

# PERFORMANCE AUDIT REPORT ON INSTALLATION AND MAINTENANCE OF ROAD FURNITURE

BY

KENYA NATIONAL HIGHWAYS AUTHORITY  
KENYA URBAN ROADS AUTHORITY AND  
THE KENYA RURAL ROADS AUTHORITY



NOVEMBER 2020

## **VISION**

Accountability and effective management of public resources.

## **MISSION**

To audit and report on the management of public resources for improved service delivery to the Kenyan People.

## **CORE VALUES**

Integrity

Objectivity

Professional Competency

Innovation

Team Spirit

## **MOTTO**

Enhancing Accountability

## **FOREWORD BY THE AUDITOR - GENERAL**

I am pleased to present this Performance Audit report on Installation and Maintenance of Road Furniture by the Kenya National Highways Authority, Kenya Urban Roads Authority and the Kenya Rural Roads Authority. My Office carried out the audit under the mandate conferred on me by Section 36 of the Public Audit Act, 2015. The Act mandates the Office of the Auditor-General to examine the economy, efficiency and effectiveness with which public money has been expended pursuant to Article 229 of the Constitution of Kenya, 2010.

Performance, Financial and Compliance audits form the three-pillar audit assurance framework that I have established to give focus to the varied and wide scope of the audit work done by my Office. The framework is intended to provide a high level of assurance to stakeholders that public resources are not only correctly disbursed, recorded and accounted for, but that the use of the resources results in positive impacts on the lives of all Kenyans. The main goal of our performance audits is to ensure effective use of public resources and promote service delivery to citizens.

Our performance audits examine compliance with policies, obligations, laws, regulations and standards, and whether the resources are managed in a sustainable manner. They also examine the economy, efficiency and effectiveness with which public resources have been expended. I am hopeful that corrective action will be taken in line with our recommendations in the report.

The report is submitted to Parliament in accordance with Article 229 (7) of the Constitution of Kenya, 2010 and Section 36 (2) of the Public Audit Act, 2015. In addition, I have submitted copies of the report to the Principal Secretary, State Department for Infrastructure in the Ministry of Transport, Infrastructure, Housing, Urban Development and Public Works, the Director-Generals, Kenya National Highways Authority, Kenya Urban Roads Authority and Kenya Rural Roads Authority, the Principal Secretary, The National Treasury and the Secretary, President's Delivery Unit.

**Nancy Gathungu**  
**AUDITOR – GENERAL**

**14 December, 2020**



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**LIST OF ABBREVIATIONS**

ALEHU	-	Axle Load Enforcement and Highways Unit
ARICS	-	Annual Road Inventory and Condition Survey
BQ	-	Bill of Quantities
GoK	-	Government of Kenya
INTOSAI	-	International Organization for Supreme Audit Institution
ISA	-	International Standards on Audit
KeNHA	-	Kenya National Highways Authority
KeRRA	-	Kenya Rural Roads Authority
KRB	-	Kenya Roads Board
KURA	-	Kenya Rural Roads Authority
OAG	-	Office of the Auditor-General
PBC	-	Performance Based Contract
PIARC	-	Permanent International Association of Road Congresses
RMLF	-	Road Maintenance Levy Fund
SAI	-	Supreme Audit Institution

## GLOSSARY OF TERMS

**Boundary Reserve Posts:** These are posts installed to mark the width of the road reserve.

**Kerbs:** These delineate pavement edges and thereby clarify the paths that vehicles are to follow.

**Lighting:** The lighting of roads may be used as an effective way of reducing accidents especially in major junctions.

**Marker Posts:** Assist in a timely perception of the alignment ahead and when equipped with reflectors, provide good optical guidance at night.

**Road Markings:** These are markings on the surface of the road for the control, warning, guidance or provision of information to road users, for instance, yellow lines at the centre of the road.

**Safety Fences:** Fences or gates that prevent cars from leaving the road at locations where this would have most severe consequences. They include guardrails, crash barriers and bridge rails. Fences and gates along road reserves are a means of controlling access.

**Traffic Calming Features:** These serve to reduce the speed of oncoming vehicles at a particular spot, they include; pedestrian crossing, rumble strips and speed bumps.

**Traffic Islands:** A central or subsidiary area raised or marked on the carriageway, generally a road junction, shaped and placed so as to direct traffic movement.

## EXECUTIVE SUMMARY

### Introduction

1. Road furniture is the additional fittings installed on roads that are intended to guide and inform road users. Road furniture is essential for the safety and control of traffic as it provides motorists and other road users with the necessary warnings, rules, distance and directional information.
2. The Ministry of Transport, Infrastructure, Housing, Urban Development and Public Works, through the State Department for Infrastructure, is responsible for creating a modern and efficient transport system within the Country through the three state Authorities; Kenya National Highways Authority (KeNHA) in charge of highways, Kenya Urban Roads Authority (KURA) in charge of urban roads and Kenya Rural Roads Authority (KeRRA) in charge of rural roads.
3. The factors that motivated the Office of the Office Auditor-General (OAG) to carry out the audit include; road accidents being partly attributed to lack of or inappropriately placed road furniture, calls by stakeholders for erection of appropriate road furniture and dilapidated road furniture. This is despite the Kenya Roads Board (KRB) disbursing Ksh. 149,943,044,821 during the period 2013/2014 to 2017/2018 for maintenance of roads, including road furniture.

### Audit Objective

4. The main objective of the Performance audit was to assess measures put in place by KeNHA, KURA and KeRRA to ensure adequate installation and maintenance of road furniture. The specific objectives were:
  - i) To assess whether the measures put in place by the three Authorities ensure adequate installation of road furniture;
  - ii) To assess whether the three Authorities adequately maintain road furniture;
  - iii) To assess whether measures put in place by the three Authorities to curb vandalism are effective; and
  - iv) To assess whether measures put in place by the three Authorities to protect road reserves are effective.

### Scope of the Audit

5. The performance audit team examined the operations of the three Authorities for the financial years 2013/2014 to 2018/2019 and focused on the process of planning, installation, maintenance and protection of road furniture. The audit assessed the measures that the Authorities have put in place to ensure adequate installation and maintenance of road furniture. The audit was conducted in nine administrative regions;

Central, Upper Eastern, Coast, Western, Nyanza, Nairobi, South Rift, North Rift and Lower Eastern.

## **Summary of Audit Findings**

### **A. Inadequate Planning for Road Furniture as Evidenced by: -**

#### **i) Non-inclusion of road furniture in the Bill of Quantities**

6. The Kenya Road Design Manual (Part I) - Geometric Design for Rural Roads, identifies designing safety of roads as one of the main objectives of geometric design. During the design stage, a detailed traffic engineering analysis is prepared to specify the design of necessary traffic control features including detailed traffic signs, signals as necessary, pavement markings, and other control features. Subsequently, safety features applicable to a given type of road should be included in the Bill of Quantities (BQs) and be built into the road during its initial construction as well as during maintenance as may be applicable.
7. A review of sampled KURA and KeRRA road contracts revealed that some contracts either had minimal or no provision for road furniture. Four out of twenty-two KURA contracts did not have provision for road furniture, while eight contracts only had provision for kerbs. For KeRRA, out of eleven contracts, one did not have provision for road furniture while six only had provision for kerbs.
8. Under traffic and detailed engineering designs, road furniture is considered to be an important aspect of any road and a road is not considered 100% complete in the absence of associated road furniture. Interviews with the Regional Managers revealed that KURA and KeRRA prioritized the improvement of carriageways over provision for road furniture.

#### **ii) Non-Inclusion of Road Furniture in the Annual Road Inventory and Condition Survey**

9. Annual Road Inventory and Condition Survey (ARICS) is an annual assessment of roads that serves to capture the status of roads, including road furniture. It informs the extent of maintenance works to be carried out on the roads every financial year. The Kenya Roads Board requires KeNHA, KURA and KeRRA to conduct ARICS. Review of sampled ARICS templates for the financial year 2015/2016 to 2018/2019 revealed that road furniture condition was rarely captured during the survey. Failure to capture the condition of road furniture during ARICS presents a risk of the component being left out during the planning and implementation phases.

### **iii) Lack of an Inventory for Road Furniture**

10. The Kenya Roads Act, 2007, requires each of the Road Authorities to maintain and keep current, an inventory of the roads under their management. Interviews with the Regional Managers and Directors revealed that the three Authorities did not keep an inventory of roads and road furniture. This poses a risk to proper planning for maintenance as well as protection of road furniture.

### **B. Non- Installation of Road Furniture**

11. The Kenya Road Design Manual (Part I) - Geometric Design for Rural Roads, identifies designing safety into roads as one of the main objectives of geometric design. The Traffic Signs Manual, 1974 also requires erection of signage in relation to hazards ahead in an effort to inform road users and improve the general safety of roads. Road markings must be considered by the designers in the geomantic layout of the road and the physical layout must be supplemented by effective signing and marking as a means of informing, warning and controlling traffic.
12. Inspection of road furniture on the sampled roads between January and March, 2019 revealed that various warning signs for bumps, bends and pedestrian crossings were missing at crucial locations. Analysis of data collected during inspection of the sampled roads shows that out of the 786 road bumps recorded for the three Authorities, 430 (55%) did not have signs to warn motorists. In addition, some sections and points with steep side slopes and high fills along the road did not have guardrails installed as safety measures. It was also noted that there were roads without markings on the carriageways, junctions and bus bays.
13. Absence of these critical road furniture poses safety risks to road users. Lack of safety fences renders limited or no protection to road users while absence of markings in areas where traffic is expected to slow down exposes road users to accidents.

### **C. Inadequate Maintenance of Road Furniture**

14. According to the Permanent International Association of Road Congresses (PIARC), maintenance of roads and road furniture must be done regularly. The goal of maintenance is to preserve the asset. Upon completion and handing over of roads, the three Authorities are supposed to maintain the roads including road furniture. KeNHA's Strategic Plan for 2013-2017 also highlights one of its strategic objectives as establishment of a systematic and organized process of maintaining, upgrading and operating roads.

15. Field inspections revealed instances where road signs had rust or were defaced, faded road markings, damaged guard rails and road signs which had not been replaced. This was despite the fact that some roads had been under Performance-Based Maintenance Contracts.
16. Minimal or lack of maintenance could be attributed to the fact that road furniture is not given priority during planning for maintenance. Lack of maintenance of road furniture has direct and indirect costs as neglected road structures and signs may lead to road accidents. Additionally, without regular maintenance of road assets, they can rapidly fall into disrepair.

#### **D. Vandalism of Road Furniture**

17. According to the Road Design Manual-Geometric Design for Rural Road Part 1, road signs and lighting supports and other utility poles should be located far enough from the carriageway to reduce the likelihood of being struck by out of control vehicles, or they should have break-way capability. Road furniture are important assets and as such should be protected from vandalism.
18. During field visits between January and March, 2019, it was observed that there were cases of vandalism of road furniture. In total, there were 50 vandalized road signs, 40 vandalized guardrails and 14 vandalized bridge rails on the 22 KeNHA roads inspected. The Gilgil-Mau Summit Road (A8), Machakos-Kitui Road (B62) and Mariakani- Kaloleni- Mavueni Road (B91) were among the roads that had the greatest number of vandalized road furniture. KURA and KeRRA also had roads with vandalised road signs.
19. The sustained vandalism of road furniture can be attributed to lack of continuous inspection and monitoring of road furniture and lack of mechanisms for reporting vandalism. It was also noted that the materials used for road signs, mostly metallic, are more susceptible to vandalism because of the relatively high value of scrap metal in the market. In addition, the Scrap Metal Act, enacted in 2015 to make provisions for the regulation of scrap metal trade, had not been operationalised by the Ministry of Trade and Industry at the time of the audit. Warnings and informatory signs communicate to road users and reduce the risk of accidents. Vandalism therefore may increase instances of road accidents due to misinformation and limited or no protection to road users.

#### **E. Inadequate Demarcation and Protection of Road Reserves**

20. Part II Section 4.2(b) of the Kenya Roads Act, 2007, gives all the road Authorities the mandate of controlling road reserves and access to road side developments. During the audit inspection in January, February and March,

2019 it was observed that 10 out of 22 roads under KeNHA and 12 out of 16 roads under KeRRA were not demarcated while all KURA roads inspected were not demarcated. Some of the roads had been encroached resulting to blockage of road signs. The audit also revealed that collaboration with stakeholders on roadside development activities was not adequate. Failure to collaborate with stakeholders led to encroachment on road reserves as a result of conflict of interest among various agencies.

## **Conclusions**

21. The three road Authorities have not been able to adequately install and maintain road furniture on the roads. This is mainly attributed to inadequate planning for road furniture. The Authorities have also not put in place adequate measures to ensure protection of road furniture. There is a perception that roads are still usable without road furniture and that road furniture is a minor component of road construction and maintenance.
22. The funding for installation of road furniture during construction of roads is expended to other road elements. This results to roads being opened for use without adequate installation of road furniture.
23. The three Authorities did not maintain an inventory of road furniture on the roads and the ARICS template is not designed to adequately capture the condition of road furniture. As a result, plans for maintenance of roads exclude the road furniture component and related budget.
24. The three Authorities have not adequately sensitized the public on the importance of protecting road furniture. In addition, they lack a structured system for curbing, monitoring and reporting vandalism. As a result, road furniture does not last long after installation leading to wastage of funds and endangering road users.
25. The three Authorities have not managed to adequately demarcate and protect road reserves. There is encroachment along some of the roads which has resulted to obstruction of road signs. Inadequate demarcation and protection of road reserves is attributed to inadequate collaboration with stakeholders on roadside development activities.

## **Recommendations**

26. In view of the findings and conclusions of this audit, the following recommendations are proposed for implementation by KeNHA, KURA, KeRRA and the parent Ministry. This is aimed at improving the installation and

maintenance of road furniture which will contribute towards safety of motorists and other road users:

- i. The three Authorities should maintain inventories of all road assets including road furniture for ease of tracking the status of road furniture;
- ii. The three Authorities in consultation with the Kenya Roads Board should review the Annual Road Inventory and Condition Survey template to ensure that the status of road furniture is well captured during the survey and subsequently included in the maintenance workplan;
- iii. The three Authorities should enhance sensitization of the public on protection of road furniture and also ensure adequate monitoring of road furniture;
- iv. The Ministry of Transport, Infrastructure, Housing, Urban Development and Public Works, in collaboration with the Ministry of Trade should finalise the process of operationalising the Scrap Metal Act, 2015, which will help in curbing vandalism;
- v. The Ministry of Transport, Infrastructure, Housing, Urban Development and Public Works should develop a policy for the three Authorities for adoption of alternative material for road furniture that is not susceptible to vandalism; and
- vi. The three Authorities should step up their efforts in mapping and demarcating road reserves in order to protect road assets. They should also enhance collaboration with stakeholders on road side development activities in order to curb encroachment.

## **1.0 BACKGROUND TO THE AUDIT**

### **Introduction**

- 1.1 Road furniture is the additional fittings installed on roads that are intended to guide and inform road users. Road furniture is essential for safety and control of traffic as it provides motorists and other road users with the necessary warnings, rules, distance and directional information. They include traffic signs, road markings, traffic calming features, traffic islands, kerbs, safety fences and gates along road reserves, marker posts, lighting poles as well as other fixed objects along the carriageway which may form a traffic hazard. Road furniture should be correctly selected, appropriately placed, visible, durable and protective to road users in case of accidents.
- 1.2 According to the Kenya Roads Board (KRB) annual report, 2016, the road network in Kenya totals 161,451.5 kilometres out of which, 13,033.6 (8%) kilometres are paved and 148,417.9 (91.9%) are unpaved roads. The Ministry of Transport Infrastructure, Housing, Urban Development and Public Works, through the State Department for Infrastructure, is charged with the responsibility of creating a modern and efficient transport system within the Country through the three road Authorities; Kenya National Highways Authority (KeNHA) in charge of highways, Kenya Urban Roads Authority (KURA) in charge of urban roads and Kenya Rural Roads Authority (KeRRA) in charge of rural roads.

### **Motivation for the Audit**

- 1.3 The following factors motivated the Office of the Auditor-General to carry out the audit:
  - i) Road accidents partly attributed to lack of or inappropriately placed road furniture, have been recorded in the past. The most recent being on 10 October, 2018 at Fort-Ternan along Londiani–Fort-Ternan Road (C749) which claimed the lives of 56 passengers. The accident was blamed on lack of road markings and appropriate road signage. Another accident was also reported on 10 December, 2016, where a speed hump placed without signage along Nakuru-Nairobi Highway (A 104) claimed the lives of 39 passengers. The Kenya Police Service lists 78 roads as having black spots. Members of Parliament and other stakeholders have been demanding for the erection of appropriate road furniture to enhance road safety. It is alarming that lives are lost yet installation of the appropriate furniture could have prevented the accidents to a large extent;

- ii) The Hansard report of 4 May, 2016 indicated that the cost of maintaining roads supported by metallic bars was increasing due to vandalism. For instance, it was reported that approximately Ksh. 50 million was lost to vandalism within a year of commissioning Thika Road;
- iii) The Kenyan Government through the Kenya Roads Board disbursed Ksh. 149,943,044,821 from the financial year 2013/2014 to 2017/2018 under the Road Maintenance Levy Fund (RMLF). This was towards maintenance of roads, including road furniture. Despite these allocations, it is common to find dilapidated road furniture on Kenyan roads; and
- iv) There have been complains from members of the public on erection of speed bumps without signage, as well as erection of bumps that are not up to standard, hence posing danger to motorists. Further, newly constructed roads had been opened for public use before completion of installation of road furniture <sup>1</sup>.

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<sup>1</sup> Standard 23<sup>rd</sup> January 2017, 15<sup>th</sup> Dec 2017, Dec 11<sup>th</sup> 2016

## **2.0 DESIGN OF THE AUDIT**

### **Audit Objective**

- 2.1 The main objective of the audit was to assess the measures put in place by KeNHA, KURA and KeRRA to ensure adequate installation and maintenance of road furniture. The specific objectives were:
- i) To assess whether the measures put in place by the three Authorities ensure adequate installation of road furniture;
  - ii) To assess whether the three Authorities adequately maintain road furniture;
  - iii) To assess whether measures put in place to curb vandalism are effective; and
  - iv) To assess whether measures put in place to protect road reserves are effective.

### **Scope of the Audit**

- 2.2 The performance audit team examined the operations of KeNHA, KURA and KeRRA from the financial years 2013/2014 to 2018/2019. The audit focused on the process of planning, installation, maintenance and protection of road furniture. The team assessed the measures that the three Authorities have put in place to ensure adequate installation and maintenance of road furniture.

### **Methods Used to Gather Audit Evidence**

- 2.3 The team conducted the audit in accordance with Performance Auditing Standards issued by the International Organization of Supreme Audit Institutions (INTOSAI) which states that; in conducting a performance audit, auditors should follow the INTOSAI Code of Ethics and Auditing Standards as well as relevant Supreme Audit Institution (SAI) standards and guidelines applicable to performance auditing. The INTOSAI general auditing standards states that the auditor and the SAI must be independent, possess required competence and exercise due care to provide a guide on execution and reporting of audit findings.
- 2.4 To gather audit evidence, we conducted interviews, documentary reviews and physical verifications in nine administrative regions. These are; Central, Upper Eastern, Coast, Western, Nyanza, Nairobi, South Rift, North Rift and Lower Eastern.
- 2.5 Interviews were conducted with various staff at the three Authorities' head offices and regional offices to understand how road furniture is planned for, installed and maintained as well as measures put in place to protect them. Various documents in regards to planning, installation and maintenance of road furniture were also reviewed. Twenty-two roads were inspected in August 2018 during the preliminary

study while Sixty-two roads were inspected between January and March, 2019 during the main study phase of the audit. These roads were randomly sampled for inspection. **Appendix 1** shows the list of the roads inspected. **Appendix 2** and **Appendix 3** shows the list of people interviewed and the documents reviewed, respectively.

### Assessment Criteria

- 2.6 The audit team assessed installation and maintenance of road furniture against criteria drawn from the Road Design Manual-Geometric Design for Rural Roads, the Kenya Roads Act, 2007, the Traffic Signs Manual,1974, Road Markings Manual, KeNHA, KURA and KeRRA Strategic Plan, 2013-2017 as well as recommended best practices from the Permanent International Association of Road Congresses (PIARC), 1994.
- 2.7 Details of the audit criteria and the source of the criteria are provided in the findings chapter and are also listed in **Appendix 4**.

## 3.0 DESCRIPTION OF THE AUDIT AREA

### Road Furniture

- 3.1 Road furniture represents a collection of marginal elements intended to improve the driver's perception and comprehension of the continually changing appearance of the road. They are additional fittings on the road that communicate to road users. They provide road users with the necessary warnings, rules, distance and directional information for the safety of users. Road furniture includes; traffic islands, kerbs, road markings, fences and gates along road reserves, marker posts, traffic signs, lighting poles as well as other fixed objects along the carriageway which may form a traffic hazard.
- 3.2 Road furniture should be correctly selected, have specifications, be appropriately placed, visible, durable and protective to road users in case of accidents. For instance, motorists use road signs as a warning of pending hazardous or unusual road conditions such as sharp curves and low shoulders. A list of critical traffic signs is as shown in **Appendix 5**. Safety barriers such as guardrails act as crash cushions that protect the driver and passengers during collisions. Light and utility poles serve to illuminate roads and walkways for the benefit of both pedestrians and drivers. Essentially, road furniture serves as a traffic management tool that promotes safety and discipline on the roads.

### Statutory Mandate for the Ministry of Transport, Infrastructure, Housing, Urban Development and Public Works

- 3.3 Construction of road infrastructure is a function of the Ministry of Transport, Infrastructure, Housing, Urban Development and Public Works which was created via Executive Order No.1 of 2016. The Ministry is charged with the responsibility of providing the regulatory framework, co-ordination, oversight, supervision, liaison with other state agencies and any services necessary for the smooth functioning of the roads sub-sector.
- 3.4 The Ministry has five State Departments, among them is the State Department of Infrastructure, which is responsible for planning, designing, construction and maintenance of road infrastructure. This responsibility is carried out through the three Road Authorities; KeNHA, KURA and KeRRA.

### **The Statutory Mandate of the Kenya National Highways Authority**

3.5 The Kenya National Highways Authority (KeNHA) is a state corporation established under the Kenya Roads Act, No.2 of 2007 Part II (A) Section 3. It is charged with the responsibility of management, development, rehabilitation and maintenance of classes A, B and C roads as defined below;

**Class A:** International trunk roads that link centres of international importance and crossing international boundaries or terminating at international ports,

**Class B:** National trunk roads linking nationally important centres,

**Class C:** Primarily roads linking provincially important centres to each other or two higher-class roads.

3.6 One of KeNHA's objective under the Strategic Plan 2013-2017, strategy 2.6, is to reduce the number of fatalities attributed to poor or deficient highway or road design characteristics.

### **KeNHA's Organizational Structure**

3.7 KeNHA is headed by a Director-General who provides leadership for the implementation of its mandate and strategic objectives. The Director-General is assisted by Directors in Planning and Design, Development of Roads and Corridor & Asset Management Directorates. Other administrative Directors assist in the day to day activities of the entity. KeNHA's organogram is as shown in **Appendix 6**.

### **The Mandate of the Kenya Urban Roads Authority**

3.8 The Kenya Urban Roads Authority is a statutory body established by the Kenya Roads Act, 2007 Part II (C) Section 9. The mandate of KURA as defined in the Kenya Roads Act, 2007 is the management, development, rehabilitation and maintenance of national urban trunk roads. KURA's Strategic Plan, 2013-2017 states one of its objectives as to ensure quality, cost-effective and socially responsive roads construction and maintenance.

### **KURA's Organizational Structure**

3.9 KURA is headed by a Director-General who provides leadership for the implementation of its mandate and strategic objectives. The Director-General is assisted by Directors in Planning & Design, Development of

Roads and Corridor and Asset Management Directorates. Other Administrative Directors assist in the day-to-day activities of the entities. KURA's organogram is shown in **Appendix 7**.

### **The Mandate of the Kenya Rural Roads Authority**

3.10 The Kenya Rural Roads Authority (KeRRA) is a statutory body established by the Kenya Roads Act, 2007 Part II (B) Section 6. The Authority's primary mandate is to develop, construct and maintain the rural road network in the Country as per the Kenya Roads Act, 2007. KeRRA's Strategic Plan 2013-2018 states that the Authority would maintain roads including road furniture by providing adequate road signs and road markings and installing crash barriers and clearing bushes on road reserves. This was aimed at reducing traffic accidents.

### **Process Description for Installation and Maintenance of Road Furniture**

3.11 Road Construction which encompasses installation of road furniture follows the steps outlined below.

#### **Feasibility Study**

3.12 This is the first stage in road construction. It entails collection of social, economic, environmental, operating, and physical data that is necessary to support conclusions about the technical feasibility and socio-economic viability of the road and any related feeder roads. The output is the feasibility and economic study report.

#### **Preliminary Design**

3.13 This entails review of the existing data on the proposed road project and social and economic activities in the project study area to enable:

- i) Preliminary corridor definition including plot boundary information, details of encroachments and illegal allocations;
- ii) Preliminary engineering survey and design work for the optimum alignment and design standards including preliminary costs estimates and implementation schedule; and
- iii) Carrying out an Environmental and Social Impact Assessment of the project area in relation to the proposed project including preparation of an Environmental Impact Assessment Report.

### **Detailed Engineering Design**

- 3.14 This entails design for the construction of the project road, complete with cost estimates and bidding documents on the basis of standards agreed upon. The detailed engineering design work include, but not be limited to:
- i) Staking out in the field the approved alignment;
  - ii) Preparation of plan and profile drawings;
  - iii) Topographic survey indicating road edges and all structures along the road and preparation of site plans of all major structures and major junctions;
  - iv) Preparation of detailed land acquisition plans and strategies on tackling encroachments where necessary;
  - v) Soils and materials investigation, drainage and bridge site investigation, geometric design requirements, earthworks and pavements, drainage and bridge design and traffic engineering design is then carried out; and
  - vi) A detailed Bills of Quantities is prepared corresponding to the relevant sections of the standard specification and including contingencies and escalation of price elements. A cost estimate, with the ruling bill rates applicable to the proposed time of construction shall also accompany the Bills of Quantities (BQs). Road furniture is always a component of the BQ (Bill No. 20) for any road project.

### **Traffic Engineering Design**

- 3.15 A detailed traffic engineering analysis is prepared to specify the design of necessary traffic control features. This analysis includes detailed traffic assignments, including where appropriate, design traffic forecasts for major intersection. Based on the traffic assignments, related traffic studies to determine the location of signs, signals as necessary, pavement markings, and other control features are designed. Further, a detailed scheme for maintenance of traffic flow is developed to ensure that vehicle and pedestrian traffic is properly handled during the construction period. This plan shall include details of the location and design of bypass lanes, temporary structures, barriers, signing, signals and other physical features necessary to accommodate traffic flow and minimize traffic disruption during construction.

### **Construction**

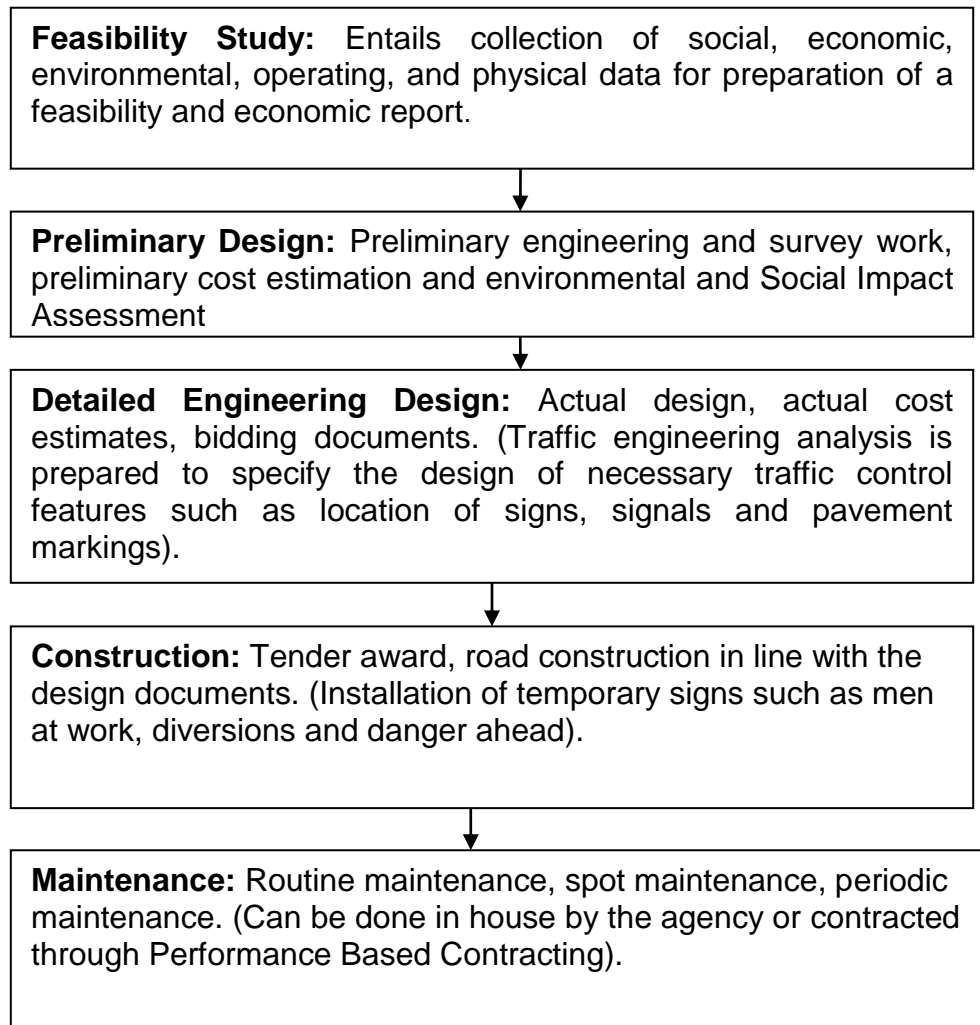
- 3.16 Once a tender has been awarded, construction is done in line with the design documents. Any changes to the design are as instructed by the Resident Engineer. Road furniture to be installed is decided on at the design stage but

during construction temporary signs are installed to guide and manage efficient flow of traffic. For instance; men at work, diversions and danger ahead. Permanent road furniture is installed towards the end of road construction since items like road marking can only be done after the bitumen has completely hardened. On completion, handover is normally done in two stages; substantial takeover on completion, followed by a defect liability period where the contractor repairs any defects as identified by the Resident Engineer. Finally, a final takeover is normally done with issuance of a completion certificate after which the contractor is then released from the site. At this stage, all aspects of road furniture as was in the design ought to be in place.

## **Maintenance**

- 3.17 Road maintenance comprises of activities to keep pavements, shoulders, slopes, drainage facilities and all other structures and property within the road margins as near as possible to their as-constructed or renewed condition. The Authorities carry out an Annual Road Inventory and Condition Survey (ARICS) to assess the need for maintenance activities. Road furniture is expected to be included during this process. Road maintenance is categorized into routine maintenance, periodic maintenance and spot improvement as explained below:
- i) Routine maintenance consists of many different frequent activities necessary to maintain the function of the road such as cleaning of culvert, potholes repairs, road marking, sealing of cracks, clearing of the bushes along the roads, repainting of sign posts and cleaning the drainages to keep the road in shape;
  - ii) Periodic maintenance are measures of less frequent nature designed to give the road a longer life and avoid road degradation and are normally carried out after five to six years. Periodic maintenance work includes grading, drainage work, resurfacing, and asphaltic concrete overlays; and
  - iii) Spot improvement is done within a spot and not the whole stretch. It addresses bottlenecks to improve the capacity of the road.
- 3.18 Maintenance works are in some cases carried out under Performance Based Contracts, whereby contractors are paid based on proportions of work done.

**Figure 1: Installation and Maintenance of Road Furniture Flow Chart**



*Source: OAG Analysis of the Road Safety Manual, 2009.*

### **Funding for Installation and Maintenance of Road Furniture**

- 3.19 The three Authorities receive funding from the Ministry of Transport, Infrastructure, Housing, Urban Development and Public Works and the Road Maintenance Levy Fund (RMLF) for their operations which includes installation and maintenance of road furniture.
- 3.20 Road furniture is a component of the contract sum for any road project. It was therefore not possible to establish the exact funding for road furniture from the Authorities' financial data. However, review of 50 road contracts for KeNHA, KURA and KeRRA revealed that road furniture component in the BQs averaged 4.43%, 6.67% and 2.85%

of the total contract sum for the three Authorities respectively. This shows that road furniture takes a minimal percentage of the contract sum as shown in [Appendix 8](#)

3.21 RMLF funding is entirely for road maintenance and is based on the percentage of total levies collected by the Kenya Roads Board. According to the Kenya Roads Act, 2007 Part 5 Section 6.2(d), KeNHA receives 40%, KURA 15% and KeRRA 10% of the RMLF collected annually. The total funds received for the financial years 2013/2014 to 2017/2018 is as summarized in the Table 1.

**Table 1: Road Maintenance Levy Fund Funding**

<b>YEAR</b>	<b>KeNHA RMLF funding in Kshs</b>	<b>KURA RMLF funding in Kshs</b>	<b>KeRRA RMLF funding in Kshs</b>
<b>2013/14</b>	10,470,789,000	3,761,170,875	5,516,383,950
<b>2014/15</b>	10,385,635,247	3,824,312,172	8,145,124,198
<b>2015/16</b>	11,940,279,898	4,307,231,962	9,188,761,519
<b>2016/17</b>	20,459,228,000	5,016,382,979	10,893,617,021
<b>2017/18</b>	21,464,128,000	5,361,702,128	11,438,297,872
<b>Total</b>	<b>74,720,060,145</b>	<b>22,270,800,116</b>	<b>45,182,184,560</b>

**Source: OAG Analysis of the Kenya Roads Board Financial Data**

## 4.0 AUDIT FINDINGS

### Kenya National Highways Authority

#### **Inclusion of Road Furniture in Road Contracts by KeNHA**

- 4.1 A review of road contract documents revealed that KeNHA had included the road furniture component in the Bill of Quantities (BQs). In addition, KeNHA issued a directive to all its Regional Directors in January 2019, it stated that road furniture should not be scaled down in cases where contracts are revised during implementation.

#### **KeNHA has Installed and Maintained Road Furniture on New Roads**

- 4.2 During physical inspection of roads in February 2019, it was observed that roads recently completed had their furniture in good condition. These roads included the Nairobi's Southern Bypass Road (UCA-2), Mombasa Southern Bypass Road (A3) and Nyeri – Othaya – Kangema Road (B23).

#### **KeNHA has Set up the Axle Load Enforcement and Highways Unit (ALEHU)**

- 4.3 KeNHA has set up the ALEHU whose responsibility is to control encroachment by carrying out patrols and enforcement of eviction orders, as well as enforcing axle load limits. It was also noted that KeNHA had made an effort to protect road reserves as half of the roads inspected had been demarcated.

Despite these positive observations, the audit revealed shortcomings as discussed below.

### **A. Inadequate Planning for Road Furniture**

#### **i) Non-Inclusion of Road Furniture in the Annual Road Inventory and Condition Survey**

- 4.4 Annual Road Inventory and Condition Survey (ARICS) is an annual assessment of roads that serves to capture the status of the road including road furniture. It informs the extent of maintenance works to be carried out on the roads every financial year. The Kenya Roads Board requires KeNHA to conduct ARICS.
- 4.5 Review of sampled ARICS templates for the financial year 2015/16 to 2018/19 revealed that the condition of road furniture was not captured during the survey. Only six out of the twenty-two roads whose ARICS templates were reviewed had their road furniture condition captured. The six roads are the Kisian-Bondo Road, Awasi-Nandi Hills Road, Nakuru-Marigat Road, Lanet-Dundori Road, Kiambu-Limuru Road and Muthaiga-Kiambu Road. Failure to capture the road furniture condition during ARICS risks the component being left out during planning and implementation.

## ii) Lack of an Inventory for Road Furniture

- 4.6 According to Section 48 (1) of the Kenya Roads Act, 2007, each of the Road Authorities, including KeNHA, should maintain and keep current, an inventory of the roads under its management, in such format and with such detail including categorization and identity details, as may be approved by the Minister. Further, one of the strategic objectives in KeNHA's Strategic Plan for 2013-2017 was to secure and protect national road assets through developing an inventory of all road assets.
- 4.7 Interviews conducted with the Regional Directors revealed that KeNHA does not maintain and keep current, an inventory of roads and road furniture within its jurisdiction. Inventory of road furniture is important in providing information for purposes of planning for maintenance. The Authority's failure to keep an inventory of road furniture is a risk to proper planning for maintenance as well as protection of road furniture.

### B. Non-Installation of Road Furniture

- 4.8 The Kenya Road Design Manual (Part I) - Geometric Design for Rural Roads, identifies designing safety into roads as one of the main objectives of geometric design. The Traffic Signs Manual, 1974, also requires erection of signage in relation to the hazard ahead in an effort to inform road users and improve the general safety of roads. Road markings must be considered by the designers in the geomantic layout of the road and the physical layout must be supplemented by effective signing and marking as a means of informing, warning and controlling traffic. The Road Marking Manual requires a two-lane paved road to have a centre-line to demarcate between opposing traffic flows and edge lines to show the extent of the width of the road pavement. According to the Kenya Road Design Manual Part 1, Geometric Design for Rural Roads, a safety fence, which shall be a guardrail of the flex-beam type, shall be provided at sections or points of traffic hazard, such as fixed objects along the edge of the shoulder, high fills and steep sides slope at escapements or along water courses.
- 4.9 During physical verification of road furniture on the sampled roads between January and March 2019, it was noted that various warning signs for bumps, bends and pedestrian crossing were missing at crucial locations. Analysis of data collected during inspection of the sampled roads shows that out of the 459 road bumps recorded, 254 (55%) had a signage while 205 (45%) did not have signs to warn motorists.
- 4.10 In addition, some sections and points with steep side slopes and high fills along the road did not have guardrails installed as safety measures. For example, along the Muthaiga-Kiambu Road (B32), Eldoret-Iten Road (B16), Bondo-Siaya-Rang'ala Road (B9) and Kiambu-Limuru Road (B32), there were areas where guardrails had not been

installed yet they were required. It was also noted that there were roads without markings on carriageways, junctions and bus bays as depicted in **Appendix 9**.

- 4.11 Absence of these critical road furniture poses a safety risk to road users. Lack of safety fences such as guardrails renders limited or no protection to road users. In addition, the absence of markings in areas where traffic is expected to slow down exposes road users to dangers of collision or knocking down of pedestrians as they approach the bus bay. Eventually, there is an increased likelihood of road injuries and fatalities which could have been avoided.

### **C. Inadequate Maintenance of Road Furniture**

- 4.12 According to the Permanent International Association of Road Congresses (PIARC), maintenance of roads and road furniture must be done regularly. The goal of maintenance is to preserve the asset. Upon completion and handing over of roads, KeNHA is supposed to maintain roads, including road furniture, so that roads remain as they were constructed. KeNHA's Strategic Plan for 2013-2017 also highlights one of its strategic objectives as establishment of a systematic and organized process of maintaining, upgrading and operating road assets.
- 4.13 Field inspections revealed instances where road signs had rust or were defaced, faded road markings, damaged guardrails and road signs which had not been replaced. This was despite the fact that some roads had been under Performance-Based Maintenance Contracts as shown in **Table 2**.

**Table 2: Analysis of Roads with Defaced Signs, Faded or Unmarked Carriageways, Vandalized Road Signs, Guardrails and Bridge Rails**

Region	Road name	Defaced road signs	Absent/ faded road markings - (√) Tick for present and a (-) for present)	Vandalised road signs	Dama-Ged or vandalised guard rails	Vand-alised bridge rails
Nyanza	Kisian-Bondo Road	0	√	2	0	2
	Bondo -Siaya-Rangala Road	13	-	0	1	1
	Awasi-Nandi Hills Road	6	Faded	6	4	3
	Kisumu-Mau Summit Road	1	√	2	2	0
Mombasa	Mavueni-Saba Saba Road	0	Faded	2	1	0
	Mombasa Southern Bypass Road	0	√	0	1	0
	Mariakani-Kaloleni-Mavueni Road	0	√	9	2	0
	Likoni-Ukunda Road	1	Faded	0	1	0
Nakuru	Kampi ya Moto - Kamoswor Road		√	1	0	0
	Nakuru -Marigat Road	0	√	4	-	-
	Lanet-Dundori Road	0	Faded	4	1	1
	Gilgil -Mau Summit Road	0	Faded	0	17	1
Eldoret	Eldoret-Kapsabet Road	0	Faded	1	2	2
	Eldoret-Iten Road	0	√	1	3	0
	Eldoret-Turbo-Malaba Road	1	√	5	1	0
Kakamega	Ekeru-Ebuyango Road	1	√	5	0	2
	Kakamega-Ekeru Road	0	√	4	3	2
Machakos	Machakos-Katamani-Wote Road	6	√	2	1	-
	Tala-Kamulu Road	0	√	1	0	0
Nairobi	Kiambu -Limuru Road	0	√	1	0	0
	Southern Bypass Road	0	√	0	0	0
	Muthaiga- Kiambu Road	0	Faded	0	0	0

Source: OAG-K analysis of data collected by auditors during field inspection

4.14 **Figure 2** shows roads with road signs that were defaced, faded and had rust. These roads were under Performance-Based Contracts that were about to lapse;

- i. The Nyeri-Othaya-Kangema-Gacharage Road (B23), which had a defaced signage, faded road markings and damaged guardrails;

- ii. The Eldoret-Iten Road (B16) with damaged guardrails; and
- iii. The Katumani-Wote Road (B60) which had a defaced signage.

**Figure 2: Road Signs that were Defaced, Faded and had Rust**



4.15 Minimal or lack of maintenance could be attributed to the fact that road furniture is not given priority during planning for maintenance. This is evident from the ARICS report reviewed that did not capture the condition of road furniture. This means that recommendations on aspects to be included in the work plans for maintenance may lack the necessary work to be carried out on road furniture. Consequently, maintenance may not be adequately done. Lack of maintenance of road furniture has direct and indirect cost as neglected road structures and signs may lead to road accidents.

**D. Vandalism of Road Furniture**

4.16 According to the Road Design Manual – Geometric Design for Rural Road Part 1, Chapter 3 (b), road signs and lighting supports and other utility poles should be located

far enough from the carriageway to reduce the likelihood of being struck by out of control vehicles, or they should have break-way capability. KeNHA’s Strategic Plan for 2013-2017 also outlines one of its strategies as to enhance the capacity to regulate usage of roads and prevent vandalism of road furniture.

4.17 During field visits between January and March 2019, it was observed that there were cases of vandalism of road furniture on the roads inspected. In total, there were 50 vandalized road signs, 40 vandalized guardrails and 14 vandalized bridge rails on the 22 roads inspected. The Gilgil-Mau Summit Road (A8), Machakos-Kitui Road (B62) and Mariakani- Kaloleni- Mavueni Road (B91) are among the roads that had the greatest number of vandalized road furniture as shown on **Appendix 10** and in **Figure 3**.

**Figure 3: Vandalised Road Furniture**



4.18 The sustained vandalism of road furniture can be attributed to inadequate monitoring of road furniture and lack of mechanisms for reporting vandalism which would encourage the road users to promptly report vandalism. It was also noted that the material used for

roads signs, mostly metallic, are more susceptible to vandalism because of the relatively high market value of scrap metal. In addition, the Scrap Metal Act, enacted in 2015 to make provisions for the regulation of dealing in scrap metals had not been operationalised by the Ministry of Trade and Industry at the time of the audit.

- 4.19 Interviews conducted during the audit revealed that KeNHA does not carry out adequate sensitization campaigns to educate the public on the importance of protecting road furniture. The Regional Offices were allocated Ksh. 3 million every year for sensitisation and demarcation of road reserves. The officers interviewed revealed that a large proportion of this funding is mainly prioritised for demarcation of road reserves and sensitisation of the public. This is particularly in areas where the Authority is planning to demolish structures that are on road reserves. **Figure 4** shows inappropriate use of road furniture by the public.

**Figure 4: Inappropriate use of Road Furniture by the Public**



- 4.20 Warning and informatory signs communicate to road users and reduce the risk of accidents. Vandalism therefore may increase instances of road accidents due to misinformation and limited or no protection to road users.

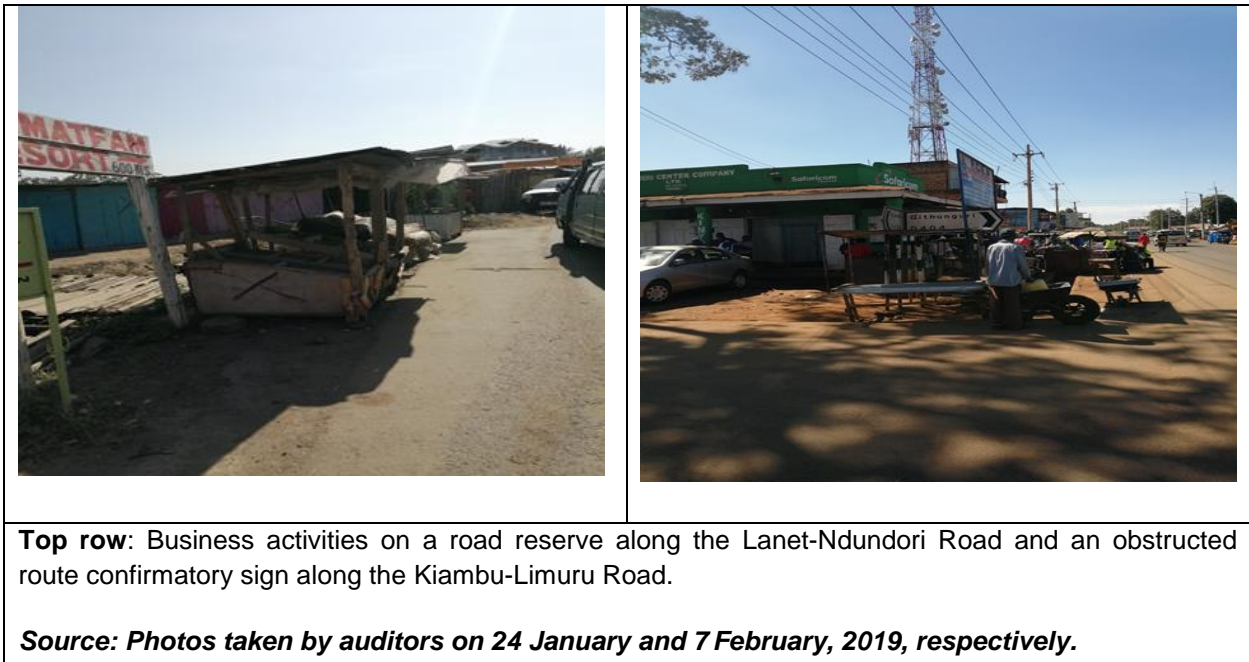
### **E. Inadequate Demarcation and Protection of Road Reserves**

- 4.21 According to Part II Section 4.2(b) of Kenya Roads Act, 2007, all the three road Authorities have the mandate of controlling road reserves and access to road

side developments. KeNHA's 2013-2017 Strategic Plan states that one of its responsibilities is to manage road reserves, map roads and road reserves, maintain road marker systems, manage road reserve boundaries, manage roads and survey data and undertake public sensitization on protection of road reserves.

4.22 During the audit inspection between January and March 2019, it was observed that 10 out of 22 roads inspected were not demarcated. For instance, the Eldoret-Kapsabet Road (B8), Ekero-Ebuyango Road (C781), Kiambu-Limuru Road (B32), Lanet-Ndundori Road (B20) and Mavueni-Sabasaba Road (A7) had been encroached with building structures, businesses and farming activities as depicted in **Figure 5**.

**Figure 5: Encroachment along Roads**



4.23 Interviews with KeNHA staff revealed that the Authority has taken measures to ensure its road assets are secured through establishment of the Axle Load Enforcement and Highway Unit. Its responsibility is to strengthen road asset management by making timely responses on encroachments through enforcements of protection of road assets and axle load control. KeNHA allocates Ksh. 3 million to the Regional Offices every financial year to carry out sensitization on encroachment and demarcation of road corridors.

- 4.24 The audit also revealed that collaboration with stakeholders on roadside development activities was not adequate. It was noted that there was no structured engagement with stakeholders who include; county governments, main utility and service providers, the public and other government agencies. Document review also indicated that there had been minimal collaborations between the stakeholders. For instance, correspondence between the Murang'a Governor and KeNHA Central Region Office indicated that the County had erected kiosks along the following roads; the Thika-Gacharage Road (B23) at Gacharage market, Nyeri-Kangema Road (B23) at Kangema town and Kenol-Muranga Road (B25) at Kenol market without seeking any authority. Erection of illegal structures was confirmed during field visit along the Nyeri-Othaya-Kangema Road.
- 4.25 Encroachment results to blockage of drainages and obstruction of visibility of road signs, leading to serious compromise on road safety. Failure to collaborate with stakeholders leads to encroachment on road reserves as a result of conflict of interest among various agencies such as county governments.

## Kenya Urban Roads Authority

### A. Inadequate Planning for Road Furniture

#### i) Non-Inclusion of Road Furniture in the Bill of Quantities

- 4.26 The Kenya Road Design Manual (Part I) identifies designing safety into roads as one of the main objectives of geometric design. During the design stage, a detailed traffic engineering analysis is prepared to specify the design of necessary traffic control features. These include detailed traffic signs, signals as necessary, pavement markings, and other control features. Subsequently, safety features applicable to a given type of road should be included in the BQ and be built into the road during its initial construction as well as during maintenance as may be applicable.
- 4.27 A review of sampled KURA road contracts revealed that some contracts either had minimal or no provision for road furniture. Four out of twenty-two KURA contracts did not have provision for road furniture while eight contracts only had a provision for kerbs as shown in **Table 3**. Failure to include road furniture in the BQ results into non-installation of the same.

**Table 3: Status of Road Furniture Inclusion in Sampled Contracts**

Kenya Urban Roads Authority							
Name of the Roads	Contract No.	Road Furniture Amount	Road Signs	Kerbs	Road Marking	Bush Clearing	Bollards
Awuor- Otiende Road	KURA/RMLF/NZ/064/2017-2018	0	-	-	-	-	-
Nyerere Road	KURA/RMLF/NZ/244/2017-2018	1,150,000	No	Yes	No	No	-
Rabuor- Chiga Road	KURA/RMLF/NZ/070/2017-2018	770,000	No	Yes	No	No	-
Likoni-Mombasa Hosplink Road	KURA/RMLF/COR/158/2017-2018	0	-	-	-	-	-
Bangladesh-Baringo Road	KURA/RMLF/SR/046/2017-2018	0	-	-	-	Yes	-
General Mathenge Road	KURA/RMLF/SR/222/2016/2017	900,000	No	Yes	No	No	No
Eveready Road	KURA/RMLF/SR/045/2017/2018	0	-	-	-	-	-
Road	KURA/RMLF/NR/022/2017-2018	522,000	No	Yes	No	No	No
Eldoret - SoS Children's Home Road	KURA/RMLF/NR/025/2017-2018	179,630	No	Yes	No	No	No
D296 Kamukunji Road	KURA/RMLF/NR/024/2017-2018	1,820,000	No	Yes	No	No	No
Kasambai - Sabatia Road	KURA/RMLF/WE/112/2017-2018	4,462,500	No	No	Yes	No	No
Devki -pepe -Vanillas Road	KURA/RMLF/LE/101/2017-2018	701,000	No	Yes	No	No	No
Mzee Paurana Road	KURA/RMLF/LE/102/2017-2018	552,000	No	Yes	No	No	No

**Source: OAG Analysis of Sampled Contracts**

4.28 Under the traffic and detailed engineering designs, road furniture is considered to be an important aspect of any road and a road is not considered 100% complete in the absence of associated road furniture. Interviews with the Regional Managers revealed that the Authority prioritized the improvement of carriageways over provision for road furniture.

#### **ii) Non-inclusion of Road Furniture in the Annual Inventory and Road Condition Survey**

4.29 Annual Inventory and Road Condition Survey (ARICS) is an annual assessment of roads that serves to capture the status of roads including road furniture. It informs the extent of maintenance works to be carried out on the roads every financial year. KURA is required to conduct ARICS by the Kenya Roads Board.

4.30 Review of sampled ARICS templates for the financial years 2015/2016 to 2018/2019 revealed that the condition of road furniture is not included in the ARICS template. It was also noted that the ARICS templates used by KURA did not have a road furniture column. Failure to capture road furniture during ARICS presents a risk of the component being left out during planning and implementation.

#### **iii) Lack of an Inventory for Road Furniture**

4.31 According to Sec 48 (1) of the Kenya Roads Act, 2007, each of the three road Authorities, including KURA, should maintain and keep current, an inventory of the roads under its management, in such format and with such detail including categorization and identity details, as may be approved by the Minister.

4.32 Interviews conducted with staff from KURA revealed that the Authority does not keep an inventory of road furniture for the roads within its jurisdiction. Inventory of road furniture is important in providing information for purposes of planning for maintenance. The Authority's failure to keep an inventory of road furniture is a risk to proper planning for maintenance as well as protection of road furniture.

### **B. Non-Installation of Road Furniture**

4.33 The Kenya Road Design Manual (Part I) identifies designing safety into roads as one of the main objectives of geometric design. The Traffic Signs Manual, 1974 also requires erection of signage in relation to hazards ahead in an effort to inform road users and improve the general safety of roads. Road markings must be considered by the designers in the geomantic layout of the road and the physical layout must be supplemented by effective signing and marking as a means of informing, warning and controlling traffic. The Road Marking Manual requires a two-lane paved road to have a

centre-line to demarcate between opposing traffic flows and edge lines to show the extent of the width of the road pavement.

- 4.34 During physical verification of road furniture on the sampled roads between January and March 2019, it was noted that various warning signs for bumps, pedestrian crossings and bus parks were missing at crucial locations. Analysis of data collected during inspection of the sampled roads shows that out of the 173 bumps recorded, 126 (72%) did not have signs to warn motorists. It was also noted that there were roads without markings on carriageways, junctions and bus bays as depicted in **Appendix 11**.
- 4.35 Non-installation of road furniture could be attributed to inadequate planning where the BQs for road furniture were not incorporated in the road contracts. On other road projects that had the road furniture component in the contract, the explanation provided was that the road furniture budget gets consumed by major road construction works. This is due to the fact that the road furniture component is the last item to be done and the perception that roads are still usable without road furniture.
- 4.36 Absence of these critical road furniture poses safety risks to road users. Lack of safety fences such as guardrails renders limited or no protection to road users while absence of markings in areas where traffic is expected to slow down exposes road users to dangers of collision or knocking down of pedestrians as they approach a bus stage. Eventually, there is a likelihood of increased road injuries and fatalities which could have been avoided.

### C. Vandalism of Road Furniture

- 4.37 Road Furniture plays an important role in communicating important messages as well as protecting road users. They are important assets and as such should be protected from vandalism.
- 4.38 During field visits in January, February and March, 2019, it was observed that there were cases of vandalism of road signs on the roads inspected. Some of the roads that had vandalised road furniture are Eastern and Northern Bypass, Eldoret-Herman Greener School Road, Kisambai-Sabatia Road in Kakamega and Bangladesh-Baringo Road in Nakuru, among others. **Figure 6** shows photos of vandalised road furniture taken during the audit.

**Figure 6: Vandalised Road Furniture**



- 4.39 The sustained vandalism of road furniture can be attributed to lack of continuous inspection and monitoring of road furniture and lack of mechanisms for reporting vandalism. Reporting mechanisms would encourage road users to promptly report vandalism. It was also noted that the material used for road signs, mostly metallic, is more susceptible to vandalism because of the relatively high market value of scrap metal. In addition, the Scrap Metal Act, enacted in 2015 to make provisions for the regulation of dealing in scrap metals had not been operationalised by the Ministry of Trade and Industry at the time of the audit.
- 4.40 Document review and interviews revealed that the Authority does not carry out adequate sensitization campaigns to educate the public on the importance of protecting road furniture. The audit revealed that sensitisation campaigns were planned and carried out by the Head Office who only manages to cover one or two regions in a year.
- 4.41 Warnings and informatory signs communicate to road users and reduce the risk of accidents. Vandalism therefore may increase instances of road accidents due to misinformation and limited or no protection to road users.

#### **D. Inadequate Demarcation and Protection of Road Reserves**

- 4.42 According to Part II Section 4.2(b) of the Kenya Roads Act, 2007 all the three road Authorities, including KURA, have the mandate of controlling road reserves and access

to road-side developments. KURA's Strategic Plan for 2013-2017 outlined one of its strategies as being to acquire and secure road corridors.

- 4.43 During the field inspection in February and March 2019, it was observed that all the KURA roads inspected, except for the Eastern Bypass, were not demarcated. It was also observed that 17 out of the 24 roads inspected were encroached. This is depicted in **Figure 7** and **Appendix 12**.

**Figure 7: Encroachment on Roads**



- 4.44 Encroachment results to blockage of drainages and obstruction of visibility of road signs, leading to serious compromise on road safety. Interviews with Regional Managers revealed that collaboration with stakeholders on roadside development activities was not adequate.

## Kenya Rural Roads Authority

### A. Inadequate Planning for Road Furniture

#### i) Non-Inclusion of Road Furniture in the Bill of Quantities

- 4.45 The Kenya Road Design Manual (Part I) - Geometric Design for Rural Roads, identifies designing safety into roads as one of the main objectives of geometric design. During the design stage, a detailed traffic engineering analysis is prepared to specify the design of necessary traffic control features. These include detailed traffic signs, signals as necessary, pavement markings and other control features. Subsequently, safety features applicable to a given type of road should be included in the BQ and be built into the road during its initial construction and during maintenance as may be applicable.
- 4.46 A review of sampled road contracts revealed that some contracts either had minimal or no provision for road furniture. Out of the eleven contracts reviewed, one (1) did not have a provision for road furniture while six only had provision for kerbs as shown in **Table 4**.

**Table 4: Sampled Contracts and Status of Road Furniture Inclusion**

Road Name	Contract number	Road Furniture amount in Ksh.	Road signs	Kerbs	Guardrails	Road markings
Maseno-Kombewa Road	RWC 119	41,181,700	Yes	Yes	Yes	Yes
Nakumatt-Bamburi Road	KeRRA/001/MSA/39/019-16/17	195,700	No	Yes	No	No
Kadzandani-Mwatamba Road	KeRRA/001/MSA/39/051-16\17	869,400	No	Yes	No	No
Elementaita Road	RWC-188	22,092,000	Yes	Yes	Yes	Yes
End of Tarma-Kirima Road	KeRRA/011/NKU/039/119/17-18	-	-	-	-	-
JuaKali-Sugoi Road	RWC064	46,296,000	Yes	-	Yes	Yes
Musoli-Shamusinjiri Road	KeRRA/011/39/06/2015/16	180,000	Yes	No	No	No
Massi-Tawa Road		717,500	Yes	No	No	No
Mukarara Road	KeRRA/RM/NR/48/2014-15	1,440,000	No	Yes	No	No
Kwarara Road	KeRRA/011/NR/39/140/2015-2016	160,800	No	Yes	No	No
Dog-Unit Road	NBI/GOK/2-56-14\15-013 Langa	2,200,000	No	Yes	No	No
Karadini Road	KeRRA/RM/NR/47/2014-2015	1,520,000	No	Yes	No	No

Source: OAG Analysis of Sampled Contracts

4.47 Under the traffic and detailed engineering designs, road furniture is considered to be an important aspect of any road. A road is not considered 100% complete in the absence of associated road furniture. It is evident that road furniture is viewed as a minor component. Interviews with Regional Managers revealed that KeRRA prioritized the improvement of carriageways over provision for road furniture. Failure to include the road furniture component in the BQ results to their non-installation.

### **ii) Non-Inclusion of Road Furniture in Annual Road Inventory and Condition Survey (ARICS)**

4.48 Annual Road Inventory and Condition Survey (ARICS) an annual assessment of roads that serves to capture the status of roads, including road furniture. It informs the extent of maintenance works to be carried out on roads every financial year. The Kenya Roads Board (KRB) requires KeRRA to conduct ARICS.

4.49 Review of sampled ARICS templates for the financial year 2015/16 to 2018/19 revealed that the condition of road furniture was not included in most of the ARICS template. It was also noted that the ARICS template used by KeRRA did not have a road furniture column. Failure to capture road furniture during ARICS presents a risk of the component being left out during planning and implementation.

### **iii) Lack of an Inventory for Road Furniture**

4.50 According to Section 48 (1) of the Kenya Roads Act, 2007, each of the Road Authorities, including KeRRA, should maintain and keep current, an inventory of the roads under its management, in such format and with such detail including categorization and identity details, as may be approved by the Minister.

4.51 Interviews conducted with staff from KeRRA revealed that the Authority does not keep an inventory of road furniture for the roads within its jurisdiction. Inventory of road furniture is important in providing information for purposes of planning for maintenance. The Authority's failure to keep an inventory of road furniture is a risk to proper planning for maintenance as well as protection of road furniture.

## **B. Non-Installation of Road Furniture**

4.52 The Kenya Road Design Manual (Part I) - Geometric Design for Rural Roads, identifies designing safety into roads as one of the main objectives of geometric design. The Traffic Signs Manual, 1974, also requires erection of signage in relation to the hazard ahead in an effort to inform road users and improve the general safety of roads. Road markings must be considered by the designers in the geomantic layout of the road and

the physical layout must be supplemented by effective signing and marking as a means of informing, warning and controlling traffic.

- 4.53 The Road Marking Manual requires a two-lane paved road to have a centre-line to demarcate between opposing traffic flows and edge lines to show the extent of the width of the road pavement. According to the Road Design Manual Part 1, Geometric Design for Rural Roads; a safety fence, which shall be guard rail of the flex-beam type, shall be provided at sections or points of traffic hazard, such as fixed objects along the edge of the shoulder, high fills and steep sides slope at escapements or along water courses.
- 4.54 During physical verification of road furniture on the sampled roads between January and March 2019, it was noted that various warning signs for bumps, pedestrian crossing and bus parks were missing at crucial locations. Analysis of data collected during inspection of the sampled roads revealed that out of the 154 bumps recorded, 99 (64%) did not have signs to warn motorists. It was also noted that there were roads without markings on carriageways, junctions and bus bays as depicted in **Appendix 13**.
- 4.55 Absence of these critical road furniture poses a safety risk to road users. Lack of safety fences such as guard rails renders limited or no protection to road users. In addition, the absence of markings in areas where traffic is expected to slow down exposes road users to dangers of collision or knocking down of pedestrians as they approach a bus stage. Eventually, there is likely to be an increase in road injuries and fatalities which could have been avoided. Non-installation of road furniture could be attributed to lack of planning where the BQs for road furniture were not incorporated in the road contracts.

### C. Vandalism of Road Furniture

- 4.56 According to the Road Design Manual–Geometric Design for Rural Road Part 1, Chapter 3 (b); road signs and lighting supports and other utility poles should be located far enough from the carriageway to reduce the likelihood of being struck by out of control vehicles, or they should have break-way capability.
- 4.57 During field visits between January and March 2019, it was observed that there were cases of vandalism of road signs on the roads inspected. Some of the roads that had vandalised road furniture are Jua Kali-Sugoi Road, Marula-Kongoni Road, Kabiria Road and SGR-Mkupe Jetty Road among others as shown in **Figure 8**.

**Figure 8: Vandalised Road Furniture**



**Top row:** Vandalized road sign along the Jua Kali-Sugoi Road; Uasin Gishu County.

**Bottom row:** Vandalized road sign along the Marula-Kongoni Road in Nakuru County and Kabiria Road in Dagoretti South; Nairobi County.

**Source:** *Photos taken by auditors on inspection (Clockwise; 23 January, 2019, 5 and 13 February, 2019, respectively).*

- 4.58 The sustained vandalism of road furniture was attributed to lack of monitoring of road furniture and lack of mechanisms for reporting vandalism. Reporting mechanisms would encourage road users to promptly report vandalism. It was also noted that the material used for road signs is susceptible to vandalism because of the relatively high market value of scrap metal. In addition, the Scrap Metal Act, enacted in 2015 to make provisions for the regulation of dealing in scrap metals had not been operationalised by the Ministry of Trade and Industry at the time of the audit.
- 4.59 Document review and interviews revealed that KeRRA did not carry out adequate sensitization campaigns to educate the public on the importance of protecting road furniture. Sensitisation campaigns were planned and carried out by the head office who only manages to cover a few regions in a year.

- 4.60 Warning and informatory signs communicate to road users and reduce the risk of accidents. Vandalism therefore may increase instances of road accidents due to misinformation and limited or no protection to road users.

#### **D. Inadequate Demarcation and Protection of Road Reserves**

- 4.61 According to Part II Section 4.2(b) of the Kenya Roads Act, 2007, all the three road Authorities, including KeRRA, have the mandate of controlling road reserves and access to road side developments. One of KeRRA's strategy in the Strategic Plan 2013-2017 is to map and demarcate road reserves. The locations surveyed are marked with pegs then marker posts or boundary reserve posts are installed.
- 4.62 During the field inspection between January and March 2019, it was observed that most of the roads were not demarcated. Twelve out of sixteen roads inspected were not demarcated and encroachment was observed along nine of these roads as shown in **Appendix 14**.
- 4.63 Encroachment results to blockage of drainages and obstruction of visibility of road signs, leading to serious compromise on road safety. Interviews with Regional Managers revealed that collaboration with stakeholders on roadside development activities was not adequate.

## 5.0 CONCLUSIONS

- 5.1 The three Authorities have not been able to adequately install and maintain road furniture on the roads. This is mainly attributed to inadequate planning for road furniture. The Authorities have also not put in place adequate measures to ensure protection of road furniture. There is a perception that roads are still usable without road furniture and that road furniture is a minor component of road construction and maintenance.
- 5.2 The funding for installation of road furniture during construction of roads is expended to other road elements. This results to roads being opened for use without adequate installation of road furniture
- 5.3 The three Authorities did not maintain an inventory of road furniture on the roads and the ARICS template is not designed to adequately capture the condition of road furniture. As a result, plans for maintenance of roads exclude the road furniture component and related budget.
- 5.4 The three Authorities have not adequately sensitized the public on the importance of protecting road furniture. In addition, they lack a structured system for curbing, monitoring and reporting vandalism. As a result, road furniture does not last long after installation leading to wastage of funds and endangering road users.
- 5.5 The three Authorities have not managed to adequately demarcate and protect road reserves. There is encroachment along some of the roads which has resulted to obstruction of road signs. Inadequate demarcation and protection of road reserves is attributed to inadequate collaboration with stakeholders on roadside development activities.

## 6.0 RECOMMENDATIONS

- 6.1 In view of the findings and conclusions of this audit, the following recommendations are proposed for implementation by KeNHA, KURA, KeRRA and the parent Ministry. This is aimed at improving the installation and maintenance of road furniture which will contribute towards safety of motorists and other road users:
- i. The three Authorities should maintain inventories of all road assets including road furniture for ease of tracking the status of road furniture;
  - ii. The three Authorities in consultation with the Kenya Roads Board should review the Annual Road Inventory and Condition Survey template to ensure that the status of road furniture is well captured during the survey and subsequently included in the maintenance workplan;
  - iii. The three Authorities should enhance sensitization of the public on protection of road furniture and also ensure adequate monitoring of road furniture;
  - iv. The Ministry of Transport, Infrastructure, Housing, Urban Development and Public Works, in collaboration with the Ministry of Trade should finalise the process of operationalising the Scrap Metal Act, 2015, which will help in curbing vandalism;
  - v. The Ministry of Transport, Infrastructure, Housing, Urban Development and Public Works should develop a policy for the three Authorities for adoption of alternative material for road furniture that is not susceptible to vandalism; and
  - vi. The three Authorities should step up their efforts in mapping and demarcating road reserves in order to protect road assets. They should also enhance collaboration with stakeholders on road side development activities in order to curb encroachment.

## 7.0 APPENDICES

### Appendix 1: List of Roads Sampled

Region	Name of the road
<b>Kenya National Highways Authority</b>	
<b>Nyanza</b>	1. Bondo -Siaya-Rangala Road (B9)
	2. Kisian-Bondo Road (B10)
	3. Awasi-Nandi Hills Road (B8)
	4. Kisumu-Mau Summit Road (A12)
<b>Coast</b>	5. Mavueni-Saba Saba Road (A7)
	6. Mariakani-Kaloleni-Mavueni Road (A3)
	7. Dongo Kundu Road (A3)
	8. Likoni-Ukunda Road (A7)
<b>South Rift</b>	9. Kampi ya Moto -Kamoswor Road (B77)
	10. Nakuru -Marigat Road (B17)
	11. Gilgil -Mau Summit Road (A8)
	12. Lanet-Dundori Road (B20)
<b>North Rift</b>	13. Eldoret-Kapsabet Road (B8)
	14. Eldoret-Iten Road (B16)
	15. Eldoret-Turbo-Malaba Road (A8)
<b>Western</b>	16. Ekeru-Ebuyango Road (C781)
	17. Kakamega-Ekeru Road (B12)
<b>Lower Eastern</b>	18. Machakos-Katumani-Wotee Road (B60)
	19. Tala-Kamulu Road (B63)
<b>Nairobi</b>	20. Kiambu -Limuru Road (B32)
	21. Southern -Bypass Road (UCA-2)
	22. Muthaiga- Kiambu Road (B32)
<b>Upper Eastern</b>	23. Subuiga- Meru Road
	24. Meru -Kangeta -Laare Road
	25. Meru- Katheri Road
	26. Meru-Embu Road
<b>Central</b>	27. Nyeri-Othaya-Kangema Road
	28. Gacharage -Thika Road
<b>Kenya Urban Roads Authority</b>	
<b>Nyanza</b>	29. Nyerere Road
	30. Rabuor- Chiga Road
	31. Awuor -Otiende Road

<b>Region</b>	<b>Name of the road</b>
<b>Coast</b>	32. Shimanzi Road
	33. New Nyali Road
	34. Likoni-Mombasa hosplink Road
<b>South Rift</b>	35. General Mathenge Road
	36. Bangladesh-Baringo Road
	37. Eveready Road
<b>North Rift</b>	38. Eldoret-Herman Gremer School Road
	39. Eldoret - SOS Children's Home Road
	40. Kings highway – ECD Road
	41. D296 Kamukunji Road
	42. Eldoret Achievers ECD- Eldoret Road
	43. Eldoret-Moi University Road
<b>Kakamega</b>	44. Kasambai – Sabatia Road
	45. Mbale- Kisiambai Road
	46. State Lodge Road
<b>Lower Eastern</b>	47. Kitangi - Githome Road
	48. Devki -Pepe -Vanillas Road
	49. Mzee Paurana Road
<b>Nairobi</b>	50. Northern Bypass/Eastern Bypass Road
	51. Kamiti - Roysambu Road
	52. Outering
<b>Upper Eastern</b>	53. Chuka Hospital access Road
	54. Chuka DC access Road
	55. Chuka Boys Access Road
	56. Chuka Market access Road
	57. Cooperative Road
	58. Moi Road
	59. Njuri Ncheke Road
<b>Central</b>	60. Manyeki Road
	61. Murang'a CBD Road
	62. Murang'a University Access Road
<b>Kenya Rural Roads Authority</b>	
<b>Kisumu</b>	63. Maseno-Kombewa Road (D245)
<b>Mombasa</b>	64. Nakumatt-Bamburi Zaitunni Junction Road(E949)

<b>Region</b>	<b>Name of the road</b>
	65. Kadzandani-mwatamba Road(E930)
	66. Mkupe-Jeti Road
<b>Nakuru</b>	67. Elementaita-Mau Narok Road(D320)
	68. Marula-Kongoni Road
	69. End of Tarmac –Kirima Road (D393)
<b>Eldoret</b>	70. JuaKali-Sugoi Road (E306)
	71. Eldoret-Kaptagat Road
<b>Kakamega</b>	72. Musoli-Shamusinjiri Road(E389)
<b>Machakos</b>	73. Massi-Tawa Road(D517)
<b>Nairobi</b>	74. Mukarara Road (UUF689)
	75. Kwarara Road (UUF80)
	76. Dog-Unit Road
	77. Kaberia Road
	78. Karadini Road
<b>Muranga</b>	79. Mukuyu- Githambo Road
	80. Saba Saba -Kandani Road
	81. Njiiri- Kaharati Road
<b>Meru</b>	82. Kithoka -Ruiru Road
	83. Ruiru -Isiolo Road
	84. Isiolo-Miriri Road

*Source: KeNHA, KURA and KeRRA database on road network*

## Appendix 2: List of Officers Interviewed

Position of the interviewee	Purpose of the interview
<b>Kenya National Highways authority</b>	
Assistant Director Highways Development-KeNHA	To gain insight on the operations of the Authority in the design and construction of roads and road furniture.
Deputy Director, Roads Assets & Corridor Management-KeNHA	To gain an insight on the operations of KeNHA with regard to maintenance of roads and road assets.
Deputy Director (Highway Safety and Planning) and Staff in Survey Department	To gain an understanding on the roles of Survey and Road Safety Departments in relation to protection of road furniture road reserves.
Regional Directors in Nairobi, South Rift, North Rift, Western, Nyanza, Coast, Lower Eastern Upper Eastern and Central regions	To get to know the operations of the regional office on installation and maintenance of road furniture within their jurisdiction.
<b>Kenya Urban Roads Authority</b>	
Assistant Director, Urban Road Asset and Corridor Management-KURA	To ascertain how the department ensures maintenance activities, protection and maintenance of road corridors and road asset management.
Assistant Director, Urban Roads Development-KURA	To get an insight on how design and installation of road furniture is carried out by the department.
Department of Urban Roads and Planning-KURA	To get a general understanding on how planning of roadworks and road furniture is carried out by the entity.
Assistant Director, Road Safety	To understand the role of the Road Safety Department in relation to road furniture.
Assistant Director, Survey	To understand the role of the Survey Department with regard to road reserve

<b>Position of the interviewee</b>	<b>Purpose of the interview</b>
	demarcation.
Deputy Directors in Nairobi, South Rift, North Rift, Western, Nyanza, Coast and Lower Eastern regions.	To get to know the operations of the Regional Offices on installation and maintenance of road furniture within their jurisdiction.
<b>Kenya Rural Roads Authority</b>	
General Manager Planning	To get a general understanding on how planning of roadworks and road furniture is carried out by the Authority.
General Manager Design and construction	To get an insight on how design and installation of road furniture is carried out by the Authority.
Ag. General Manager Maintenance	To understand how maintenance of roads and road furniture is executed by the entity.
Deputy Director -Survey	To understand the role of the Survey department with regard to road reserve demarcation.
Regional Managers for- Nairobi, Nakuru, Eldoret, Kakamega, Kisumu, Mombasa, Machakos, Nyeri, Meru and Muranga.	To get a general understanding on the operation of the regional offices on installation and maintenance of road furniture within their jurisdiction.

### Appendix 3: Documents Reviewed

Document	Information needed from the document
KeNHA, KURA and KeRRA Strategic Plan, 2013-2017	To obtain information on the entities' strategic objectives, organisational structure, goals and functions.
Kenya Roads Act, 2017	To obtain information on the mandate of the three entities.
Kenya Roads Board Act, 1999	To obtain information on the mandate and roles of the Kenya Roads Board and Constituency Roads Committee.
Work Plans	To obtain information on maintenance works.
Manual for Traffic Signs, 1975	To obtain information on the standards and specifications of road signs.
Road Design Manual, 1979	To obtain information on the standards and specifications for road furniture.
Road Markings Manual	To obtain information on the standards and specifications on road markings.
Traffic Act 2013, Revised, 2015	To obtain information on the standards for road signs.
Constitution of Kenya, 2010	To assess the requirement of the Constitution with regard to roads and safety of the citizens
Road Contracts	To obtain information on provision and allocation for road furniture installation
Correspondences with service providers and government entities	To obtain information on collaboration regarding encroachment and protection of road reserves.
Annual Road Inventory and Condition Survey (ARICS) reports	To obtain information on the process of planning for road furniture maintenance.




## Appendix 4: Audit Criteria and their Sources

Criteria	Source
Designing safety into roads is one of the main objectives of geometric design. Safety features applicable to a given type of a road should be built into the road during its initial construction.	Road Design Manual, 1979
<p>The Authorities should erect signage in relation to the hazard ahead in an effort to inform road users and improve the general safety of roads.</p> <p>A two-lane paved road should have a centre-line to demarcate between opposing traffic flows and edge lines to show the extent of the width of the road pavement.</p> <p>A safety fence, which shall be a guardrail of the flex-beam type, shall be provided at sections or points of traffic hazard, such as fixed objects along the edge of the shoulder, high fills, steep sides slope at escapements or along water courses.</p>	<p>Manual for Traffic Signs, 1975</p> <p>Road Design Manual, 1979</p>
Maintenance must be done regularly with the aim of preserving the preserve the road asset	Permanent International Association of Road Congresses (PIARC), 1994 KURA's Strategic Plan, 2013-2017
<p>Road signs and lighting supports and other utility poles should be located far enough from the carriageway to make them unlikely to be struck by an out of control vehicle, or they should have break way capability</p> <p>As per its strategic plan KeNHA should enhance its capacity to regulate usage of roads and prevent vandalism of road furniture.</p>	<p>Road Design Manual – Geometric Design for Rural Road Part 1</p> <p>KeNHA's Strategic Plan, 2013-2017</p>
<p>KeNHA has the mandate of controlling road reserves and access to road side development.</p> <p>KeNHA should manage road reserves (utility services), map roads and road reserves, maintain road markers systems, manage road reserve boundaries, manage roads and survey data and undertake public sensitization on protection of road reserves.</p>	<p>Kenya Roads Act, 2017</p> <p>KeNHA's Strategic Plan, 2013-2017</p> <p>KeRRA's Strategic Plan, 2013-2017</p>

## Appendix 5: List of Road Traffic Signs

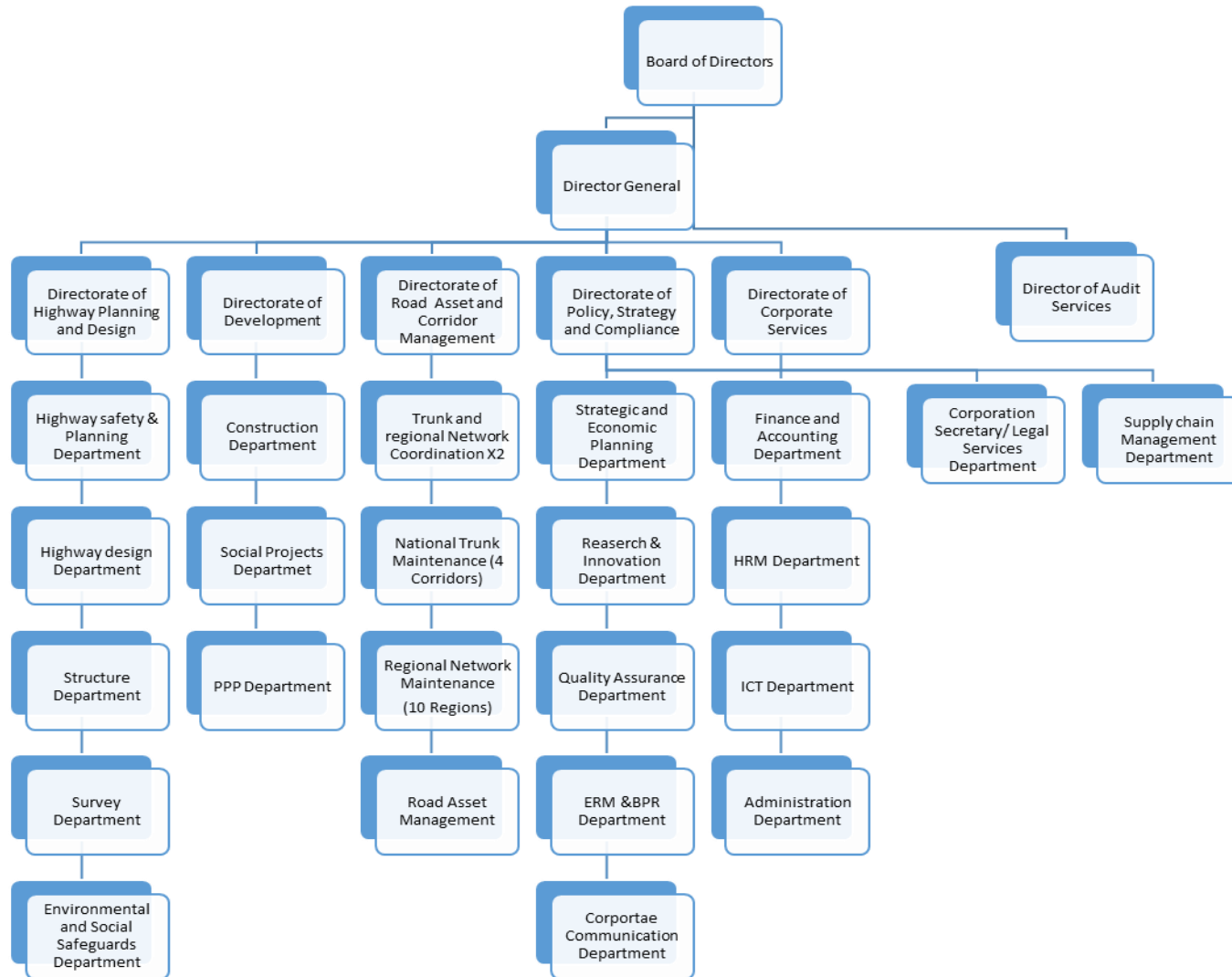
**Traffic Signs** provide essential information to drivers for their safe and efficient manoeuvring on the road and they are categorized as follows;

Sign	Example
<p><b>Informatory Signs:</b> These are directional signs which give road users essential information to enable them find a way to their destination. Other informatory signs give either information of practical importance for example about parking facilities, or information of general interests such as place name. Examples include; place identification, parking signs, pedestrian crossing, among others.</p>	 <p><b>Round about ahead</b></p>
<p><b>Directional Signs:</b> These are any road signs used primarily to give information about the location of either the driver or possible destinations and are considered as a subset of the informatory signs group. Examples include advance direction signs, route confirmatory signs, among others.</p>	
<p><b>Prohibitory Signs:</b> They give instructions to drivers on what they must not do. Examples include; prohibition of turnings, overtaking, speed limit, use of audible warning devises, passing without stopping, priority to oncoming vehicles, end of prohibition, standing and parking signs.</p>	 <p><b>No right turn</b></p>

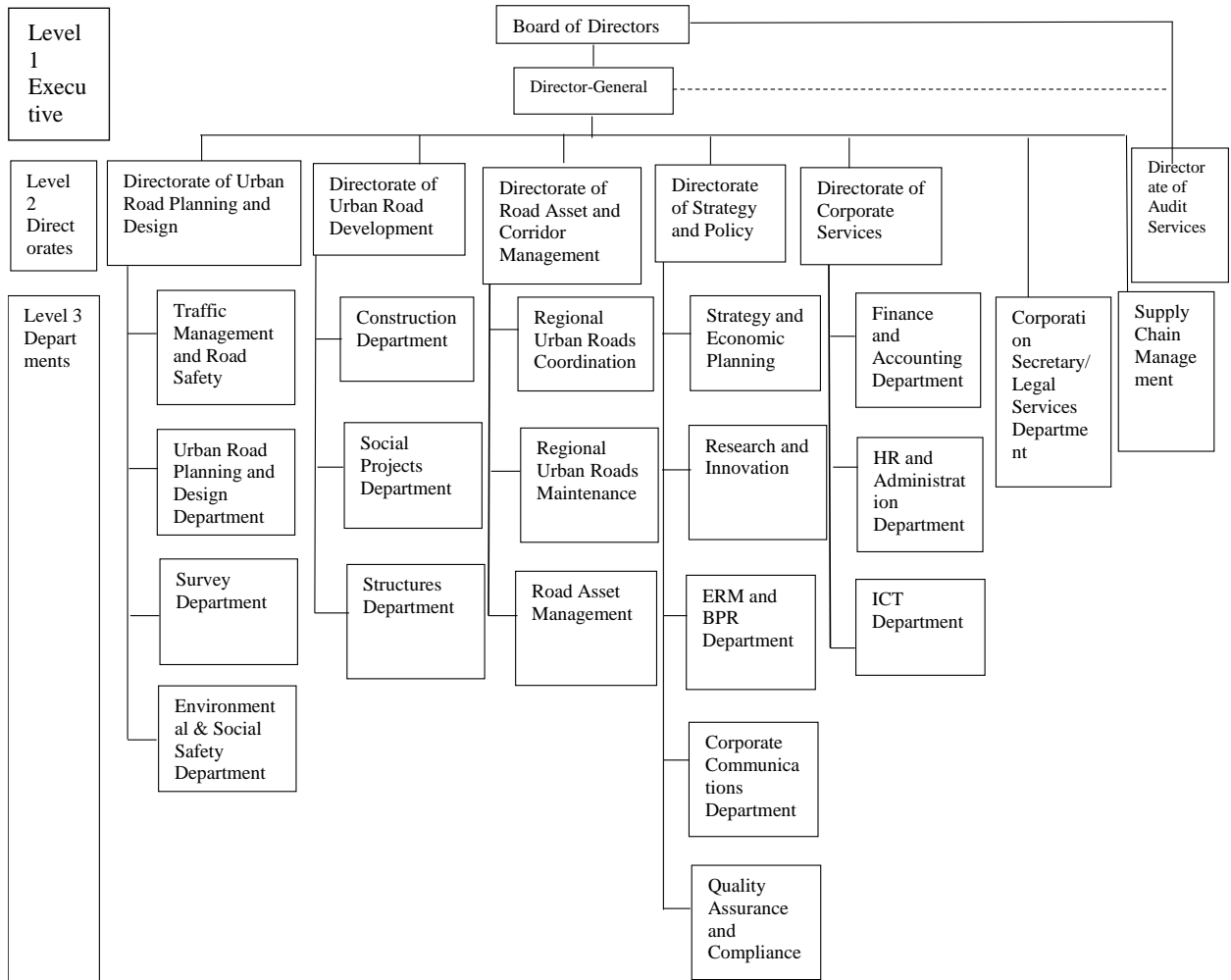
Sign	Example
<p><b>Mandatory Signs:</b> They give instructions to drivers on what they must do, for example, directions to be followed, pass this side, compulsory roundabout, compulsory tracks and minimum speed.</p>	 <p><b>Speed limit of 30 kilometres</b></p>
<p><b>Priority Signs:</b> indicate the order in which vehicles should pass intersection points, examples include: Stop sign-notifies driver to stop before entering an intersection and give way to vehicles on the road they are approaching. Give way sign-used to notify drivers at an intersection where the sign is placed to give way to vehicles on the road they are approaching.</p>	 <p><b>Give way sign</b></p>
<p><b>Warning Signs:</b> Warning signs are used to warn traffic of danger or potential danger ahead, they may require extra caution and a reduction in speed by drivers. Examples include; dangerous bend(s), steep hill, carriageway narrows, river/quarry side, uneven road, severe bump/dip/drift, slippery road, loose surface, falling rocks, pedestrian crossing ahead, children crossing, cyclist, cattle or other animals, road works, light signals, air field, two-way traffic, among others.</p>	 <p><b>Children crossing sign</b></p>

Source: *Design Manual for Roads and Bridges-Road Signs, 2009*

## Appendix 6: KeNHA's Organogram



# Appendix 7: KURA's Organogram



## Appendix 8: Analysis of Proportion of Road Furniture Funding

### Kenya National Highways Authority

Region	Road Nme	Contract Sum in KES	Road furniture Amount in KES	Road furniture as % of contract sum
<b>Nyanza</b>	Bondo -Siaya-Rangala Road	2,014,849,858	19,536,200	0.97
	Kisian-Bondo Road	241,194,305	21,313,000	8.84
	Awasi-Nandi Hills Road	25,523,254	788,000	3.09
	Kisumu-Mau Summit	154,176,328	7,960,000	5.16
<b>Coast</b>	Mavueni-Saba Saba road	492,828,743	4,980,000	1.01
	Mariakani-Kaloleni-Mavueni Road	115,215,376	7,200,000	6.25
	Likoni-Ukunda Road	30,919,800	1,220,000	3.95
<b>S.Rift</b>	Kampi ya Moto -Kamoswor Road	330,177,238	36,120,000	10.94
	Nakuru -Marigat Road	371,610,490	27,124,000	7.30
	Gil-Gil -Mau Summit Road.	117,114,305	20,770,100	17.73
<b>N.Rift</b>	Eldoret-Kapsabet Road	465,422,090	6,518,000	1.40
	Eldoret-Iten Road	447,261,055	29,955,000	6.70
	Eldoret-Turbo-Malaba Road	157,108,420	5,740,000	3.65
<b>Western</b>	Ekeru-Ebuyango Road	70,671,289	1,200,000	1.70
	Kakamega-Ekeru Road	197,321,713	23,017,000	11.66
<b>L.Eastern</b>	Machakos-Katamani-Wotee Road	263,313,924	9,916,940	3.77
	Tala-Kamulu Road	168,705,045	15,148,520	8.98
<b>Nairobi</b>	Kiambu -Limuru Road	263,382,582	15,375,000	5.84
	Soutehrn -Bypass Road	135,048,841	10,793,000	7.99
	Muthaiga- Kiambu Road	263,382,582	15,375,000	5.84
	<b>TOTAL</b>	<b>6,325,227,237</b>	<b>280,049,760</b>	Average 4.43
<b>Kenya Urban Roads Authority</b>				
<b>Nyanza</b>	Nyerere road (0.95)	13,778,770	1,150,000	8.35
	Rabuor- Chiga	26,690,904	770,000	2.88
<b>Coast</b>	Shimanzi (3)	33,016,613	1,660,000	5.03
	New Nyali (7.4)	13,692,357	843,100	6.16
<b>S.Rift</b>	General Mathenge (0.5)	15,994,200	900,000	5.63
<b>N.Rift</b>	Eldoret-Herman Gremer school (6.8)	23,502,064	522,000	2.22
	Eldoret - Sos children's home (13)	8,205,840	179,630	2.19
	Kings highway - ECD	19,417,500	2,414,000	12.43
	D296 Kamukunji road (2.7)	29,845,060	1,820,000	6.10
	Eldoret Achievers ECD- Eldoret	684,976,833	50,465,000	7.37

Region	Road Nme	Contract Sum in KES	Road furniture Amount in KES	Road furniture as % of contract sum
<b>Kakamega</b>	Kasambai - Sabatia (8.7)	29,773,140	4,462,500	14.99
	Mbale- Kisiambai	19,110,408	600,100	3.14
	State lodge road (2.2)	31,042,528	1,008,000	3.25
<b>L. Eastern</b>	Kitangi - Githome (5.2)	55,513,000	5,140,000	9.26
	Devki -pepe -Vanillas (3.8)	13,662,190	701,000	5.13
	Mzee Paurana (4.5)	10,698,355	552,000	5.16
<b>Nairobi</b>	Northern Bypass/Eastern Bypass (70)	106,394,040	31,910,000	29.99
	Kamiti - Roysambu (20)	32,509,000	3,686,000	11.34
	Outering (C59)	11,231,068,688	718,356,214	6.40
<b>Total</b>		<b>12,398,891,490</b>	<b>827,139,544</b>	<b>Average 6.67</b>
<b>Kenya Rural Roads Authority</b>				
<b>Kisumu</b>	Maseno-Kombewa-Kalandi+B2:B11ni(D245)	1,468,712,470	41,181,700	2.80
<b>Mombasa</b>	Nakumatt-Bamburi Zaitunni Junction(E949)	2,239,648	195,700	8.74
	kadzandani-mwatamba(E930)	3,501,877	869,400	24.83
<b>Nakuru</b>	Elementaita-Mau Narok(D320)	1,076,760,247	22,092,000	2.05
<b>Eldoret</b>	JuaKali-Sugoi(E306)	1,452,746,596	46,296,000	3.19
<b>Kakamega</b>	Musoli-Shamusinjiri (E389)	16,686,073	180,000	1.08
<b>Machakos</b>	Massi-Tawa(D517)	4,799,500	717,500	14.95
<b>Nairobi</b>	Mukarara(UUF689)	24,647,680	1,440,000	5.84
	Kwarara(UUF80)	4,988,348	160,800	3.22
	Dog-Unit	19,711,300	2,200,000	11.16
	Karadini	25,616,512	1,520,000	5.93
<b>Total</b>		<b>4,100,410,251</b>	<b>116,853,100</b>	<b>Average 2.85</b>

Source- OAG Analysis of sampled road contracts

**Appendix 9: Analysis of Roads with Missing Road Signs, Guard Rails, Bridge Rails, Bus Bay and Carriageway Markings-KeNHA**

	Road Name	No. of Missing Road Signs (Bumps, pedestrian crossing, bends)	No. of Bus Bays Without Markings	Carriageway Without Road Markings	No. of Missing Guard Rails	No of Missing Bridge Rails
Nyanza	Bondo -Siaya-Rangala Road	31	31	1	1	1
	Kisian-Bondo Road	19	14	-	1	-
	Awasi-Nandi Hills Road	4	5	-	-	-
	Kisumu-Mau Summit	6	21	-	-	1
Coast	Mavueni-Saba Saba Road	25	5	-	-	-
	Mombasa Southern Bypass Road	-	-	-	-	-
	Mariakani-Kaloleni-Mavueni Road	9	7	-	-	-
	Likoni-Ukunda Road	14	12	-	-	-
South Rift	Kampi ya Moto - Kamoswor Road	1	-	-	-	1
	Nakuru -Marigat Road	4	-	1	-	-
	Lanet-Dundori Road	2	-	-	-	1
	Gilgil -Mau Summit Road.	21	8	-	-	-
North Rift	Eldoret-Kapsabet Road	7	4	-	-	1
	Eldoret-Iten Road	3	2	-	-	1
	Eldoret-Turbo-Malaba Road	11	-	-	-	-
Western	Ekeru-Ebuyango Road	22	-	-	-	-
	Kakamega-Ekeru Road	7	-	-	-	1
Upper Eastern	Machakos-Katamani-Wote Road	4	4	-	-	-
	Tala-Kamulu Road	19	-	-	-	-
Nairobi	Kiambu -Limuru Road	22	-	1	1	-
	Southern -Bypass Road	-	-	-	-	-
	Muthaiga- Kiambu Road	8	1	-	1	-

Source: OAG analysis of data collected through physical inspection

**Appendix 10: Analysis of Roads with Vandalized Road Signs, Guard Rails, Bridge Rails, Bus Bay and Carriageway Markings-KeNHA**

<b>Region</b>	<b>Road Name</b>	<b>Vandalised Road Signs</b>	<b>Damaged/ Vandalised Guard Rails</b>	<b>Vandalised Bridge Rails</b>
Nyanza	Kisian-Bondo Road	2	0	2
	Bondo -Siaya-Rangala Road	0	1	1
	Awasi-Nandi Hills Road	6	4	3
	Kisumu-Mau Summit Road	2	2	0
Mombasa	Mavueni-Saba Saba Road	2	1	0
	Mombasa Southern Bypass Road	0	1	0
	Mariakani-Kaloleni-Mavueni Road	9	2	0
	Likoni-Ukunda Road	0	1	0
Nakuru	Kampi ya Moto -Kamwosor Road	1	0	0
	Nakuru -Marigat Road	4	-	-
	Lanet-Dundori Road	4	1	1
	Gilgil -Mau Summit Road.	0	17	1
Eldoret	Eldoret-Kapsabet Road	1	2	2
	Eldoret-Iten Road	1	3	0
	Eldoret-Turbo-Malaba Road	5	1	0
Kakamega	Ekeru-Ebuyango Road	5	0	2
	Kakamega-Ekeru Road	4	3	2
Machakos	Machakos-Katumani-Wote Road	2	1	-
	Tala-Kamulu Road	1	0	0
Nairobi	Kiambu -Limuru Road	1	0	0
	Southern -Bypass Road	0	0	0
	Muthaiga- Kiambu	0	0	0
<b>Total</b>		<b>50</b>	<b>40</b>	<b>14</b>

*Source: OAG analysis of data collected through physical inspection*

## Appendix 11: Roads with Missing Road Signs, Guard Rails, Bridge Rails, Bus Bay and Carriageway Markings-KURA

<b>Physical Verification of the Kenya Urban Road Authority Road Network</b>					
	<b>Road Name</b>	<b>No. of missing road signs (Bumps, pedestrian crossing &amp; bends)</b>	<b>No. of bus bays without markings</b>	<b>Carriageway markings (P for present and A for Absent)</b>	<b>No. of missing guard rails</b>
Nyanza	Awuor- Otiende Road	4	-	P	-
	Nyerere Road	1	-	A	-
	Rabuor- Chiga Road	9	-	A	-
Coast	Shimanzi Road	8	-	p	-
	Likoni-Mombasa Hosplink Road	-	-	A	-
	New Nyali Road	-	-	P	-
South Rift	Bangladesh-Baringo Road	-	2	A	-
	General Mathenge Road	7	1	A	-
	Eveready Road	7	1	P	-
North Rift	Eldoret-Herman Gremer School Road	15	-	P	-
	Eldoret - SoS Children's Home Road	9	-	P	-
	Kings Highway – ECD Road	10	1	A	-
	D296 Kamukunji Road	-	-	-	-
	Eldoret - Moi University Road	1	1	P	-
	Eldoret Achievers ECD- Eldoret Road	-	-	P	-
Western	Kasambai – Sabatia Road	10	-	P	-
	Mbale- Kisiambai Road	10	-	p	-
	State Lodge Road	2	-	p	-
Upper Eastern	Kitangi – Githome Road	8	-	p	1
	Devki -Pepe -Vanillas Road	10	-	p	-
	Mzee Paurana Road	15	-	A	-
Nairobi	Northern Bypass Road	5	1	P	-
	Kamiti-Roysambu Road	2	2	A	1
	Eastern Bypass Road	3	1	P	-
	Outering Road	11	1	P	-

**Source: OAG analysis of data collected through physical inspection**

## Appendix 12: Status of Road Demarcation and Encroachment-KURA

<b>Region</b>	<b>Name of Roads</b>	<b>Boundary Reserve Post (A-Absent, P-Present)</b>	<b>Encroached</b>
Nyanza	Awuor- Otiende Road	A	Yes
	Nyerere Road	A	Yes
	Rabuor- Chiga Road	A	Yes
Coast	Shimanzi Road	A	Yes
	Likoni-Mombasa Hosplink Road	A	Yes
	New Nyali Road	A	No
South Rift	Bangladesh-Baringo Road	A	Yes
	General Mathenge Road	A	Yes
	Eveready Road	A	Yes
North Rift	Eldoret-Herman Gremer School Road	A	Yes
	Eldoret - SoS Children's Home Road	A	Yes
	Kings Highway – ECD Road	A	Yes
	D296 Kamukunji Road	A	No
	Eldoret - Moi University Road	A	No
	Eldoret Achievers ECD- Eldoret	A	Yes
Western	Kasambai – Sabatia Road	A	No
	Mbale- Kisiambai Road	A	No
	State Lodge Road	A	No
Lower Eastern	Kitangi – Githome Road	A	No
	Devki -Pepe -Vanillas Road	A	Yes
	Mzee Paurana Road	A	Yes
Nairobi	Northern Bypass Road	A	No
	Kamiti – Roysambu Road	A	Yes
	Eastern Bypass Road	P	Yes
	Outering Road	A	Yes

*Source: OAG analysis of data collected through physical inspection*

## Appendix 13: Roads with Missing Road Signs, Guard Rails, Bridge Rails, Bus Bay and Carriageway Markings-KeRRA

Region	Road Name	No. of missing road signs (Bumps, pedestrian crossing, bends)	No. of bus bays without markings	Carriageway markings (P-means Presence of carriageway markings; A-means absence of carriageway marking)	No. of missing guardrails	No of missing bridge rails
Kisumu	Maseno-Kombewa Road	-	1	A	1	-
Mombasa	Nakumatt-Bamburi Road	7	-	A	-	-
	Kadzandani-Mwatamba Road	6	-	A	-	-
	Mkupe-Jeti Road	6		P	-	-
Nakuru	Marula-Kongoni Road	1	1	P	-	-
	Elementaita Road	5	1	A	-	-
	End of Tarma-Kirima Road	4	1	P	1	-
Eldoret	Eldoret-Kaptagat Road	6	-	P	1	1
	JuaKali-Sugoi Road	11	-	P	-	-
Kakamega	Musoli-Shamusingiri Road	6	-	N/A	-	1
Machakos	Massi-Tawa Road	15	1	A	-	-
Nairobi	Mukarara Road	12	1	P	-	-
	Kabiria Road	21	1	P	-	-
	Kwarara Road	5	-	P	-	-
	Dog-Unit Road	5	1	A	-	-
	Karadini Road	7	-	N/A	-	-

Source: OAG analysis of data collected through physical inspection

## Appendix 14: Status of Road Demarcation and Encroachment-KeRRA

Region	Road Name	P-for presence while A-for absence of boundary marker post	Encroached
<b>Kisumu</b>	Maseno-Kombewa Road	A	No
<b>Mombasa</b>	Nakumatt-Bamburi Road	A	No
	Kadzandani-Mwatamba Road	A	No
	Mkupe-Jeti Road	A	Yes
<b>Nakuru</b>	Marula-Kongoni Road	P	No
	Elementaita Road	A	No
	End of Tarma-Kirima Road	A	No
<b>Eldoret</b>	Eldoret-Kaptagat Road	P	Yes
	JuaKali-Sugoi Road	P	Yes
<b>Kakamega</b>	Musoli-Shamusinjiri Road	P	Yes
<b>Machakos</b>	Massi-Tawa Road	A	No
<b>Nairobi</b>	Mukarara Road	A	Yes
	Kabiria Road	A	Yes
	Kwarara Road	A	Yes
	Dog-Unit Road	A	Yes
	Karadini Road	A	Yes

*Source: OAG analysis of data collected through physical inspection*

**Appendix 15: Kenya National Highway Authority`s Comments on Audit Findings and Recommendations**

Audit Finding	Audit Recommendation	Auditee's Comments	Auditors' Comments
<p><b>A. Inadequate Planning for Road Furniture (Paragraph 4.5)</b></p> <p><b>i) Non-Inclusion of Road Furniture in Annual Roads Condition Survey</b></p> <p>A review of sampled Annual Road Inventory and Condition Survey templates for the financial year 2015/16 to 2018/19 revealed that road furniture condition is not captured during the survey. Out of 22 roads whose ARICS templates were reviewed, only 6 had the road furniture condition captured. These roads are Kisian-Bondo Road, Awasi-Nandi Hills Road, Nakuru-Marigat Road, Lanet-Dundori Road, Kaimbu-Limuru Road and Muthaiga-Kiambu Road. Failure to capture road furniture during ARICS risks the component being left out during planning and implementation.</p> <p><b>ii) Lack of Inventory for Road Furniture (Paragraph 4.7)</b></p> <p>Interviews conducted with the Regional Directors revealed that KeNHA does not keep an inventory of roads and road</p>	<p>KeNHA in consultation with the Kenya Roads Board (KRB) should consider revising the ARICS template to ensure that the road furniture condition is adequately captured during the survey.</p> <p>KeNHA should consider keeping an inventory of all assets including road furniture for</p>	<p>We shall also improve the data collection sheet (ARICS) to focus on road furniture as well</p> <p>We shall endeavour to have a data base of all road assets including road furniture.</p>	<p>The intention to have a database for road asset as well as improve the ARICs template is commendable. The office shall conduct a follow up audit to verify this and how it contributes to effective planning of road furniture installation and maintenance.</p> <p>The finding remains as reported.</p>

Audit Finding	Audit Recommendation	Auditee's Comments	Auditors' Comments
<p>furniture within its jurisdiction. Inventory of road furniture is important in providing information for purposes of planning for maintenance. The Authority's failure to keep an inventory of road furniture is a risk to proper planning for maintenance as well as protection of road furniture.</p>	<p>ease of tracking the status of road furniture.</p>		
<p><b>B.Non-Installation of Road Furniture (paragraph 4.9-4.11)</b></p> <p>During physical verification of road furniture on the sampled roads in February 2019, it was noted that various warning signs for bumps, bends and pedestrian crossing were missing at crucial locations. Analysis of data collected during inspection of the sampled roads shows that out of the 459 bumps recorded, 205 (45%) did not have signs to warn motorists.</p> <p>In addition, some sections and points with steep side slopes and high fills along the road did not have guardrails installed as safety measures. For example, along the Muthaiga-Kiambu Road (B32), Eldoret-Iten Road (B16), Bondo-Siaya-Rang'ala Road (B9) and Kiambu-Limuru Road. There were areas where guard rails had not been installed yet were required. It</p>	<p>i. The Ministry of Transport, Infrastructure, Housing, Urban Development and Public Works, in collaboration with the Ministry of Trade and the Attorney General's Office, should finalise the process of implementation of the Scrap Metal Act, 2016 which will help in curbing vandalism.</p> <p>ii. The Ministry of Transport, Infrastructure, Housing, Urban Development and Public Works, should also</p>	<p>We shall pursue these recommendations. We wish to note that annually, we install a considerable number of road furniture as evidenced in our reports attached herein.</p> <p>Additionally, we have taken a Board Directive where road furniture scope shall not be scaled down to cater for other works.</p>	<p>The auditees action to issue a Board directive to ensure that road safety is prioritized in all contracts is commendable. The office will in future carry out a follow up audit to assess how the auditee's action will have improved road furniture installation.</p> <p>The finding remains as reported.</p>

Audit Finding	Audit Recommendation	Auditee's Comments	Auditors' Comments
<p>was also noted that there were roads without markings on carriageways, junctions and bus bays.</p>	<p>consider developing a policy for KeNHA and the other road Authorities to adopt use of alternative material that is not susceptible to vandalism.</p>		
<p><b>C.Inadequate Maintenance of Road Furniture (Paragraph 4.13)</b></p> <p>Field inspections revealed instances where road signs had rust or were defaced, faded road markings, damaged guard rails and road signs which had not been replaced despite the fact that some roads had been under Performance-Based Maintenance Contracts. Examples of the roads are the Nyeri-Othaya-Kangema-Gacharage Road (B23), Katumani-Wote Road (B60), Awasi-Nandi Hills Road, among others.</p>	<p>The Ministry of Transport, Infrastructure, Housing, Urban Development and Public Works should also consider developing a policy for KeNHA and the other road Authorities to adopt use of alternative material that is not susceptible to vandalism.</p>	<p>Under the Performance Based Contract, we are currently enforcing immediate replacements of knocked down road furniture as a critical service level to be attained.</p>	<p>The finding remains as reported. The Office shall carry out a follow up audit to assess how use of Performance-Based Contracts is contributing to adequate maintenance of road furniture.</p>
<p><b>D.Vandalism of Road Furniture (Paragraph 4.18)</b></p> <p>During field visits in February 2019, it was observed that there were cases of vandalism of road furniture on the roads inspected. In total there were 50 vandalized road signs, 40</p>	<p>i. The Ministry of Transport, Infrastructure, Housing, Urban Development and Public Works, in</p>	<p>i. Noted We shall pursue the recommendation s. Vandalism remains key challenge</p>	<p>The finding remains as reported</p>

Audit Finding	Audit Recommendation	Auditee's Comments	Auditors' Comments
<p>vandalized guard rails and 14 vandalized bridge rails, on the 22 roads inspected. The Gilgil-Mau Summit Road (A8), Machakos-Kitui Road (B62) and Mariakani-Kaloleni-Mavueni Road (B91) are among the roads that had the greatest number of vandalized road furniture.</p>	<p>collaboration with the Ministry of Trade and the Attorney General's Office, should finalise the process of implementation of the Scrap Metal Act, 2016, which will help in curbing vandalism.</p> <p>ii. The Ministry of Transport, Infrastructure, Housing, Urban Development and Public Works, should also consider developing a policy for KeNHA and the other road Authorities to adopt use of alternative material that is not susceptible to vandalism.</p>		
<p><b>E. Inadequate Demarcation and Protection of Road Reserves (Paragraph 4.23)</b></p> <p>During the audit inspection in February 2019 it was observed that 10 out of 22 roads inspected were not demarcated. Some of the roads like Eldoret-Kapsabet-(B8),</p>	<p>Structured engagement with stakeholders such as county governments and</p>	<p>In our sensitisation meetings, we invite the county commissioners, county</p>	<p>While the actions taken by KeNHA are commendable and will deter encroachment,</p>

<b>Audit Finding</b>	<b>Audit Recommendation</b>	<b>Auditee's Comments</b>	<b>Auditors' Comments</b>
<p>Ekeru- Ebuyango-(C781), Kiambu-Limuru-(B32), Lanet Ndundori and Mavueni-Sabasaba-(A7) had been encroached with building structures, businesses and farming activities.</p>	<p>service providers.</p>	<p>governments and other key stakeholders. Additionally, we have intentionally included in the contracts for road reserve marker posts to clearly demarcate the reserves. Progressively, this we believe shall be well covered.</p>	<p>our observation is factual and therefore remains as reported.</p>

**Appendix 16: Kenya Urban Roads Authority`s Comments on Audit Findings and Recommendations**

Audit Finding	Response by KURA's Management	Auditors' Comments
<p><b>A. Inadequate Planning for Road Furniture</b></p> <p><b>i) Non-inclusion of road furniture in the Bill of Quantities (Paragraph 4.2)</b></p> <p>A review of sampled KURA road contracts revealed that some contracts either had minimal or no provision for road furniture. Four out of twenty-two KURA contracts did not have provision for road furniture while eight contracts only had provision for kerbs.</p> <p><b>ii) Non-inclusion of road furniture in the Annual Road Inventories and Condition Survey (ARICS) (Paragraph 4.5)</b></p> <p>Review of sampled ARICS templates for the financial year 2015/2016 and 2018/2019 revealed that the road furniture condition is not included in most of</p>	<p>Road furniture are usually installed during the construction of roads. Road development projects must therefore include components of road furniture installation. The sampled contracts were all maintenance contracts.</p> <p>KURA will review ARICS template in the Roads Maintenance Manual to allow for capturing of the inventory of road furniture in all the roads.</p>	<p>It is our understanding that during maintenance, the necessary road furniture is planned for and installed even if it was not considered during construction of the road. Most of the roads whose contracts were sampled lacked critical road signs like bumps sign.</p> <p>The intention to review the ARICS template is commendable. The office shall conduct a follow up audit to verify this and how it contributes to effective planning of road furniture installation and maintenance. The finding remains as reported.</p>

Audit Finding	Response by KURA's Management	Auditors' Comments
<p>the ARICS template. It was also noted that the ARICS template used by KURA did not have a road furniture column. Failure to capture road furniture during ARICS presents a risk of the component being left out during planning and implementation.</p> <p><b>iii) Lack of an inventory of road furniture (Paragraph 4.7)</b></p> <p>Interviews conducted with staff from KURA revealed that the Authority does not keep an inventory of road furniture for the roads within its jurisdiction. Inventory of road furniture is important in providing information for purposes of planning for maintenance of road furniture.</p>	<p>KURA has engaged a consultant to develop a Roads Management System (RMS). The system shall have the capability to capture and store inventory of road furniture.</p>	<p>The action taken to develop a Roads Management System is commendable. A follow up audit shall be conducted to check whether the information captured by RMS contributes to efficiency and effectiveness in planning for maintenance.</p> <p>The finding remains as reported.</p>

Audit Finding	Response by KURA's Management	Auditors' Comments
<p data-bbox="212 224 620 296"><b>B. Non-Installation of Road Furniture</b></p> <p data-bbox="212 348 620 552">Physical inspection established that there were roads without markings on carriageways, junctions and bus bays. <b>(Paragraph 4.9)</b></p> <p data-bbox="212 852 620 1476">During physical verification of road furniture on the sampled roads between January and March 2019, it was noted that various warning signs for bumps, pedestrian crossing and bus park were missing at crucial locations. Analysis of data collected during inspection of the sampled roads shows that out of the 173 bumps recorded, 126 (72%) did not have signs to warn motorists. <b>(Paragraph 4.9)</b></p> <p data-bbox="212 1528 620 1854">Absence of critical road furniture such as guard rails renders limited or no protection to road users resulting in increased road injuries and fatalities which could be avoided. <b>(Paragraph 4.11)</b></p>	<p data-bbox="643 348 1057 800">Installation of road furniture is usually captured in road development contracts. Road maintenance projects are prioritized based on the available resources and also whether there was critical road furniture during road construction that may require replacement or maintenance.</p> <p data-bbox="643 852 1057 1388">Some of the road furniture that were installed during road construction are missing due to vandalism. KURA has adopted Performance Based Maintenance Contracts (PBMC) to retain contractors for at least two years and the scope of works to include maintenance or replacement of missing road furniture.</p> <p data-bbox="643 1528 1057 1686">Some of the road furniture that were installed during road construction are missing due to vandalism.</p>	<p data-bbox="1079 348 1424 632">While the explanation given by KURA is satisfactory, the findings remains as reported as it is what the auditors observed at the time.</p> <p data-bbox="1079 852 1424 1304">It is commendable that KURA has adopted PBMC. A follow up audit shall be done to assess the effectiveness of PBMC in maintaining or replacing road furniture. The finding remains as reported.</p> <p data-bbox="1079 1528 1424 1713">The paragraph was not a finding but rather pointing out the risk of missing critical road furniture.</p>

Audit Finding	Response by KURA's Management	Auditors' Comments
<p><b>C. Vandalism of Road Furniture</b></p> <p>During field visits in January, February and March 2019, it was observed that there were cases of vandalism of road signs on the roads inspected. Some of the roads that had vandalized road furniture are Eastern and Northern Bypass Road, Eldoret-Herman Greener School Road, Kisambai-Sabatia in Kakamega and Bangladesh-Baringo in Nakuru, among others. <b>(Paragraph 4.13)</b></p>	<p>Due to rampant vandalism of road furniture, KURA has partnered with security agencies to deter the vice.</p>	<p>The finding remains as reported.</p>
<p><b>D. Inadequate Demarcation and Protection of Road Reserves</b></p> <p>KURA has the mandate of controlling road reserve and access to road side development. During the field inspection in February and March 2019, it was observed that all the KURA roads inspected except for the Eastern Bypass were not demarcated. It was also observed that 17 out of the 24 roads inspected were encroached. <b>(Paragraph 4.17-4.18)</b></p>	<p>The Director of Road Asset and Corridor Management has prepared a long-term work plan for identification and protection of road corridors covering all regions.</p>	<p>The action taken is commendable. The Office shall carry out a follow up audit to assess the status. The finding remains as reported.</p>

**Appendix 17: Kenya Rural Roads Authority Response to the Audit Findings and Recommendations**

<b>Audit Finding</b>	<b>Response by KeRRA's Management</b>	<b>Auditors' Comments</b>
<p><b>A. Inadequate Planning for Road Furniture</b></p> <p><b>i) Non-Inclusion of Road Furniture (RF) in Bill of Quantities (BQ) (Paragraph 4.2)</b></p> <p>A review of sampled road contracts revealed that some contracts either had minimal or no provision for road furniture. Out of the eleven contracts reviewed one (1) did not have provision for road furniture while six of them only had provision for kerbs. Failure to include road furniture component in the BQs results into non-installation of the same.</p>	<p>The type and quantity of a particular road furniture item to be included in the BQ depends on the needs of the road section to be improved.</p> <p>Due to budgetary limitations, it is not practically possible to provide for all the road furniture needs of our roads.</p> <p>Prioritizing the improvement of carriageway over provision of road furniture arises due to the sequence of various road construction activities. Installation of permanent road furniture can only be done after the carriageway and drainage works have been completed.</p>	<p>The finding remains as reported.</p>

Audit Finding	Response by KeRRA's Management	Auditors' Comments
<p><b>ii) Non-Inclusion of Road Furniture in ARICS (paragraph 4.5)</b></p> <p>Review of sampled ARICS templates between financial year 2015/16 and 2018/19 revealed that road furniture condition was not included on most of the ARICS template. It was also noted that the ARICS template used by KeRRA did not have road furniture column. Failure to capture road furniture during ARICS, risks the component being left out during planning and implementation.</p> <p><b>iii) Lack of Inventory for Road Furniture (Paragraph 4.7)</b></p> <p>Interviews conducted with staff from KeRRA revealed that the authority does not keep an inventory of road furniture for the roads within its purview. Inventory of road furniture is important in providing information for purposes of planning for maintenance. The Authority's failure to keep an inventory of road furniture is a risk to proper planning for maintenance as well as protection of road furniture</p>	<p>This omission has been noted.</p> <p>The management will follow up to ensure that the ARICS template forms captures all information related to road furniture.</p> <p>We have noted that some of our regions are not regularly collecting and updating the road furniture inventory. The Management will follow up and ensure the omission is remedied.</p>	<p>The Office will carry out a follow up audit in future to assess the action taken.</p> <p>The finding remains as reported. The Office will carry out a follow up audit in future to assess the action taken.</p>
<p><b>B. Non-Installation of Road Furniture (Paragraph 4.10)</b></p> <p>During physical verification of road furniture on the sampled roads in February 2019, it was noted that various warning signs for bumps, pedestrian crossing and bus parks were missing at crucial locations. Analysis of data collected during inspection of the sampled roads, shows that out of the</p>	<p>We concur that some of the Authority's road network lack necessary RF. This is mainly attributed to inadequate budgetary provisions. However, the Authority is in the process of seeking</p>	<p>The finding remains as reported. The office will conduct a follow up audit to assess the</p>

<b>Audit Finding</b>	<b>Response by KeRRA's Management</b>	<b>Auditors' Comments</b>
<p>154 bumps recorded, 99 (64%) did not have signs to warn motorists. It was also noted that there were roads without markings on carriageways, junctions and bus bays.</p>	<p>funds for installation of road furniture on roads identified through the ongoing Road Safety Audits.</p>	<p>action taken.</p>
<p><b>C. Vandalism of Road Furniture (Paragraph 4.13-4.15).</b></p> <p>During field visits in February 2019, it was observed that there were cases of vandalism of road signs on the roads inspected. Some of the roads that had vandalised road furniture are the Jua Kali-Sugoi Road, Marula-Kongoni Road, Kabiria Road and SGR-Mkupe Jetty Road, among others.</p> <p>The sustained vandalism of road furniture can be attributed to lack of monitoring of road furniture and lack of mechanism for reporting vandalism which would encourage the road users to promptly report vandalism when noticed. It was also noted that the Authorities are still using materials susceptible to vandalism because of the relatively high market value of scrap metal.</p> <p>Document review and interviews revealed that KeRRA does not carry out adequate sensitization campaigns to educate the public on the importance of protecting road furniture. Sensitization campaigns are planned and carried out by the head office who only managed to cover one or two regions in a year.</p>	<p>We agree that there are several cases of vandalism of road furniture on some of the Authority's road network. However, we wish to clarify that our Deputy Directors in the Counties are in constant liaison with the security agencies to apprehend the culprits.</p> <p>Further, the Authority has a monitoring and reporting mechanism for vandalism cases. Our officers at the constituency level are charged with the responsibility of monitoring and reporting on the condition of the roads including the road furniture within their areas of jurisdiction. These offices work with the Constituency Roads Committees.</p> <p>The Authority carries out</p>	<p>The sensitisation campaigns are commendable despite being undertaken in few regions due to budgetary constraints.</p> <p>The auditors are of the view that from explanation given, there were no structured measures taken for monitoring and reporting of vandalism.</p> <p>The finding</p>

Audit Finding	Response by KeRRA's Management	Auditors' Comments
	sensitization campaigns on the importance of road furniture from time to time. However, due to budgetary limitations, the campaigns mainly target those regions which are worst affected by vandalism.	therefore remains as reported.
<p><b>D. Inadequate Demarcation and Protection of Road Reserves (Paragraph 4.19)</b></p> <p>During the field inspection in February and March 2019 it was observed that most of the roads were not demarcated. Twelve out of sixteen roads inspected were not demarcated and encroachment was observed along nine of these roads. Encroachment results to blockage of drainages and obstruction to visibility of road signs, leading to serious compromise on road safety. Interviews with Regional Managers revealed that collaboration with stakeholders on roadside development activities was not adequate.</p>	<p>This is a correct observation. based on the total road network under the Authority. The finding remains as reported.</p> <p>The Office will carry out a follow up audit in future to assess the action taken only about 50% which has been mapped and demarcated. This is largely due to budgetary constraints. However, efforts are being made to cover more roads. An item for road reserve demarcation is now included in the Bill of Quantities (BQ) for roads which are currently being upgraded under the Roads 10,000 Programme.</p>	<p>The finding remains as reported.</p>



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