the preparation of tender documents and Engineers estimate. • Addition works of 100m^3 rock fill
	Package 4: TSCP	7	• Cross section design • Changes of BOQs overestimated and underestimated items • Changes of typical cross sections • Changes of cent line which was located on surveyed uncompensated plots and residences. • Changes from flexible pavement to rigid pavement • Asphalt wearing course from 30mm to 50mm thickness • Major drainage structures
Mwanza CC	TSCP Package 1	4	• Changes of 30 mm AC to 50mm AC • Drainage improvement of structures which were not included due to inadequate feasibility study. • Revision of earthworks and pavement layers (improvement) • Changes of typical cross sections, horizontal and vertical alignments to suit the corridor thus the carriage width was changed to fit the actual condition of site.

***Source**: Design Review report, Physical site visits*

Appendix 10: Amount of Variation and Addendum from the visited road projects

This part provides details of the amount of variation and addendum resulting from road design changes from the visited road projects

LGA	Contract No	Name of the project	Variation Order Mill (TZS)	Addenda Mill (TZS)
Dodoma CC	LGA/020/2017-2018/W/04	Upgrading/Rehabilitation of Ring Road in Dodoma CC		1,797.334
Kondoa TC	AE/092/2017/2018/KOTC/W/04	Upgrading of Kondoa Township Roads (1.26km)		66.552
Ilala MC	AE/092/2017-18/ILMC/W/27	Buguruni-Mnyamani 2.4 km		644.55
	LGA/015/2016/2017/HQ/W/71	Tabata - Baracuda	9.998	
Kinondoni MC	AE/092/2017-18/KMC/CR/12	Mabatini Road	83.931	
	AE/092/2017-18/KMC/CR/04	Masjid -Quba	411.724	
	AE/092/2017-18/KMC/CR/01	Tegeta -Nyuki		977.3
Mwanza CC	LGA/089/2017/2018/TSCP-AF2/C/01	Supervision and design of Mtakuja, Sukuma, Umoja, Machemba, Pamba Roads and Lumumba Street.		113.710
	LGA/089/2017/2018/TSCP-AF2/W/02	Costruction of Mtakuja, Sukuma, Umoja, Machemba, Pamba Roads and Lumumba Street.		720.000

LGA	Contract No	Name of the project	Variation Order Mill (TZS)	Addenda Mill (TZS)
Ilemela MC	LGA/159/2016/2017/W/02 (Additional Financial II)	Makongoro Junction-Mwaloni, Sabasaba – Kiseke –Buswelu and Isamilo –Mjimwema Roads and Construction of skip pads		1,069.999
	AE/092/2017-18/MZA/W/05	Kabuhoro - Ziwani	299.000	
	AE/092/2017-18/ILMC/W/01/LOT II	Kabuhoro – Ziwani road	213.026	
Tanga CC	AE/092/TAG/2018-2019/W/44	PM of 1.14km of Mwabonde road (Overlay)		36.099
Korogwe TC	AE/092/TAG/2018-2019/W/25 LOT II	Upgrading of Kibo – Mama Nko 1.1 Km to bitumen standard	91.813	
Mtwara MC	LGA/035/2017/2018/W /01 (Contractor's addendum)	Upgrading of COTC and Senegal Road, rigid paved daladala bus stand and extension of Chuno road		1,499.998
	LGA/085/2017/2018/C/01 (Consultant addendum)	Upgrading of COTC and Senegal Road, rigid paved daladala bus stand and extension of Chuno road		135.500
Nanyamba TC	LGA/178/2016-2017/W/01 LOT 9	Upgrading of Nanyamba TC Paved roads 1.0 Km	16.008	

***Source**: Project Correspondence files, Site Observation notes*

Appendix 11: Status of Compliance for Preparation of Quality Control and Quality Assurance Plans for visited roads

This part provides details of the status of compliance with regard to preparation of quality control and quality assurance plans for 38 road projects

LGA	Contract Number	Quality Control Plan	Quality Assurance Plan	Level of implementation n and enforcement		NCR reports	
				Yes	No	Open	Closed
Dodoma CC	AE/092/2018-2019/DOM/W/65		✓		x	-	-
	LGA/020/2016-2017/W/16		X		x	-	-
	AE/092/2018/2019/DOM/W/05		✓		x	-	-
	AE/092/2017-2018/DMC/W/17		✓			-	-
Kondoa TC	AE/092/2017/2018/KOTC/W/04	x	x		x	-	-
	AE/092/2018/2019/DOM/W/44	x	x		x	-	-
	LGA/188/HQ/2016-2017/W/01	x	x		x	-	-
Ilala MC	AE/092/2017-18/ILMC/W/27	x	x		x	-	-
	LGA/015/2016/2017/HQ/W/71	x	x		x	-	-
Kinondoni MC	AE/092/2017-18/KMC/CR/04	x	x		x	-	-
	AE/092/2019-19/DSM/W/67	x	x		x	-	-
	AE/092/2017-18/KMC/CR/01	x	x		x	-	-
Iringa MC	LGA/025/2016/2017/HQ/W/08	✓	✓	✓		-	-
	AE/092/2018-2019/IR/W/02	x	x		x	-	-
	AE/092/2017-18/IMC/W/01	✓	x		x	-	-
Mafinga TC	LGA/169/2015-2016/W/01/01	x			x	-	-
Mwanza CC	AE/092/2017/2018/MZCC/W/04	x			x	-	-
	AE/092/2017-18/MZCC/W/03	x			x	-	-

LGA	Contract Number	Quality Control Plan	Quality Assurance Plan	Level of implementation n and enforcement		NCR reports	
				Yes	No	Open	Closed
	LGA/089/2017/2018/TSCP-AF2/W/02	✓		✓		-	-
Ilemela MC	LGA/159/2016/2017/W/02 (Additional Financial II)	✓		✓		-	-
	AE/092/2017-18/MZA/W/05	x			x	-	-
	AE/092/2017-18/ILMC/W/01/LOT II	x	✓		x	-	-
Tanga CC	LGA/128/2016-2017/HQ/W/17		✓		x	-	-
	AE/092/TAG/2018-2019/W/44/VOL II		x		x	-	-
	AE/092/TAG/2018-2019/W/44		x		x	-	-
	LGA/128/2016-2017/HQ/W/08-LOT II		x		x	-	-
	LGA/128/2016-2017/HQ/W/08-LOT I		x		x	-	-
Korogwe TC	AE/092/TAG/2018-2019/W/25 LOT II		x		x	-	-
	LGA/126/2017/2018/HQ/W/35-LOT1		x		x	-	-
Mtwara MC	AE/092/2018/2019/MT/W/05		x		x	-	-
	LGA/035/2017/2018/W/01	✓	✓	✓	x	-	-
Nanyamba TC	LGA/178/2016-2017/W/01 LOT 9		x		x	-	-

Source: *Road Project Correspondence files, TARURA's LGA's Progress Reports*