

**DEVELOPMENT OF AN URBAN CONSERVATION
PLANNING FRAMEWORK BASED ON HERITAGE
VALUES: A SURVEY OF HISTORIC TOWNSCAPES
ALONG THE KENYA RAILWAY**

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**Development of an Urban Conservation Planning Framework Based
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Kenya Railway**

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the Degree of Doctor of Philosophy in Urban Planning and
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Agriculture and Technology**

2026

DECLARATION

This thesis is my original work and has not been presented for a degree in any other University

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DEDICATION

For Nelly, Jasmine, Leon and my parents.

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ACRONYMS AND ABBREVIATIONS

ADC	Agricultural Development Corporation
AfDB	African Development Bank
AFP	Agence France-Presse
CGA	County Governments Act
CUS	Centre for Urban Studies
EABL	East African Breweries PLC
EF	Ecological Footprint
GCI	Getty Conservation Institute
GHF	Global Heritage Fund
HF	Heritage Footprint
HTK	Heritage Trust Kenya
HUL	Historic Urban Landscapes
IBEA	Imperial British East Africa Company
ICCROM	International Centre for the Study of the Preservation and Restoration of Cultural Property
ICH	Intangible Cultural Heritage
ICOM	International Council of Museums
ICOMOS	International Council on Monuments and Sites

INTBAU	International Network for Traditional Building, Architecture & Urbanism
JKUAT	Jomo Kenyatta University of Agriculture and Technology
KCC	Kenya Cooperative Creameries
KFA	Kenya Farmers Association
KML	Kenya Maltings Limited
KMO	Kaiser-Meyer-Olkin Test for Sampling Adequacy
KPI	Key Performance Indicators
KRC	Kenya Railways Corporation
LAPSSET	Lamu Port-South Sudan-Ethiopia-Transport
MAP20	ICOMOS Action Plan on the 20th Century Heritage
MSA	Kaiser's Measurement of Sampling Accuracy
NACOSTI	National Commission for Science, Technology & Innovation
NBC	National Broadcasting Company
NBK	National Bank of Kenya
NMHA	National Museums and Heritage Act
NMK	National Museums of Kenya
NUA	New Urban Agenda
NUDP	National Urban Development Policy
PCA	Principal Component Analysis

PLUPA	Physical and Land Use Planning Act
RVR	Rift Valley Railways
SDGs	Sustainable Development Goals
SGR	Standard Gauge Railway
SPSS	Statistical Package for the Social Sciences
TICCIH	The International Committee for the Conservation of the Industrial Heritage
WHC	UNESCO World Heritage Committee

ABSTRACT

Kenya's, the origins of urban development and its colonial railroad are inseparable. Despite this historic significance, townscape heritage around railway stations is at risk of loss, it remains unidentified and without a common conservation approach. The study examined the characteristics of selected heritage townscapes along the Kenya Railway, identified heritage values, determined conservation needs and developed a planning framework for the historic townscapes. Literature review showed that the survey of townscapes for heritage and their values is central to understanding their significance. A mixed-methods approach and a cross-sectional research design were adopted. Three towns, Limuru, Naivasha and Molo, were selected as purposive samples. Precincts around railway stations were delimited for each town, and data collected through observation guides, maps and interview schedules. 360 respondents were interviewed in representative population ratios of the towns: 70 in Limuru, 160 in Naivasha, and 130 in Molo. Heritage value attitudinal statements on a Likert scale were used. Exploratory Factor Analysis (EFA) was used to determine latent values held for townscape heritage, while descriptive statistics were used to analyse the status of heritage and conservation needs. Findings revealed a heritage footprint of 10.3%, 8.4% and 19.4% for Limuru, Naivasha and Molo respectively. For the EFA, the Chi-Square test was significant ($p < .05$), and the null hypothesis that all variables are uncorrelated in the population and the correlation matrix is an identity matrix was rejected. Five main heritage values explaining 43.28% of the total variance were extracted from the factor solution. Their interpretation was: cultural continuity, functional-economic, identity, placeness and historicity. Additionally, three values; rarity, evidence and memory were identified to complete the spectrum of meanings. Five townscape conservation needs were determined: condition of walkways, capacity to provide employment, level of tourism, level of railway functions, and state of heritage and knowledge of heritage. A planning framework for the historic townscapes was formulated for the identification of heritage, and application of value-based conservation. It was concluded that there was a heritage footprint with significance to residents. In addition, the identified heritage values were interdependent and thematically communicated communities' aspirations, and should guide the values-based approach to successful planning for historic townscapes. Recommendations were; integrating heritage surveys and conservation planning, responding to heritage values in conservation plans, and initiating urban development programmes that improve social-cultural dimensions, physical environment, accessibility, and economics. Suggested areas for further study were to establish lost heritage footprint over time, and to carry out a Confirmatory Factor Analysis (CFA) to test the factor structure obtained through EFA.

Keywords: conservation; heritage footprint; heritage values; historic planning; townscape heritage.

CHAPTER ONE

INTRODUCTION

1.1 Background

Historic townscapes along the Kenya railway offer evidence of the origins of urbanism in Kenya's hinterland. The historic railway line, famously referred to as the 'Lunatic Express', was the first major infrastructure development project in Kenya over 120 years ago. The Imperial British East Africa (IBEA) Company was in charge of administering the region during this time. Its influence can still be seen in the current urban fabric, as it was instrumental in the founding of many communities along its course. The endeavour to conserve townscape heritage along the Kenya railway is grounded in the realm of historic planning and addresses the sustainability of heritage conservation in urban settings. The basis of the inquiry is the towns which share an idiosyncratic colonial legacy of imperial debris. The argument is that, given their history, the towns possess heritage and values that can be methodologically determined for conservation.

Audefroy (2022), in the International Council on Monuments and Sites (ICOMOS) Heritage at Risk report, discloses that over 65% of the culturally significant buildings on earth are in poor conservation condition. This leads to a constant loss of their cultural, artistic, and economic value according to Otero (2022). That is not to mean that there have been no attempts to address the problem. The United Nations Educational, Scientific and Cultural Organisation (UNESCO) adopted the recommendation on the Historic Urban Landscape (HUL) in 2011, as an approach that goes beyond the idea of a historic centre and views an urban region as the outcome of a historic layering of cultural and ecological qualities and attributes. It is the basis for a comprehensive and integrated method for identifying, evaluating, conserving, and managing historic urban landscapes within a larger framework for sustainable development. HUL emphasises conservation beyond the heritage object to extend historic planning interventions that respond to the conservation needs of the urban context.

Conservation is the process of managing change and preventing deterioration; it dynamically includes all actions that extend the life of our natural and cultural assets. Taha (2012) opines that the goal of conservation is to uphold the meanings in the form of heritage values that the community upholds, not to preserve material for its own sake, with physical intervention or treatment being one of many means. The concept of meanings is intertwined with another one known as likability representing dimensions of how people experience and value their environments. Likability encompasses two types of variables: human evaluative responses and visual features of sceneries. It is defined as the likelihood that an environment will elicit a positive evaluative response among the groups of individuals seeing it (Hamedan, 2019). Heritage values can be identified using psychometric scales, such as semantic differential scale, Likert scale, and Thurstone scale.

Evaluating the meanings in the form of heritage values is a central to conservation efforts since values greatly influence the intervention decisions that are made. This is the idea that gives rise to need for a value-based historic planning framework as a tool for conservation sustainability. Chandan and Kumar (2019) explain that the concepts of sustainability and conservation deal with the same principle, maintaining the existing and protecting the heritage for future generations, and therefore must be part of the same strategy of preserving cultural heritage. The scope of conservation of the built environment, which consists mainly of historic buildings, ranges from town planning to the preservation or consolidation of a crumbling artefact (Feilden, 2007). Hmood (2019), however, voices concern that compared to the world's historic richness, there are comparatively few efforts to conserve historic cities and cultural assets. Therefore, it urges urban conservation to be expanded to focus on a greater amount of town and city heritage.

Ekimci, Ergincan, and İnceoğlu (2019) point out that the railway constructions are a part of the cities' industrial past and include some of the most significant urban public spaces, while in other nations they are seen as a sign of progress. They additionally point out that rapid technical advancement has resulted in the abandonment of numerous former industrial buildings and facilities. Furthermore, the preservation of industrial heritage is generally threatened by town growth, which results in problems

related to demolition, renovation, and use. Llano-Castresana, Azkarate, and Sánchez-Beitia (2013) acknowledge that the progressive modernization of railroad resources has caused many railway lines, whether active or disused to progressively dispense with a series of railway buildings, landmark buildings, and auxiliary elements whose use has become obsolete or no longer fulfils the main function for which they were intended for at the time. Despite the aforementioned issues, they are architectural and civil engineering elements of great value, and above all, they represent a great potential for generating active resources for our society.

According to Eliot (1905), between 1896 and 1901, Kenya's first railway line was constructed, facilitating Britain's conquest of the country's hinterland. This development made it possible for business to be done across great distances, therefore creating the conditions for the growth of towns. Indians who moved to East Africa as imported labourers from Punjab to work on the railway also made a significant contribution; the majority of those who settled were engaged in trade and craftsmanship. (Beri, 2014; Gadgil, 2019). By establishing enterprises along the railway line and close to stations, they played an important role in the development of towns and market centres. Over a century later, there has been a substantial shift, with the cities' urban heritage fabric constantly in danger of disappearing due to a variety of technological, social, environmental, and economic issues. Llano-Castresana et al. (2013) articulate that the city grows and expands, as any living organism progressively colonises the territory. With the growth and expansion of the cities built along the Kenya Railway line, the railway's linear region was in effect colonised by urban areas. Despite being significant to the nation's history, the towns' unique urban fabric is in danger of disappearing.

Despite the known existence of heritage and its apparent value in the historic railway towns, efforts and studies for urban conservation in Kenya have mainly concentrated on the coastal towns such as Lamu and Mombasa old town, the capital city of Nairobi, individual monuments, and cultural sites around the country. There have been studies based on the railway, specifically on industrial heritage by Njuguna, Wahome, & Deisser (2018), and photographic documentation of the railway stations by Chao (2015); however, associated townscape heritage has not been addressed. On the

contrary, there is growing interest from urban heritage scholars and enthusiasts towards the towns along the Kenya railway that have influenced the lives of three to four generations. This interest has been expressed through scenic photography, written articles, and nostalgic visits by people and descendants of those who long lived in these towns. It is therefore a relevant and current area for conservation studies in Kenya to evaluate the heritage footprint, concerning what and how much urban heritage is important for conservation.

1.2 Statement of the Problem

The townscape heritage of a locale is a constant reminder of its history. Cities that lack memory, are away from their past, and do not preserve their heritage and identity cannot build their future, which makes them vulnerable to destruction (Hmood, 2019). The 930 kilometres of the Kenya Railway line from Mombasa to Kisumu is credited with the establishment of many towns along it, a result of the British colonisation over a century ago. The study area between Nairobi and Kisumu had 19 towns out of the 30 railway stations. The heritage of the towns along the railway line is in a state of decay, despite the fact that the roots of Kenya and many of its cities may be directly linked to the railway's founding. In the face of physical change, the townscape heritage surrounding the railway stations is still unknown. Physical growth and development, reorganisation of the economic system, and the creation of new town districts distant from the original town nuclei seem as the main causes of the change. However, the procedure for determining heritage values is not described in Kenya's heritage conservation protocol. The practical process of identifying urban heritage associated with the railway and its significance for historic planning has not been established.

The railway historic precinct zones of towns have continued to decline in character through the wearing out of infrastructure such as roads and walkways; disorder of activities such as parking; inappropriate waste disposal, and the disintegration of buildings. The built environment associated with the establishment of the railway stations in these towns is neglected and is in a derelict state despite their historic significance. The urban heritage is deteriorated and, as a consequence, is isolated and under threat of loss, as in the example of Limuru town shown in Figure 1.1. The

problem of historic conservation is also heightened by obsolescence and abandonment of some of the facilities that are long out of use. All the problems exhibited have contributed to the creation of urban brownfields.



Figure 1.1: Townscape Heritage in Limuru Town

Kenya Railways has embarked on rehabilitating the railway while rebuilding parts of railway stations (*Rebuilding Railway Transport in Kenya: Milestones and Ongoing Works* by Kenya Railways | *Daily Nation*, 2021). This approach, without the consideration of the existing heritage, could lead to the loss of heritage and memory. In addition, the disappearance of some townscape heritage through urban renewal within precincts has continued to isolate the railway core from its townscape context. Consequently, the link between the railway station, perceived as the nucleus and the immediate precinct area is weak. The result is the loss of identity and the loss of the symbiotic relationship between the core and the precinct.

More often, the characteristics of the original urban fabric in the precincts are ignored when planning for new developments such as commercial buildings. The scale, shape, and materials of the towns' current development are detached from those of the British colonial and Indian influences. As seen in the example of Kikuyu town shown in Figure 1.2, the urban fabric becomes dissonant due to the contrasts between the old

and new characteristics of townscape development. Various factors could have contributed to the loss of the unique character of the original townscape; variances in building scale and changes in built environment densities have made urban history less visible. Furthermore, the townscape heritage is lost and erased when it is demolished. A sense of orientation and identity is lost as a result of the constant alteration of the original townscape character. Therefore, the urban heritage as a link to history is getting eroded by neglect and insensitivity to the townscape heritage environment. The matter of managing environmental aesthetics in the towns is important since the neglect of our heritage is detrimental in the form of brownfields that lead to visual blight.



Figure 1.2: Detached Scale and Form of Development in Kikuyu Town

As indicated by the United Nations Department of Economic and Social Affairs (2018) population in urban areas of Kenya has continued to grow, and the rate is projected to increase, creating demand for further development and, in turn, putting pressure on heritage areas of the townscapes. The dormancy of traditional uses of the townscape heritage presents an uncertain future. These significant alterations raise the prospect of a new heritage value system for the Kenyan railway towns, which is something that merits further research.

The continued neglect of the townscape heritage in towns established along the railway line might lead to their loss through demolition and urban renewal if their significance

will not be established. Photographic documentation of the historic railway stations and their industrial legacy is the extent of current efforts to recognise this legacy, such as a study conducted by Chao (2015). On the other hand, research on urban heritage protection is restricted to coastal towns and cities, cultural landmarks, and Nairobi, the nation's capital. (Ghaidan, 1974; King & Procesi, 1990; Muhoro, Munala, & Njuguna, 2016; Muthuma, 2016; Njuguna et al., 2018; Siravo & Pulver, 1986). These efforts are desirable but not adequate in addressing the conservation needs of Kenya's urban heritage resources.

Due to a lack of a suitable legal and practical framework, historic planning in Kenya does not identify or map its heritage areas. The Kenyan system of cultural heritage conservation mainly adopts a material-based approach where professionals hold the discretion of the process, as well as its results. The opposing view is the value-based approach, where meanings held by people are at the centre of cultural conservation or the living heritage approach that focuses on a community's continuous association with heritage. Consequently, the local planning framework does not wholly employ the people-based, 'bottom up' approach to identify, map and conserve places of historic interest to manage change and continuity. Furthermore, less evident heritage assets like historic urban patterns and features are not given enough recognition and protection.

Kohl and McCool (2016) give criticism of the weakness in rational comprehensive planning since it does not respond to the interests of urban heritage conservation. They admit that the largest cost heritage sites bear is their degradation of natural and cultural qualities while waiting for the process. They propose holistic planning as a new paradigm that builds on the core aspects of rational comprehensive planning. The holistic planning paradigm is lacking in the Kenyan urban conservation context, where there is a continuous dialogue with heritage area communities designed to forge a consensus on the desired evolving future. In theory, the interest is to establish what underlying values relate to the conservation of townscape heritage. This study seeks to answer the philosophical question, 'How should townscape heritage along the railway line in Kenya be conserved?'. It explores the underlying heritage values and

consequently formulates a planning framework for selected historic townscapes along the Kenya railway.

1.3 Purpose of the Study

The purpose of this study is to explore the underlying heritage values of the identified heritage in selected towns along the Kenya Railway.

1.4 Research Objectives

1.4.1 Main Objective

The main objective of this study was to develop a planning framework for selected historic towns along the Kenya railway based on heritage values. This was attended to by the specific objectives stated below.

1.4.2 Specific Objectives

- i. To examine the characteristics of selected heritage townscapes along the Kenya Railway.
- ii. To identify the inherent heritage values associated with selected towns along the Kenya Railway.
- iii. To determine the conservation needs in selected towns along the Kenya Railway.
- iv. To formulate a planning framework for historic townscapes along the Kenya Railway.

1.5 Research Questions

Objective one: To examine the characteristics of selected heritage townscapes along the Kenya Railway.

- a. What are the figure-ground characteristics of railway precincts of towns along the Kenya Railway?
- b. What constitutes the heritage in towns along the Kenya Railway?
- c. What is the heritage footprint of towns along the Kenya Railway?
- d. What is the status of heritage in towns along the Kenya Railway?

Objective two: To identify the inherent heritage values associated with selected towns along the Kenya Railway.

- a. What are the opinions of residents on heritage in towns along the Kenya Railway?

Objective three: To determine the conservation needs in selected towns along the Kenya Railway.

- a. What are the challenges associated with conservation in towns along the Kenya Railway?

Objective Four: To formulate a planning framework for historic townscapes along the Kenya Railway.

- a. What are the strategies to be used to conserve townscape heritage along the Kenya Railway?

1.6 Study Assumptions

The following Assumptions about theory and methodology guided the study.

- i. Universality holds that some heritage is meaningful to all of mankind; it assumes that certain aspects of heritage are meaningful to all people, regardless of cultural, social, political, and economic differences, and emphasises the positive role of heritage in promoting unity and understanding. That is the basis of heritage values stemming from the construct of intersubjectivity of meanings as put across by Muñoz-Viñas (2012). There is also a need to preserve heritage material truth, and material heritage serves important functions within contemporary culture and society; thus, heritage conservation is an essential social function (Avrami, Mason, & Torre, 2001; Avrami & Mason, 2000; Muñoz-Viñas, 2012). All values, therefore, need to be considered in the process of conservation planning to preserve the meanings people have for their heritage.
- ii. The figure-ground theory is founded on the assumption of the perception of the relationship between building footprints as solid masses and open spaces as voids. The premise is that each urban environment has solids and voids, or figure and

ground (Hebbert, 2016; Trancik, 1986). This is a way that simplifies the perception of form in urban planning. Key to the interpretation of figure-ground maps is the reduction of the black and white technique to the representation of buildings and open ground to show the patterns created by physical forms within the city (Wortham-Galvin, 2010). This means, therefore, that the areas represented by both solids and voids can be measured and represented as a ratio.

- iii. The ecological footprint theory assumes that we can measure not only the availability of nature but also human demand on it, where ‘footprint’ reveals how much of our planet’s productive area is used for each human activity (Wackernagel & Beyers, 2019). In addition, the theory is aimed at revealing the limits of nature to contribute to building a globally sustainable economy. Similarly, the assumption is that we can measure not only the land under an urban area but also the heritage on it as a proportion of urban developments in the form of a ‘heritage footprint’ that should be conserved.
- iv. Methodological assumptions address the place of study and the nature of attitudes carried by residents. According to the social constructivist perspective, the performances and consumptions of identity and place that are currently in use are just as genuine as those that have been historically accepted. (Silverman, 2015). Contemporary authenticity is predicated on the idea that society creates new settings where individuals can produce significant actions and artefacts without necessarily bringing the past into the present. The semantic differential scale, as well as the Likert scale, as methods of measuring attitudes are based on the presumption that an object can have different dimensions and intensities of connotative meanings (Likert, 1932; Osgood, Suci, & Tannenbaum, 1957). These meanings can be located in a multidimensional property space, or what can be called the semantic space in the context of the semantic differential scale. In this sense, attitudinal statements on a Likert scale were the basis of identifying inherent heritage values.

1.7 Study Significance

This study was concerned with the question of “Heritage for whom?”. This was related to people’s attitudes and opinions towards townscape heritage. The value-based approach was advocated in identifying heritage for conservation and was concerned

with the meaning ascribed by people. This approach was employed in towns along the Kenya railway to identify underlying values to explore its applicability in the local scenario. Apart from the railway stations, which were the nuclei for development, other isolated heritage in the townscape was anticipated. Accordingly, the study applied the notion that the familiarity and connection people have to a place are useful in identifying their local townscape heritage.

This study also contributes to the methodology of conservation planning in Kenya. The character of the townscape and its heritage were evaluated and mapped within the towns. The heritage values held for the townscape heritage were identified through the application of exploratory factor analysis.

The contemporary theory of conservation was applied; however, there was a question related to its application to the local context, and the aspect of common sense in heritage conservation is explored (Muñoz-Viñas, 2012). It is inadequate to conserve cultural heritage if the conservation is not integrated with sustainable development options to benefit the community (Taha, 2012). To provide a way to quantify the heritage footprint of towns, the ecological footprint hypothesis was appropriated and used. The theory was adopted in reverse to account for heritage in the urban environment. The theory of ecological footprint aims at reducing environmental impact on land, while the appropriate heritage footprint concept, applied, aims to increase heritage for conservation. It addressed a gap in Kenya's planning methodology, wherein heritage places in the towns were still unmapped, unidentified, and unprotected due to a lack of a framework for such an endeavour.

1.8 Study Justification

Sustainable Development Goals (SDGs) No. 11. advocates for stepping up initiatives to preserve and safeguard the natural and cultural assets of the world (United Nations, 2015).. This is under the commitment to make cities and human settlements inclusive, safe, resilient, and sustainable. Aspiration 5 of the African Union Agenda 2063 envisages an Africa with a strong cultural identity, common heritage, values, and ethics. It argues that African cultural identity, values, and ethics as a critical factor in

Africa's re-emergence on the global stage in the decade of the 2010s, will be promoted and strengthened by 2063 (African Union Commission, 2015).

According to Ekimci et al. (2019), some of the most significant urban public spaces are railway facilities, which are a part of cities' industrial past. In addition to being linked to employment, land use, and most manufacturing structures in the urban landscape, the value of industrial heritage highlights the significance of a community's past and how its preservation fosters a sense of regional pride (Xie, 2015). Additionally, conserving industrial sites and facilities tends to evoke the full historical process, with improvements and community life.

Colonial heritage belongs to the realm of tangible evidence of a past that, assuming colonialism would not recur, has faded away forever (van Roosmalen, 2003). It was this particular condition that gave rise to the need to determine whether such heritage was of special interest and importance. The Uganda Railway, now Kenya Railway, gave heritage value to its route and established towns along it that grew and thrived (Njuguna et al., 2018). This raised interest related to the need to conserve towns established along the Kenya railway line.

Furthermore, the Kenya railway's initial layout consisted of the railway termini, related amenities, and the nearby land uses that gave rise to settlements. This has historic importance to the culture and identity of the population it impacted. With railway stations serving as the hubs of their spatial development, the towns displayed a legacy that dated back to the time of their establishment. Even as the different towns grew, the townscape heritage had always given identity to the urban areas. The Constitution of Kenya (2010) Article 11, culture is regarded as the cornerstone of the country and as the collective civilisation of the Kenyan people. Conservation of this heritage, therefore, contributes to the preservation of the collective memory of a population as envisioned in the Kenyan constitution for the social, economic and environmental sustainability of urban environments.

The townscape heritage areas benefit our towns in that they are places with a rich legacy. Because of its historical significance and connection to significant historic events, the towns' heritage has the potential to attract tourists, therefore making

economic sense. Additionally, there are financial benefits to reusing existing buildings rather than constructing new ones. The study is timely because the Kenyan government was now renovating the country's railway system in an effort to boost connectivity and stimulate economic activity.

In terms of technology, both the built works and the industrial heritage displayed expert craftsmanship that can be learnt from. The subject of heritage in Kenyan towns was also gaining momentum from urban planners, architects, landscape architects, historians, and anthropologists. The study, therefore, presented an opportunity to highlight the industrial heritage that existed in the towns under study. Urban renewal and regeneration without heritage surveys would continually lead to the loss of townscape heritage.

The 142 railway stations along the Kenya railway network, shown in Appendix XI around which many of the towns developed, had a significant footprint on the landscape and required attention to safeguard the physical evidence of their existence. For example, along the railway line between Nairobi and Kisumu, there were 19 towns out of the 30 railway stations. Because of this, the towns that were founded are a superb illustration of a certain kind of building, architectural or technological ensemble, or landscape that reflected important periods in human history. (UNESCO, 2021).

Legally, Subject to the guidelines of the National Museums and Heritage Act, buildings of exceptional architectural merit or historic interest may be preserved under section 71 of the Physical and Land Use Planning Act. (Republic of Kenya, 2012b). The responsibility of identifying places of heritage importance lies with the county governments as well as the National Museums of Kenya. However, the National Museums of Kenya is responsible for preserving and safeguarding cultural heritage. These laws have no clear guidelines on how to engage concerned communities in conservation processes. Consequently, there was a contribution to the planning framework on how to carry out heritage surveys, and proposing appropriate value-based conservation actions for sustainable historic planning.

1.9 Study Scope

1.9.1 Geographical Scope

The towns along the railway line between Nairobi and Kisumu comprised the geographical area of the study, despite the fact that the major railway line runs from Mombasa to Kisumu, as illustrated in Figure 1.3

The greatest concentration of towns along the railway line was seen in this particular segment. The major railway line between Nairobi and Kisumu passed through 19 towns. However, for this study, cities of Nairobi, Nakuru and Kisumu were eliminated due to the rationale that over time, development layers could have destroyed the integrity of the initial nexus between the railway and the urban fabric. These cities grew beyond the railway station with other multiple foci of influence, such as busy commercial districts and industrial centres. In addition, samples were picked from towns between the two cities, Nairobi and Kisumu, using the map in Figure 1.4. As was evident from Kenya's population pattern, the towns under investigation were connected areas where populations settled and expanded around the railway stations to establish towns.

The towns' levels of development, activity, and population varied. The areas of focus were the precincts surrounding the railway stations and the areas of the town where the station had an impact. The urban areas of focus where the study took place were referred to as precincts. The railway stations formed the core of the study areas and the railway precinct. Three towns that included Limuru, Naivasha and Molo, all municipalities, based on higher population and level of development compared to the others, were selected. This criterion was the basis of the homogeneous sampling method.

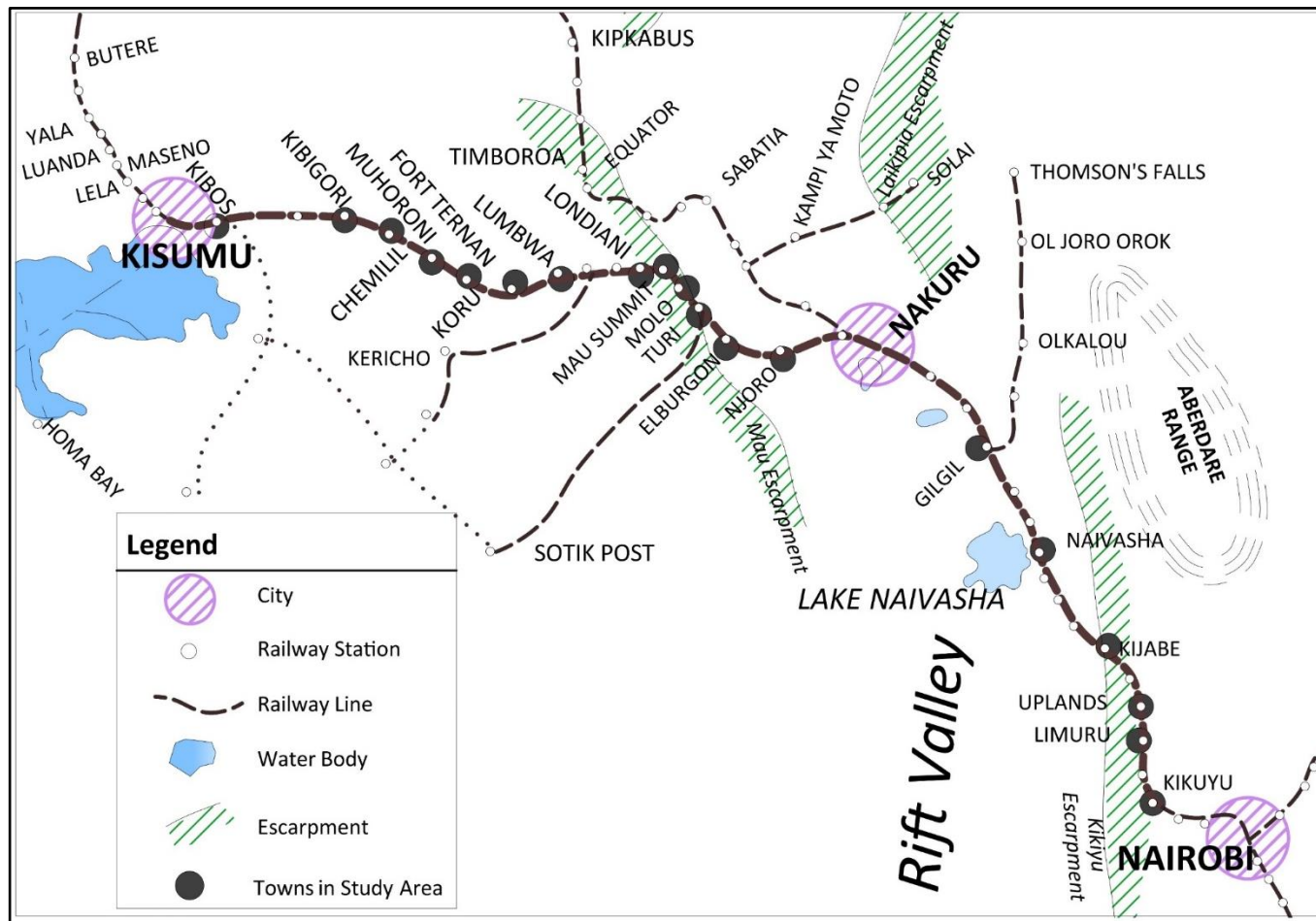


Figure 1.4: Section of the Kenya Railway between Nairobi and Kisumu

Source: Adapted from Gunston (2004); McCrow, n.d.; Molesworth (1899)

1.9.2 Theoretical Scope

The main theories that influenced this investigation were the contemporary theory of conservation, the figure-ground theory, the theory of ecological footprint, the theories of attitude, and the theory of likeability. Subjective judgements and values are emphasised by the contemporary theory of conservation. (Muñoz-Viñas 2012). The figure-ground theory was the basis for the spatial analysis of townscape heritage. Figure-ground plans show the footprints of buildings and the pattern of unbuilt voids in urban space. They offer an extreme example of reductionism, omitting most levels of information typically mapped in built-up areas, topography, highway infrastructure, administrative boundaries, landscape features, and street names to show just the plan form of buildings (Hebbert, 2016).

The theory of ecological footprint presents the idea that the carrying capacity idea can be measured with the help of an accounting instrument called the ecological footprint analysis. Nevertheless, the ecological footprint analysis was reversed for this study in order to meet the goals of preserving more history and addressing the assessment of the heritage footprint in towns. The theories related to attitudes included: functional theory, dissonance theory, learning theory and congruity theory. The theory of likability relates to the evaluative response among groups of people. The system used to evaluate people's meanings was underpinned by the theories of attitude and likeability.

1.9.3 Methodological Scope

The study involved descriptive research of sampled towns along the railway line through a survey. It focused on examining the townscape heritage footprint, identifying heritage values, and determining conservation needs of the sampled towns. Since urban planning and development was the domain of the study, the background was provided by the spatial and physical characteristics of urban heritage. Quantitative and qualitative assessments of the townscape heritage's attributes and the status of heritage conservation were conducted. The subject was all townscape history that developed as a direct result of the railway line's construction. Aspects of the study

included the townscape heritage footprint, attitudes towards the heritage, and conservation needs.

1.10 Study Limitations

The probability of sampling residents who had lived in the towns for long enough to experience the towns' evolution was minimal. In interviewing residents, those who acknowledged familiarity with the town and willingness to participate in the study were interviewed. The knowledge of key informants identified through the local administration and resident interviews was also relied upon as a way to corroborate and augment the information that was obtained through observation and resident interviews.

In sampling design, the sampling frame was infinite since the study took place in an urban setup made mainly of places of work, trade and commerce. Therefore, the fluidity of the town population at any given time in this context made it complex to establish a sampling frame. Using the corresponding town maps, the walking radius for each sampled town was divided into smaller spatial zones to maximise the uniform spread of samples throughout the study area. Respondents were then conveniently sampled from every spatial zone to ensure uniform distribution.

There could have been heritage in towns that had already been demolished, with no records and therefore no chance to identify and map it. In addition, inadequate records in the form of historical maps and photographs for the towns under study meant that it was not entirely possible to review the towns' development and evolution. Therefore, the study dwelt on the existing townscape status in the heritage survey.

1.11 Study Outline

This study is presented in six chapters. Chapter one deals with the background of the study and the statement of the problem. It further outlines the objectives and discusses the significance, justification, scope and limitations of the study.

Chapter two contains a literature review guided by the various objectives. It also presents a theoretical framework through the review of relevant theories in the

planning, psychology and conservation of cultural heritage. The legal and institutional frameworks were also reviewed in this chapter. It ends with a formulated conceptual framework and the research gaps.

Chapter three elaborates on the research methodology by explaining the research design procedures such as sampling, data collection, analysis and presentation. The chapter also presents the study area context to include the history, physiographic characteristics, and social and economic dimensions.

Chapter four is the presentation of the data as well as its analysis based on the first three research objectives. It later presents the discussion based on the analysed data.

Chapter five presents a planning framework for historic townscapes along the Kenya railway to answer the fourth research objective. It explains the components, formulation, and principles of the framework while presenting its graphical representation.

Finally, the sixth chapter provides the conclusion and recommendations, which form the summary of the preceding five chapters, while presenting all the recommendations based on the problem that forms the basis of the study and finally outlines areas for further study.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The literature review presented addresses areas specific to conservation, such as heritage significance and values; management of change in the urban space; historic planning, and the relevant principles of urban conservation. Various theories were looked into, and those that related to this study were discussed. The theories identified include the figure-ground theory, the theory of ecological footprint, and the contemporary theory of conservation. The conceptual framework later identifies the variables and their relationships. Throughout the review, previous studies have been presented to identify the gaps that this study would need to focus on.

2.2 Foundation of Historic Planning

We cannot remember without architecture, according to Ruskin (1849), who made this claim as early as 170 years ago. Urban heritage is an interpretation of history by a wide range of users; its value, though, is not simply in the historic attributes of the built fabric and spatial aspects of the townscape, but also in the life of its contemporary resident community, differentiating it from other forms of heritage (Orbasli, 2002). Garcia & Cardoso (2019) added that the convergence of cultural and urban fields has mutually strengthened current discourses in urban conservation.

There are at least four arguments behind the preservation of heritage: scientific, political messages and symbolism; social sense of place, cultural identity and economic (Timothy and Boyd, 2003). According to UNESCO (2013), through tourism, commercial use, and increased land and property values, urban heritage will stimulate socio-economic growth and generate income for maintenance, restoration, and rehabilitation. As a result, this study holds that maintaining continuity with the past during the very process of social and economic development is crucial to protecting the nation's legacy and showcasing the townscape heritage to future generations.

As stated by Waterton and Watson (2015), heritage is an interpretation of the past communicated through objects and displays, representations and engagements, remarkable locations and events, memories and commemorations, and the setting up of spaces for cultural consumption. Abbaszadeh, Mohammadmoradi, Faizi, and Ayashm (2016), after a review of various definitions attempted to explain conservation as: “all activities that use different ways including repairing, rebuilding, improvement and strengthening, to stabilize the messages and values of cultural heritage so that it gets possible to understand it, and be part of the current life, and guarantee the transmission of values to future”.

Heritage, on the other hand, is an active process of putting together items, locations, and customs that we choose to uphold as our identity rather than a passive process of merely conserving what was formerly there. (Harrison, 2015). On the importance of conservation, ICOMOS Australia (2013) culturally significant locations enhance people's lives by frequently offering a profound and motivating sense of connection to the local community, the natural environment, the past, and life experiences. Furthermore, the intergenerational equality concept must be followed in order to preserve these sites of cultural significance for both the current and future generations.

Trill et al. (2020) acknowledge that less significant heritage assets, such as historic urban patterns and features, are not sufficiently recognised and safeguarded, despite the fact that monuments and other significant tangible heritage assets must be preserved for future generations. In order to support public and private initiatives aimed at maintaining and improving the quality of the human environment, the Historic Urban Landscape (HUL) recommendation supports this. It addresses the need to better integrate and frame urban heritage conservation strategies within the larger goals of overall sustainable development (UNESCO, 2011a). By taking into account the relationships between their physical forms, spatial organisation and connection, natural features and settings, and social, cultural, and economic values, the recommendation proposes a landscape approach for identifying, evaluating, conserving, and managing historic areas within their larger urban contexts. Moreover, heritage building conservation promotes sustainable development by conserving the

embodied energy in the existing buildings (Sodangi, Khamdi, Idrus, Hammad, and AhmedUmar, 2014).

Concerning a town's *genius loci*, selectivity is required to assess aspects of a town's identity in order of priority for conservation (Nasser, 2003). However, it is also pointed out that the selection process is subject to differences in the interpretation of values, which are also subject to change. The preservation of industrial sites and facilities tends to evoke the entire historical process, along the lines of community life and improvement (Xie, 2015). Al-Saffar (2018), in his review of urban conservation and socio-economic and sustainability literature, asserts that historic centre preservation is important for preserving a city's identity and culture while also promoting economic growth.

Arguments against conservation have also been advanced by several authors. The economic approach to conservation is based on the principle of consumer sovereignty, and people's preferences are used as the foundation for value and decision-making (Folke, 2006). On the other hand, the argument continues to state that conservation-oriented scholars often support the principle of equal rights for all species and emphasise intrinsic values as opposed to instrumental values. This means importance being placed on the value an object has for its own sake, far from the value in the form of its usefulness. This illustrates the opposing and antagonistic philosophies of progress and conservation. Chirikure (2013) remarks that as Africa strives to catch up in terms of economic development, more emphasis is being placed on economic development, such as oil, gas, and mining, and they pose a danger to heritage. In the same case, while heritage practitioners are often quick to accuse the government of indifference to heritage concerns in the authorisation of developments, the same governments accuse archaeologists of failing to compromise. Heritage protection and development must be balanced because they compete with other equally essential development requirements. (Chirikure, 2013).

2.2.1 Heritage Types

As stated by Isa, Zin, Rosdi, and Sarim (2018), cultural heritage can be divided into two categories: tangible cultural heritage and intangible cultural heritage, as shown in

Figure 2.1. According to the illustration, tangible cultural heritage is a heritage that can be seen and touched and includes buildings and historic sites, monuments, artefacts, and others, which are considered important and valuable to be maintained for the future. Further, tangible heritage can be classified into movable and immovable heritage. On the other hand, intangible cultural heritage (“ICH”) describes the customs, representations, expressions, knowledge, and know-how that are passed down through generations within communities and are constantly created and changed by people in response to their surroundings and interactions with history and nature. (UNESCO, 2011b)

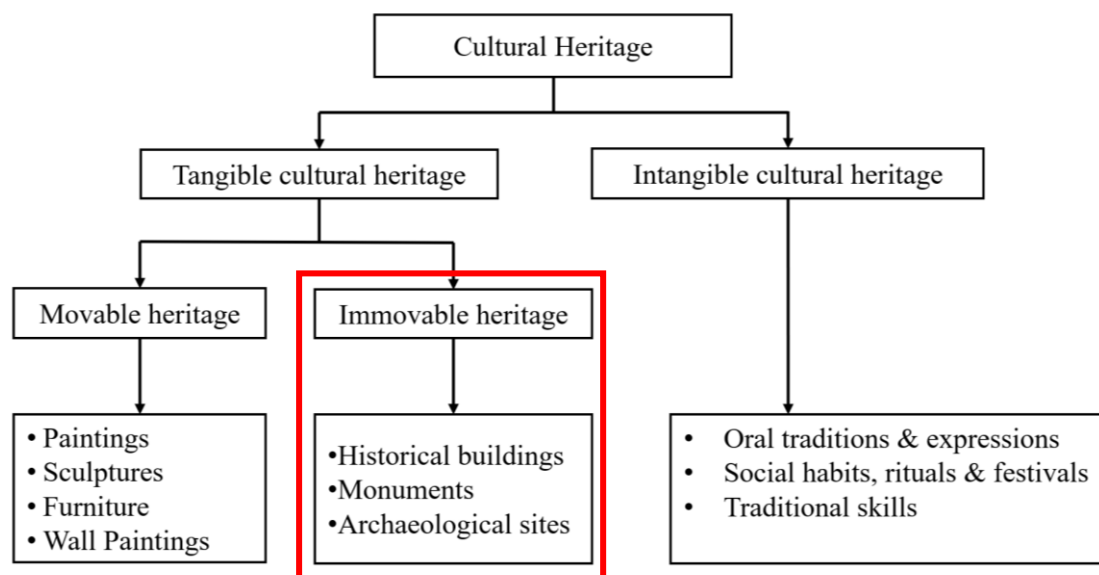


Figure 2.1: Classification of Cultural Heritage

Source: Adapted from Isa et al. (2018)

The study's focus is on immovable heritage, which includes landmarks, open spaces, historic buildings, and monuments that contribute to the townscape view. People's perceptions of the town's intangible cultural legacy, which is connected to its tangible heritage, give it significance and, consequently, heritage value.

2.2.2 The Basis of Conservation

As conservation practices evolved, two methods came into being: a material-based method and a values-based method. According to Poullos (2014), despite having emerged at separate times, these strategies are still relevant today. Another approach called the "living heritage" approach has been put forward in an attempt to mind the concept of a living heritage site. A material-based approach, also referred to as 'authorised heritage discourse', shows an extreme focus on the preservation of the material/fabric and is an expert-driven approach. The significance of heritage, namely defined in archaeological/historic and aesthetic terms, is seen as intrinsic/inherent in the fabric. Heritage authorities, made up of political figures and conservation specialists in particular, are in charge of defining and conserving cultural assets. (Poullos, 2014). As shown in Figure 2.2, the material-based approach is about conservation professionals and the heritage site and does not involve the community.

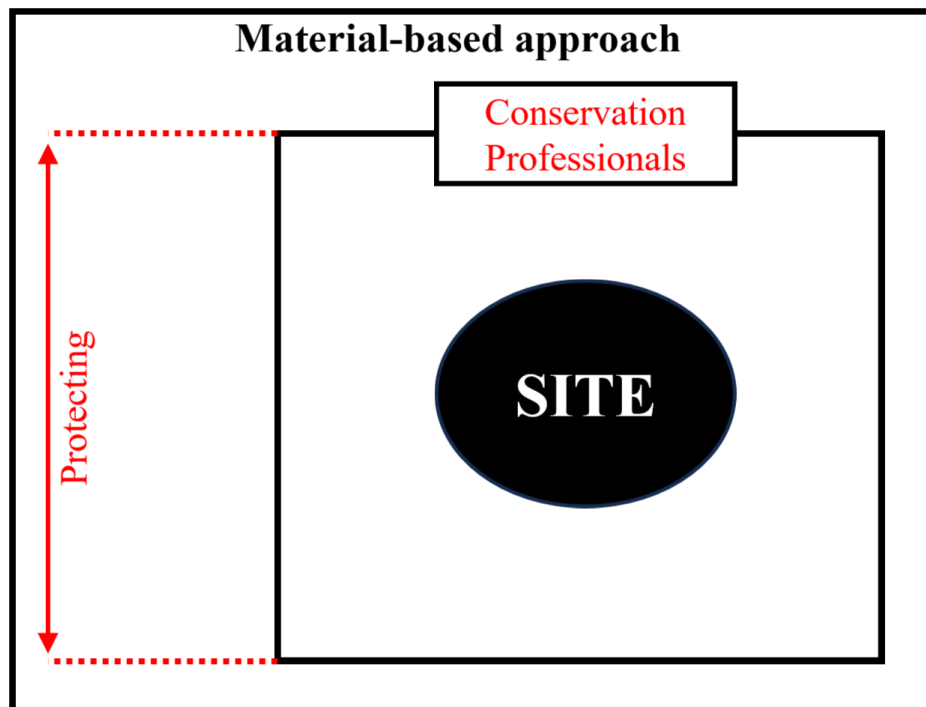


Figure 2.2: Material-based Approach

Source: (Poullos, 2014)

The key weakness of a material-based approach, as Poullos (2014) observes, is linked to the exclusive power of the conservation professionals, who are seen as the experts. It means that the conservation process, as well as its results, solely depend on the specific persons/individuals that comprise the team of experts.

Another approach to conservation is the values-based approach. A values-based approach to cultural heritage management, according to Worthing and Bond (2008), is founded on the fundamental idea that in order to maintain a specific building or location, it is required to determine why its heritage is significant, an assertion also supported by McClelland, Peel, Hayes, and Montgomery (2013). The development of a values-based approach to cultural heritage management has been attributed, particularly, to the Burra Charter (McClelland et al., 2013; Worthing & Bond, 2008). The Los Angeles-based Getty Conservation Institute provided additional support for the adoption of a values-based approach through its campaigning and research in the 1990s, which encouraged the Burra Charter's tenets to be exported globally. (McClelland, 2018). The same work manifested in a series of reports exploring the role of heritage values and conservation in a rapidly changing world. The aim was to develop methods for evaluating cultural significance for varied contexts and diverse categories of heritage.

Poullos (2010) observes that heritage is not just about preserving the actual artefact; it is also about protecting the values that stakeholders attach to it. As a result, heritage conservation is more than just preserving the material artefact, as illustrated in Figure 2.3. The Illustration demonstrates stakeholder groups are equally involved in the conservation process, under the supervision of a managing authority, which is, in most cases, the conservation professionals. Advocates of the values-based approach claim that it makes heritage management more democratic and all-encompassing. This is because it was born out of an understanding of the various ways that various individuals and communities have valued history over time, especially in ways that are occasionally conflicting and disputed (McClelland, 2018). In contemporary cultural heritage planning and management, attention to values and a values-based approach have become the requirement in deciding what and how to conserve (Worthing & Bond, 2008).

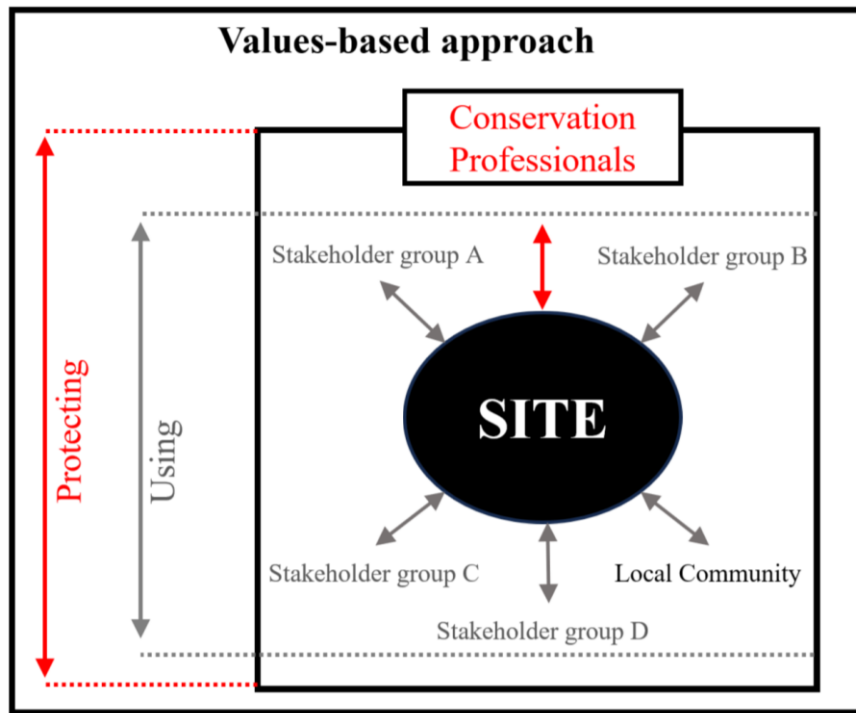


Figure 2.3: Values-Based Approach

Source: (Poulios, 2014)

In his critique of the values-based approach, Poulios (2010) argues that because the current theoretical framework and practice of heritage conservation heavily emphasise maintaining the "authenticity" of the fabric and are founded on the discontinuity created between the monuments, which are thought to belong to the past, and the people of the present, they appear unable to embrace the idea of a living heritage site. In the argument, a "living heritage" approach concentrates on a community's original association with a site: continuity is put forward. In that approach, tangible and intangible/non-material heritage expressions are seen and safeguarded as a unity, within the framework of continuity, where the boundaries between past, present, and future are eliminated.

Garcia and Cardoso (2019) advise that it has become imperative to acknowledge that architectural heritage cannot be studied in isolation from the territory to which it belongs and that the borders between the tangible and the intangible, past and present, modest and monumental, have been abolished. Further, it has been accepted that the

cultural significance of architectural properties varies by people's perspectives (Garcia & Cardoso, 2019). The proposal is that conservationists need to 'escape' from the discontinuity created between the monuments, considered to belong to the past, and the people of the present and also from the attachment to the fabric, and move towards embracing communities' associations with sites and the continual process of creation of the sites in the context of these associations. It is imperative, therefore, that in today's conservation practice in the urban space, the concepts of value as well as continuity must be combined to get a super approach that deals with both meanings and current societal concerns.

2.3 Heritage Significance and Values

Kendle and Forbes (1997), while highlighting the challenge in identifying heritage for conservation, pose the idea that views on what should be preserved and why differ, despite the fact that most people agree on the significance of conserving historic environments, structures, and features. The value-based approach is used as the justification in the field of conservation. Mason (2002) points out that conservation decisions for any purpose use an articulation of heritage values, often defined as "cultural significance", as a point of reference. As a result, evaluating the values attached to heritage is a crucial part of any conservation effort because values greatly influence the choices that are made. Del, Sedghpour, and Tabrizi (2020) observe that conserved architectural heritage promotes the identity of the community, and a society with great identity cares about its cultural values and strives to preserve them. In contrast, the demolition of historic buildings weakens the identity of the society, in the long run, so that a society without identity does not care about its cultural values.

According to ICOMOS Australia (2013), cultural significance is historic, aesthetic, social, scientific, or spiritual value for past, present, or future generations. These values come about through a process of growth and people's experiences in the towns. Orbasli (2002) also acknowledges that societies live and work in towns and cities and, as they begin to evolve, the urban form does the same to accommodate change and growth. As stated by Zancheti & Hidaka (2011), when heritage values are the result of numerous subject-object interactions—that is, numerous inter-subjective

evaluations—they are important to society. They have to do with historical eras and collective recollections. As a result, the heritage's values can vary depending on who analyses it, when they evaluate it, and where they evaluate it.

For its users, be they, residents or visitors, the city becomes a cultural heritage is an interpretation of history by a wide range of users; its value, though, is not simply in the historic attributes of the built environment and spatial aspects of the townscape, but also the life of the present-day community residing there, differentiating it from other forms of heritage. Values attached to cultural qualities and the reliability of sources of related information can vary from culture to culture and even within the same society. (ICOMOS, 1994). It is impossible to base assessments of authenticity and values on predetermined standards, and in order to show respect for all cultures, heritage properties must be taken into account and evaluated within the cultural contexts to which they belong (ICOMOS, 1994). This study relied on factor analysis as an important tool to reveal the underlying values from the expressed meanings.

In a man-place relationship, when a man dwells, he is simultaneously located in space and exposed to a certain environmental character. The two psychological functions involved may be called 'orientation' and 'identification'. To gain an existential foothold, man must be able to orient himself to know where he is, but to identify himself with the environment, he has to know how he is in a certain place (Norberg-Schulz, 1979). In the preservation of *genius loci* as it relates to the significance of heritage, Day (2012) indicates that although past ways of doing things may no longer be appropriate, places of such practical efficiency, ecological harmony, beauty, and place-anchoring, individuality could be created is a continual inspiration and the challenge is to achieve the same in ways right for our time.

Feilden and Jokilehto (1998) define value as the relative social attribution of qualities to things; values thus depend on society and can change over time. A whole historic area should not be considered only with an architectural framework but should also include the human values related to its social and economic context (Feilden & Jokilehto, 1998). According to Abbaszadeh et al. (2016), the classifications of the 'value' concept done by various authors from different articles and research are

indicative of the extensiveness of the concept in the field of cultural heritage. ICOMOS Australia (2013) provides a guide that, instead of focusing on one value at the detriment of others, conservation efforts should identify and take into account all facets of a location's cultural and natural significance.

2.3.1 Identification and Classification of Values

The identification and classification of heritage values have been done over time by various authors, scholars and organisations (Abbaszadeh et al., 2016; Ginzarly & Teller, 2018; ICOMOS Australia, 2013; Judson & Iyer-Raniga, 2010; Mason, 2002; Olukoya, 2021; Zacharopoulou, 2015). These different classifications present the progressive interpretation of heritage values. Olukoya (2021) came up with a comprehensive summary of heritage value typologies by various authors over time, as demonstrated in Table 2.1. Abbaszadeh et al. (2016) reason that the different classifications of this field come from the culture of societies, the need for research, and the individuals' intellectual priorities. There are, however, two categorisations of values: inherent and instrumental to define the various classifications (Abbaszadeh et al. 2016). The overall emerging themes from the review include social-cultural values, economic values and environmental values. Social-cultural values relate to the direct association with people, economic values relate to the usefulness derived from the functioning of heritage, while environmental values are perceived through heritage in a visible physical context and setting.

Feilden's classification in his book 'Conservation of historic buildings can be regarded as the most complete classification of value concepts in the field of cultural heritage and presents three categories: emotional, cultural-training, and functional (Abbaszadeh et al., 2016). These typologies define the ideology, yet they are understood differently due to the differences in the terminology used. (Ginzarly & Teller, 2018). With the recognition of a multiplicity of values, it is unlikely that any two heritage places will have the same significance, and thus benefit from the same conservation approach (De la Torre, 2013). For example, if the purpose of conservation is the protection of unique significance, there must be flexibility to select approaches and actions that fit the singularities of each case. In addition, different

conservation measures may be implemented at a location depending on the various levels of cultural significance. (ICOMOS Australia, 2013). This can thus be the justification for conservation on a case-by-case basis and the need to understand these in their singularity.

Table 2.1: Value Typologies for Cultural Heritage

Author/Year	Proposed Value Typologies			
Riegl, (1901)	Age; Historical; Commemorative; Use; Newness			
Lipe, (1984)	Economic; Aesthetic; Associative/Symbolic; Informational			
Carver, (1996)	Market Value	Community Value	Human Value	
	Capital/Estate;	Amenity; Political;	Environmental;	
	Production;	Minority/Disadvantaged/Desc	Archaeological	
	Commercial;	endant;		
	Residential			
Frey, (1997)	Monetary; Option; Existence; Bequest; Prestige; Educational values			
Ashley, (1998)	Economic; Informational; Cultural; Emotional; Existence values			
Throsby, (2001)	Aesthetic; Spiritual; Social; Historical; Symbolic; Authenticity values			
Mason, (2002)	Economic	Sociocultural		
	use values	historical		
	non-use values	cultural/symbolic		
	existence	social		
	option	spiritual/religious		
	bequest	aesthetic		
Feilden, (2003)	Emotional Value	Cultural Value	Use Value	
	Wonder;	Documentary;	Historic; Functional; Economic;	
	Identity;	Archaeological;	Social; Educational;	
	Community;	Age and Scarcity; Aesthetic and	Political and Ethnic	
	Spiritual and	Symbolic; Architectural;		
	Symbolic values	Townscape, Landscape and		
		Ecological; Technological and		
		Scientific		
Keene, (2005)	Social; Aesthetic; Spiritual; Historical; Symbolic and Authenticity values			
Appelbaum, (2007)	Art; Aesthetic; Historical; Use; Research; Age; Educational; Historic; Newness; Sentimental; Monetary; Associative; Commemorative; and Rarity			
Orbasli, (2008)	Age and Rarity; Architectural; Artistic; Associative; Cultural; Economic; Educational; Emotional; Historic; Landscape; Local distinctiveness; Political; Public; Religious and Spiritual; Knowledge; Social; Symbolic; Technical; Townscape			
Stubbs, (2009)	Universal; Associative; Curiosity; Artistic; Exemplary; Intangible; Use			
Gomez, Robie, (2010)	Typological; Structural; Constructional; Functional; Aesthetic; Architectural; Historical; Symbolic			
Szmelter, (2010)	Cultural	Contemporary/Socio-Economic		
	Identity;	Emotive;Economic;	Resources;	Functional;
	Artistic/Technical,	Evidence;Usefulness;	Educational;	Tourism; Social;
	Rarity; Administrative	Awareness; Political; Regime		
Lertcharnrit, (2010)	Informational; Educational; Symbolic; Economic; Entertaining/Recreational			
Yung and Char, (2012)	Economical	Socio and Cultural	Environmental	anPolitical
			Physical	
	Economic viability	Sense of place and	Environmental	Community

Author/Year	Proposed Value Typologies			
Giolden, et al (2014)	Job creation	tourism	identity continuity	performance
	Cost efficiency	social life	retain historical settings	participation,
	compliance	with social cohesion	and patterns	supportive
	statutory regulations	inclusiveness	infrastructure	policies,
	Economic	Cognitive	Health	transparency and accountability
				Experience

Source: (Olukoya, 2021)

2.3.2 Heritage for Whom?

The identification with heritage and a communal claim of ownership brings about the communal desire for the protection of the physical relics of urban history (Orbasli, 2002). Fouéré & Hughes (2015) reflect on what heritage is about by pointing out that it is essentially about power and representation; it is a site of struggle where belonging, ownership, and the control of power underpin heritage and heritage making. That refers to the space and time-bound configurations in which heritage is delineated, appropriated, contested, and made central in economic, political, and social struggles.

Examples abound of how there exists a conflict of meanings of heritage among people. Such intersectionality differences could be political, class, race, ethnicity, religion, or even generation-based. For instance, in early December 2013, protestors in Kyiv, the Ukrainian capital, destroyed a statue of Lenin in Figure 2.4 to show their opposition to the pro-Russian direction of their government. Pictures of the demolition of the monument were shown worldwide within a few hours. This proved the high symbolic significance and explosive force of socialist monumental art, especially statues of socialist realism. In post-socialist countries, these are no longer seen as symbols of the victory over Hitler's fascism, but as symbols of suppression by the following occupying powers (Brandt, Haspel, and Ziesemer, 2013). Another example is the history of Nairobi's public monuments, which have evolved in tandem with the changing political and cultural contexts of the capital.



Figure 2.4: Lenin Statue Toppled and Destroyed in Kyiv

Source: Anatoli Boiko/AFP, Getty Images, & Stoyan Nenov/Reuters (2013)

According to Larsen (2013), in independent Kenya, the new Kenyan government after the national independence of 1963 had the power to control what was forgotten and what was remembered in the landscape. The transition period in the lead-up to and the attainment of independence saw the beginning of the reinvention of the capital city, Nairobi's symbolic landscape, when the colonial identities, memories, and meanings inscribed into the landscape were overwritten with a new layer of postcolonial narratives.

During this transition period, the Lord Delamere statue on Delamere Avenue, shown in Figure 2.5, the King George V statue, shown in Figure 2.6 and the bronze portrait plaque on the King George VI memorial were all removed. Consequently, Delamere Avenue was renamed Kenyatta Avenue, and the statue of King George V in the city square was replaced with that of Kenya's first president, Jomo Kenyatta, shown in Figure 2.7. There are ongoing efforts by the Heritage Trust Kenya (HTK) to reinvent

Kenya's controversial colonial history as a means to generate employment and income today, encouraging local and international tourism to new areas while nurturing an awareness of the importance of Kenya's legacy entrenched in historic buildings (Heritage Trust Kenya, 2020). This is being done through the creation of a countrywide database of Kenya's townscape heritage, working with the National Museums of Kenya.



Figure 2.5: Lord Delamere Statue on Delamere Avenue

Source: (Larsen, 2013)



Figure 2.6: King George V Statue in front of the High Court in Nairobi

Source: (Railway Museum, 2014, cited in Muthuma, 2016)



Figure 2.7: Mzee Jomo Kenyatta's Statue in front of the High Court in Nairobi

Source: (Larsen, 2013)

Every site has different narratives attached to it, grounded in history and fixed to specific communities. In cases of conflicts, depending on which side comes out on top, the meaning can either be altered or determined. Those inherent anachronisms are the reason why most heritage sites carry dissonances (Nilson & Thorell, 2018). Concerning colonial heritage, van Roosmalen (2003) explains that, unlike the built heritage of earlier periods, until recently the appreciation and valuation of nineteenth and twentieth-century architecture and town planning in former colonies was almost completely neglected and ignored. He further argues that, for cultural and historical reasons, the continuation of this attitude is no longer acceptable and that the time has come to recover the imbalance and pay attention to unique works that for so long were neglected.

In Kenya, the case of neglect is still a concern, and there is therefore a need to determine why such heritage is of special interest and importance to qualify for conservation. In addition, Muthuma (2016), while looking at the case of Nairobi, argues that to withdraw the knowledge of this space by withdrawing its monuments, whether colonial or post-colonial, is to deny future generations their rightful heritage. It is equivalent to offering a blank as historical data.

Railway heritage is strongly linked to the territory it serves and is adapted to the specificity and characteristics of the environment, both orographic and economic-productive, and also to the cultural background (Llano-Castresana et al. 2013). Further, Tunbridge and Ashworth (1996) argue that all heritage is someone's heritage and therefore logically not someone else's: the original meaning of inheritance implies the existence of disinheritance and by extension, any creation of heritage from the past disinherits someone completely or partially, actively or potentially.

2.3.3 Quantification of Values

Osgood, Suci, and Tannenbaum (1957), in their seminal work, state that one of the most important factors in social activity is meaning and change in meaning, whether it is termed 'attitude' or 'value'. The term 'meaning' seems to connote, for most psychologists, at least, something inherently non-material, more akin to 'idea' and 'soul' than to observable stimulus and response. In the measurement of meaning accordingly, there is an implication in the philosophical tradition that meanings are uniquely and infinitely variable, and phenomena of this kind do not submit readily to measurement. In the measurement of meaning, several scales are used. They include the semantic differential, the Likert scale, and the Thurstone scale. The psychometric scales, as discussed below, are useful in the process of identifying values.

According to Osgood et al. (1957), if the attitude is indeed some portion of the internal mediational activity, it is by inference part of the semantic structure of an individual component of meaning, and differentiating the meaning of a concept is when a subject judges a concept against a series of scales. Each judgment represents a selection among a set of given alternatives and serves to localise the concept as a point in the semantic space.

Osgood et al. (1957) proposed 'semantic differential' as a kind of factor scale measurement operation for the measurement of meaning. The semantic differential seeks to measure the meaning of an object to an individual (D. C. Miller & Salkind, 2002) Osgood et al. (1957) add that any indices of meaning, such as the semantic differential, may be evaluated against the usual criteria for measuring instruments, that is, objectivity, reliability, validity, sensitivity, comparability, and utility. Kothari

(2004) argues that this type of scale is predicated on the idea that an object may have several connotative meaning dimensions, which may be found in a multidimensional property space, or what the semantic differential scale refers to as the semantic space. This scaling consists of a set of bipolar rating scales, usually of seven points, by which one or more respondents rate one or more concepts on each scale item (D. C. Miller & Salkind, 2002). Kothari (2004) recognises that Osgood and others in their original work did produce a list of some adjective pairs for attitude research purposes and concluded that semantic space is multidimensional rather than unidimensional.

The investigation of attitudes, opinions, and beliefs is a prominent area in much survey research and one of the most common techniques, such as the Likert scale (Bryman, 2016; DeVellis & Thorpe, 2021). Bryman (2016) states that the goal of the Likert scale, as developed by Likert (1932), is to measure the intensity of feelings about the area in question, which comprises a series of statements that focus on a certain issue of focus. Each respondent is then asked to indicate his or her level of agreement with the framed statement on a five-point or seven-point scale. As underscored by Kothari (2004), the Likert scaling technique assigns a scale value to each of the five responses, and the same thing is done concerning every statement in the instrument. This way, the instrument yields a total score for each respondent, which would then measure the respondent's favourableness toward the given point of view (Kothari, 2004). On the other hand, Kothari (2004) cautions that the limitation is that we can simply examine whether respondents are more or less favourable to a topic, but we cannot tell how much more or less they are.

The Thurstone scale, according to Kothari (2004), is considered one of the most appropriate and reliable when used for measuring a single attitude. A weakness of a scale such as the Thurstone is that the values assigned to various statements by the judges may reflect their attitudes that the method is not completely objective; it involves, ultimately, a subjective decision process (Kothari, 2004). Perhaps, the combination of these value measurement methods that include semantic differential, the Likert scale, and the Thurstone scale would be ideal in the investigation of meanings to get a hybrid method to gain their different advantages. Further, in social sciences, Exploratory Factor Analysis (EFA) is used to explore the psychometric

properties of instruments or scales (Osborne, 2014; Rust, Kosinski, & Stillwell, 2021). Consequently, EFA examines all the relationships between pairs of variables to enable the extraction of latent factors from the measured variables.

2.3.4 Criteria for UNESCO World Heritage Designation

Operational Guidelines for the Implementation of the World Heritage Convention (2021) state that the World Heritage Convention seeks to identify, preserve, conserve, convey, and pass on to future generations the exceptional universal worth of the natural and cultural heritage. Certain heritage can be deemed to have "Outstanding Universal Value" due to its extraordinary features, making it deserving of special protection from the threats that are posing an increasing threat to it.

Outstanding universal value refers to cultural significance that is so remarkable that it transcends national boundaries and is of shared importance for all of humanity's current and future generations. (Operational Guidelines for the Implementation of the World Heritage Convention, 2021). Therefore, the criteria of exceptional universal value support the preservation of cultural heritage that is most significant to the global community. Only seven sites in Kenya have successfully met the requirements for UNESCO World Heritage Organisation recognition, but there is a chance that the remaining 17 sites on the tentative list will be included. (UNESCO, 2024).

2.3.4.1 Outstanding Universal Value

Outstanding Universal Value means unique cultural and natural value that cuts across national borders and has universal relevance for all of humanity's current and future generations (UNESCO, 2021). Therefore, the international society as a whole place the utmost importance on the sustainable preservation of this heritage. (UNESCO, 2020). The Operational Guidelines for the Implementation of the World Heritage Convention give a criteria with ten points for qualifying heritage for Outstanding Universal Value, provided any one of the criteria is met (UNESCO, 2021). The criteria cover both cultural and natural heritage.

According to UNESCO (2021), the Committee considers property as having Outstanding Universal Value under cultural heritage if the property meets one or more of the following six criteria:

- i. represents a masterpiece of human creative genius;
- ii. exhibits an important interchange of human values, over time or within a cultural area of the world, on developments in architecture or technology, monumental arts, town-planning, or landscape design;
- iii. bears a unique or at least exceptional testimony to a cultural tradition or to a civilisation that is living or which has disappeared;
- iv. as an outstanding example of a type of building, architectural or technological ensemble, or landscape that illustrates significant stage(s) in human history;
- v. is an outstanding example of a traditional human settlement, land use, or sea use which is representative of a culture (or cultures), or human interaction with the environment, especially when it has become vulnerable under the impact of irreversible change;
- vi. is directly or tangibly associated with events or living traditions, with ideas, or with beliefs, with artistic and literary works of outstanding universal significance. (The Committee considers that this criterion should preferably be used in conjunction with other criteria.) (UNESCO, 2021)

Criteria related to cultural heritage, therefore, include attributes such as uniqueness, significance, testimony, historicity, aesthetics, rarity, phenomenality, as well as biodiversity. Further, the Operational Guidelines add that to be deemed of Outstanding Universal Value, a property must also have a sufficient management and protection system to guarantee its safety, as well as meet the requirements of authenticity and/or integrity. For Kenya, the criteria can readily be integrated into heritage surveys to assess townscape heritage to comprehend their degree of outstanding universal value.

2.3.4.2 Authenticity

The degree to which information sources regarding the heritage's value can be regarded as reliable or accurate determines one's capacity to comprehend the value given to it. To evaluate all facets of authenticity, one must be aware of and comprehend these

information sources, as well as the original and later features of the cultural heritage and their meaning as they have developed over time. Furthermore, culturally and even within cultures, opinions regarding the importance of cultural heritage and the reliability of relevant information sources may vary. As a result, in order to respect all cultures, cultural heritage must be analysed and evaluated largely within the cultural settings to which it belongs (UNESCO, 2020).

Silverman (2015) argues that conflicts over authenticity are becoming more frequent amongst a variety of stakeholders, including local communities, the international tourism sector, and national and international heritage management organisations. Likewise, the question is raised: who owns it, who defines it, who may access it, and who enables its performance? (Nezhad, Eshrati, and Eshrati, 2015). Cultural landscape, as the product of the interaction between culture and nature over time, needs special attention in recognising the concept of authenticity since both players in creating cultural landscape, nature and culture, are dynamic. In Kenya, the heritage sites and properties that remain without conservation attention face the threat of loss of authenticity, given their lack of proper records of information about them.

The conceptual framework in Figure 2.8. proposed by Nezhad et al. (2015) demonstrates that authenticity can be divided into two types, true and real authenticity, which are recognisable in components as well as in the whole. Real Authenticity has two dynamic and stable dimensions, both of which can have tangible and intangible aspects. Over time, tangible and intangible elements can have an impact on one another and have the potential to interact. Furthermore, each of the material and immaterial components of stable authenticity can be dynamically expressed at various points in time.

The framework states that each of the tangible and intangible components of dynamic authenticity can deposit and become stable through the filter of the indigenous people's culture. The proposed framework, in summary, argues that for the manifestation of the importance of their meaning and realisation of their significance, continuity, cultural landscapes require a sense of dynamism, change, and adaptation to time and place.

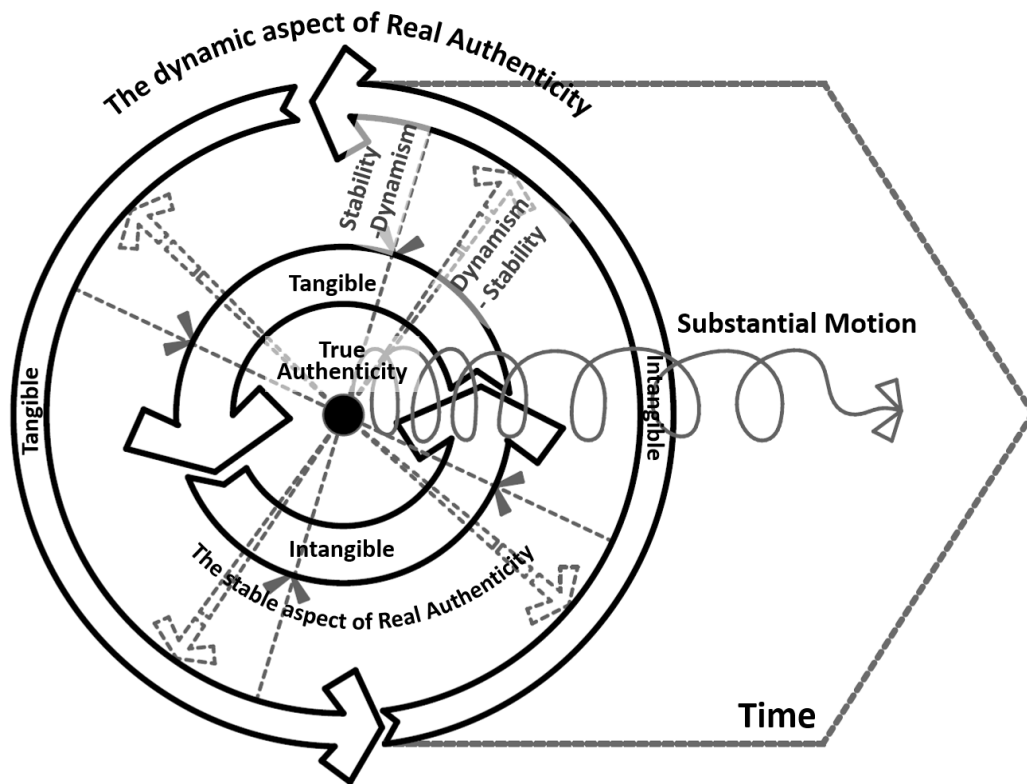


Figure 2.8: Conceptual Framework for Authenticity in a Cultural Landscape

Source: (Nezhad et al., 2015)

Silverman (2015) concludes that Conflicts over authenticity, that is, who defines it, who owns it, who has access to it, and who permits its performance, are becoming more frequent amongst national and international heritage management organisations, the international tourism sector, and local stakeholder communities. Unlike the fixity of behaviour represented by phrases like "authentic experience," contemporary authenticity refers to the dynamism of social life and is the "new authenticity."

Globalisation, commercialisation, mass media, and tourism are some of the forces creating new cultural manifestations in both tangible and intangible forms. These manifestations may be entirely new or revised, but they are ingrained in dynamic circumstances, as acknowledged by contemporary authenticity. The idea behind contemporary authenticity is that society creates new settings where people can create significant actions and things without necessarily "faithfully" carrying the past into the present.

According to UNESCO (2020), if a property's cultural values are authentically and credibly expressed through a range of attributes, such as form and design; materials and substance; use and function; traditions, techniques, and management systems; location and setting; language and other forms of intangible heritage; spirit and feeling; and other internal and external factors, it may be considered to meet the requirements of authenticity, depending on the type of cultural heritage and its cultural context. These can be seen as key variables in townscape heritage surveys as well as value assessments since they define the attributes and meanings of heritage.

2.3.4.3 Integrity

The completeness and intactness of the natural and/or cultural heritage and its characteristics are measured by integrity. Determining the degree to which the property: a) has all the components required to convey its Outstanding Universal Value; b) is large enough to guarantee the full representation of the features and processes that convey the property's significance; and c) is negatively impacted by development or neglect is necessary in order to examine the conditions of integrity. (UNESCO, 2020). All conservation efforts should adhere to the "integrity" of the genuine art piece, which is one of the fundamental tenets of conservation philosophy. (Van Saaze, 2013).

Zancheti & Hidaka (2011) state that according to contemporary conservation theory, integrity is determined by three key performance indicators (KPI), that is, significance, integrity, and authenticity. The indicators are assessed by surveying the opinion of the key stakeholders involved with the conservation management of sites, where the indicator is based on the subjective judgement of individuals framed by an inter-subjective survey structure. The Indicator of the State of Conservation (*Isc*) has the basic structure presented below:

$$Isc = f(I_{sig}, I_{int}, I_{aut}) \quad (2.1)$$

Where: I_{sig} is the KPI of significance/values

I_{int} is the KPI of integrity

I_{aut} is the KPI of authenticity

The emerging variables from this work include: the objects and processes that comprise the site, their material and non-material attributes, and their significance/values. Zancheti & Hidaka (2012) define significance as the set of all known values of the heritage; authenticity as the result of a probabilistic judgment of attributes of the heritage to express values whether truly or falsely, and integrity as the level at which the attributes of the heritage embody values in a complete, whole and secure way. Therefore, the Significance of heritage represents its values, the truthfulness of these values is its authenticity, while the wholeness of the values is the expression of its integrity.

In the Kenyan scenario, Muhoro, Munala, and Njuguna (2016) outline the National Museums of Kenya criterion that sets out broad terms of heritage listing. The first is architectural merit, such as building style, where the query is: "Is there a known architectural style in the structure?"; and "Is there any architectural era or event that the building can be linked to?" The streetscape features are another aspect of the architecture that is noteworthy, yet the question is? 'Does the building feature any intriguing or distinctive architectural features, such as arches, pediments, or balconies?' The second criterion is historic significance such as architectural style where the question asked is 'Was the building put up during any known historic period?' the other element under the second criterion is history where the question is; 'Is the building associated with any significant national historic event or period?' other criteria include; the age of the building, location, condition of the building, The sixth criteria is ownership, whether a private or public or religious or social building. This criterion relates to the criteria for UNESCO World Heritage designation in aspects of testimony of significance.

The process of gazettelement of qualified buildings in Kenya's urban areas has not been efficient since some owners are opposed to it, with cases of 'mysterious fires and demolitions' of the sites and structures only to be replaced with skyscrapers (Muhoro et al., 2016). The problem is that the process of identifying and conserving culturally significant heritage in Kenya has not been made an active process through legislation.

2.4 Townscape Characteristics

According to Papageorgiou (1971), for a town or an urban sector to be regarded as a historic element, it has to have the following characteristics: an original urban structure, significant architectural qualities, and continuing social life. He further presents a classification of historic centres that evolved strictly under town planning criteria. The classification is based on the importance of centres, their structure, and their topographical position within the artificial cluster. The four classifications include: independent and monumental groups of buildings that resemble settlements; small rural historic centres; historic towns; and historic sectors of big towns. In comparison, the urban areas under this study take the form of historic sectors of towns.

Walsh (2012) points out that townscape character is influenced by many things, including buildings and the spaces between them, streets, squares, trees, boundaries, hedges, gardens, wildlife, windows, doors, the colour and material of roofs and walls, the sense of enclosure, roadways, traffic levels, and people moving within the townscape, as well as the history of the buildings and the people who lived in them. Further suggestion is that all characteristics should be considered together to properly describe the character and, in doing so, provide a single point of reference for people who want to understand and benefit from our townscapes. In practice, heritage appraisals have also come to include an assessment of townscape, which means looking at extra elements, such as the relation of built form to topography, landscape, and urban layout, and identifying landmarks and key views. These wider aspects of a place are essential elements in defining its particular character (Samuels & Clark, 2008).

Walsh (2012) proposes four high-level themes to categorise the characteristics: people, time-depth, urban form, and ecology. On these four themes, the explanation is: that people have a vast knowledge of what makes up the character of a place; the urban form of an area, including architectural style, streetscape, urban block structure, public spaces, street pattern, sense of enclosure, and movement patterns contributes hugely to townscape character; the natural or semi-natural characteristics of an area, such as

trees, gardens, hedge lines, small woods, fields, commons, and parks, are part of townscape character.

In his consideration of the concept of the townscape, Papageorgiou (1971) presents three perspectives. First, he considers the townscape as a visual composition that derives its formation from the visual organisation of the constituent elements within the urban cluster. He cautions that the functions of these elements exert no visual effect and play no part in the formation of the townscape. However, it can be argued that the different functions or land uses require design-specific elements in the built environment that respond to the specific land use needs. For example, industries require industrial buildings and warehouses, while commercial activities need appropriate commercial buildings. Therefore, the composition of different typologies of buildings on an urban scale indirectly creates or influences the overall townscape visual effect.

The second consideration is the townscape as a spatial composition that reflects the reality of three-dimensional space, with the fourth dimension being time, which considers change. The spatial composition's most important characteristic is the rhythmical interplay and asymmetrical arrangement of mass and space or solid and void.

The third consideration is the townscape as a sphere of human activities that reflects and provides the framework for urban experiences and social activities. This is the reason many people who live in historic settlements are so attached to their townscape, through discrete messages of the life and urban experiences of the past transmitted by historic townscapes. It represents the desire by people for continuity with change in the urban sphere.

The ability of humans to enjoy or hate the urban space is triggered by the structure of buildings, landscape and forms of the city (Cullen, 2013 as cited in Damayanti, Kossak, & Nurdiah, 2020). The three main concerns in his work are optics, place, and content, which contribute to the quality of cities or urban spaces that give pleasure to humans, as expressed in Figure 2.9. As interpreted by Damayanti et al. (2020) optics concern how humans can enjoy the cinematic view, movement, and beautiful sequences while

moving through city spaces and visualise the changing scenery; the place is a quality of urban spaces that can give a feeling of being in or out of the environment; and content is the detail of the urban spaces such as colour, texture, style, scale and uniqueness.

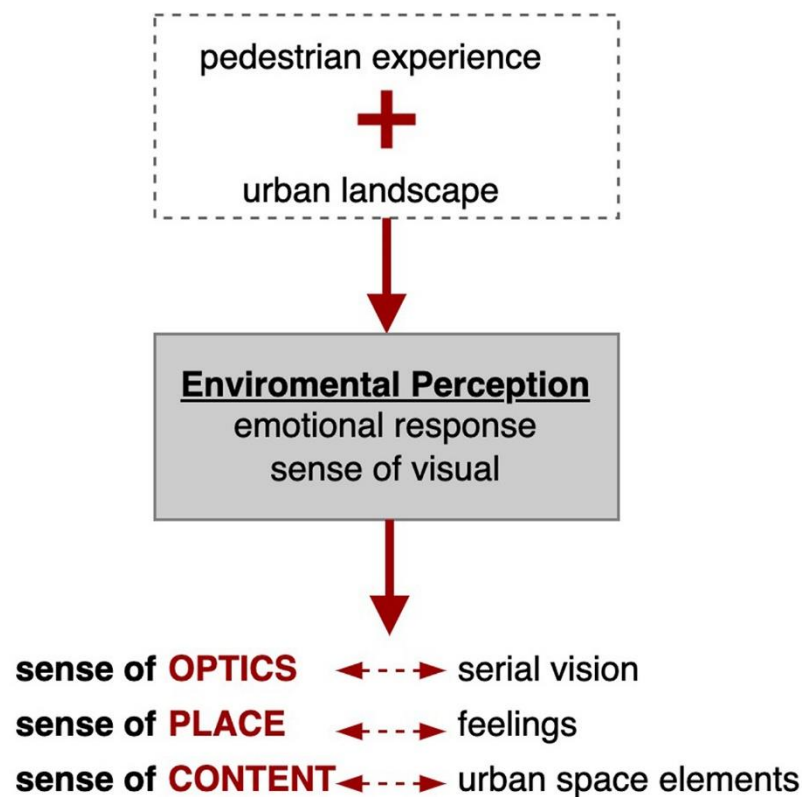


Figure 2.9: Gordon Cullen's Theoretical Proposition of Pedestrian Perception

Source: (Yildirim and Celik, 2023)

There are three main aspects of townscape analysis according to Moughtin, Cuesta, Sarris, and Signoretta (2003). The first is the legibility of the urban structure, relating to how people perceive, understand and react to the environment. They are the qualities of a place which give it an immediate identity, quickly perceived by its users. The second is the permeability of the environment, the choice it presents to the user. The third is a visual study, conforming to the more traditional meaning of townscape, as used by Cullen (2013). The Visual analysis suggested includes studies of urban space, the treatment of façades, pavement, rooflines, and street sculpture and an analysis of the visual detail distinguishing one place from another. Townscape analysis ideas by

Cullen (2013) and Moughtin et al. (2003) are congruent with each other since they reveal and emphasise the content of townscape and the specific visual elements that can be evaluated.

The importance of the street in the historic appreciation of the urban space has also been reviewed and discussed by various authors. Mehta (2013) argues that in the context of the infrastructure of a town, the physical element of the street is the most essential element that forms the history and civilisation of a place. Further, Ismail, Ja'Afar, and Harun (2019) in their study of historic streetscape characterisation emphasise that streets and streetscape are important in defining the character of urban areas since the urban population lives on streets and frequently uses them for access and movement. A study by Yildirim and Celik (2023) showed that spatial configuration and Gordon Cullen's townscape theory directly affect pedestrian movement and behaviour by complementing each other. For example, results showed that connectivity and integration values have a strong effect on pedestrian densities at nodes. The street is, therefore, the datum that gives people the frames with which they perceive townscapes.

2.4.1 Townscape Characteristics of Heritage Precincts

Townscape is a concept that gives visual coherence and organisation to buildings, streets, and places that make up the urban environment and consists of two main ideas: the sense of place and serial vision (Cullen, 2013). According to Nasser (2003), most towns derive their identity and personality from the way individual buildings, whether good or not, create a general outlook and make up a recognisable local townscape. A townscape is described as a landscape within a built-up area that includes buildings (Landscape Institute, 2017). This description considers the dynamism of the townscape. Saida, Latif, and Safiee (2016) point out that urban patterns change due to the development requirements and cater for the needs of the users as well.

In the conceptualisation of townscape as a spatial composition, Papageorgiou (1971) postulated that the expression of townscape is in two ways. One is the harmonic and asymmetrical mass and space that are found in the relationship between the solid wall surfaces and the apertures on the facades of buildings. The second is the relationship

between volumes of buildings and open areas within the urban space. The second part of the townscape interpretation reflects the two-dimensional figure-ground approach of urban form representation in a plan.

Bertolini and Spit (2005) explain that as a geographical entity, a railway station has two basic, though partly contradictory, identities. It is a node: a point of access to trains and, increasingly, to other transportation networks. At the same time, it is a place: a specific section of the city with a concentration of infrastructure but also with a diversified collection of buildings and open spaces. Around the node and place are a set of districts related to the original centre.

2.4.2 Townscape Heritage Survey

Undertaking a visual survey of the conservation area is a fundamental part of understanding those elements of character or appearance that are desirable to preserve or enhance (Historic England, 2019). The cultural significance of a place is assessed by analysing evidence gathered through the physical investigation of the place, research, and consultation (ICOMOS Australia, 2013). Del et al. (2020) conclude that the conservation of heritage can be investigated and analysed at three levels: people, experts, and governments, and the holistic conservation of the heritage can be achieved only by cooperation among all three levels. This study places people at the centre of heritage surveys for the derivation of meanings, while experts and the government are the enablers of sustainable conservation actions.

Llano-Castresana et al. (2013) point out that it is necessary to conduct a diagnostic examination that reveals the asset's actual conservation status, as well as the analysis at different scales of the territory in which it is located and the historical, economic, social, and cultural impact it has had on the territory. Said et al. (2016) did a quantitative assessment to assess the tangible results of conservation efforts in Malaysia's ancient city of Melaka. They came up with value topography maps in Figure 2.10 showing what can be seen as the townscape heritage value footprint in the urban space. The longitudinal study was done in the years 2010 and 2013. The results revealed an increase in the townscape value of areas, attributable to the townscape redevelopment guided by the conservation management plan. Such methods by Said

et al. (2016) give strong indicators and justification for the need to carry out conservation, and where to focus.

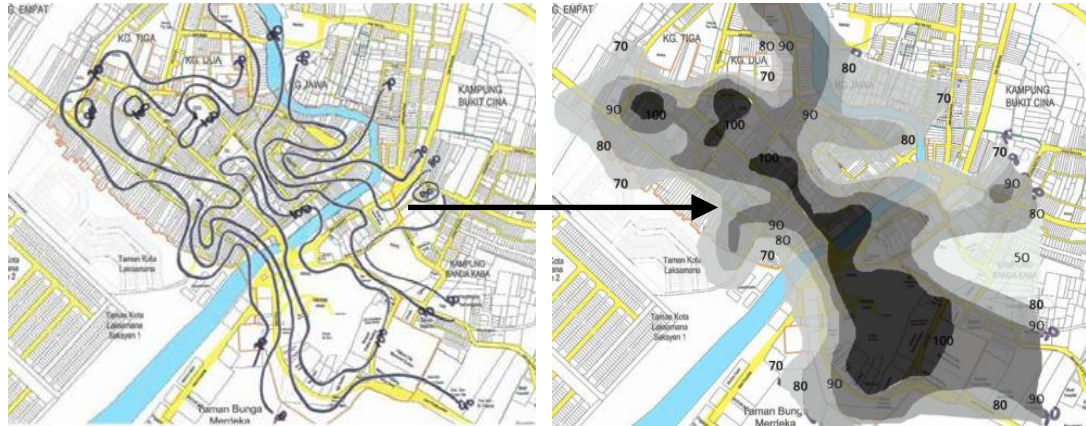


Figure 2.10: Townscape Value Iso-lines Map and its Value Topography Map

Source: (Saida et al., 2016)

This study borrows from the above study, the method of evaluating heritage by identifying significant heritage and giving it a spatial representation to achieve a heritage footprint.

Another study by Ewing, Clemente, Neckerman, Purciel-Hill, Quinn, and Rundle (2013) identified 51 key perceptual qualities of the urban environment based on a review of literature by different authors in the field of urban design, environmental psychology, and urban planning, as presented in Table 2.2.

Table 2.2: Perceptual Qualities of the Built Environment

Adaptability	Singularity	Naturalness	Identifiability	Deflection
Distinctiveness	Clarity	Texture	Ornateness	Interest
Intricacy	Enclosure	Compatibility	Upkeep	Regularity
Richness	Meaning	Formality	Continuity	Vividness
Ambiguity	Spaciousness	Novelty	Imageability	Depth
Diversity	Coherence	Transparency	Prospect	Intimacy
Legibility	Expectancy	Complementarity	Variety	Rhythm
Sensuousness	Mystery	Human Scale	Contrast	
Centrality	Territoriality	Openness	Intelligibility	
Dominance	Comfort	Unity	Refuge	
Linkage	Focality	Complexity	Visibility	

Source: (Ewing et al., 2013)

Eight out of the 51 were selected for further study according to the importance assigned to them in the reviewed literature: imageability, enclosure, human scale, transparency, complexity, coherence, legibility, and linkage. They also established that the first five of the eight were successfully measured to pass the tests of validity and reliability. Further, Yogapriya and Kumar (2019), in a study to consider the perceptual qualities of a heritage structure, categorise the 51 identified perceptual qualities into a visual image, social image, and cognitive image. However, the study mainly dwelt on the visual image. Visual image was classified into two: physical and architectural. The physical includes dominance, enclosure, visibility, linkage, and imageability. The architectural aspects include form, texture, intricacy, unity, and rhythm.

Walsh (2012) emphasises that it is important to provide the opportunity for people to contribute to a definition of character, both in terms of what they perceive the character to be and what they like and dislike about the character of the place. He further states that in order to provide a historic townscape characterisation that captures the character of the place, it is important to visit and assess the character region as perceived by people, which is a task that must be undertaken by a heritage survey study.

2.4.3 Defining and Delimiting the Heritage Precincts

Bertolini and Spit (2005), in an attempt to define and delimit the station as a place, argue that the influence of a railway station may go far beyond its immediate surroundings. Conversely, entities right next to a railway station may not show any apparent relationship to it. Almost inevitably, any delimitation of the station as a place is destined to be somewhat arbitrary. In practice, four approaches to this problem can be identified. These might be characterised as the walkable radius, functional-historical, topographic, and development perimeter approaches as discussed below.

- i. **The walkable radius.** Following this approach, the railway station area is identified as the circular area radiating from the railway station that is considered a ‘walkable’ distance. A walkable radius of five to ten minutes or approximately 500 meters (El-Geneidy, Grimsrud, Wasfi, Tétreault, & Surprenant-Legault, 2014). The advantage of this approach is that it embraces the average user’s perspective, which is the least partial of all. The disadvantage is that it does not

generally coincide with the functional unit of a ‘station district’ or the area that is the object of a redevelopment initiative. Also, the walkable radius often does not coincide with the actual walkable distances due to the existence of asymmetrical physical or psychological barriers and different kinds of users (Bertolini & Spit, 2005).

- ii. **Functional-historical elements.** The railway station area is here considered equal to the sum of the functional elements, for instance, a commercial axis connecting the station and city centre, or industrial and distribution facilities with a direct connection to the station, having a strong locational link with the rail transport centre (Bakker, 1994). As pointed out by Bertolini & Spit (2005), the advantage of the functional perspective is that it allows relatively rigorous and meaningful criteria. The disadvantage is that it focuses on current or past uses rather than on the potential evolution, and the negative ‘dysfunctional’ relationships tend to be overlooked.
- iii. **Topographic.** From this point of view, the railway station area is the surface included within an arbitrary, mostly rectangular section of a map (Bertolini & Spit, 2005). The location and extension of this window are determined by a commonsense evaluation of which elements to include in the analysis. However, its arbitrary shape is justified by the need to consider ‘all that is there, avoiding a priori assumptions (Pucci, 1996). The advantage is that it combines both user and functional criteria. The disadvantage is that the criteria are vaguely defined and thus are difficult to verify or replicate.
- ii. **A development perimeter.** A fourth possibility, according to Bertolini & Spit (2005), is to consider the area included within the perimeter of a specific redevelopment initiative. The advantages are that first, it adopts the perspective of a specific development plan, and is thus the most concrete. Second, it generally has a better coincidence with administrative boundaries and an acceptable coincidence with functional boundaries. The disadvantages are that areas under the railway station’s influence, but excluded from the plan, are neglected. The developer perspective is also the most partial. And if there is no comprehensive plan, this approach is not applicable (Bertolini & Spit, 2005).

A hybrid method was developed from the perspectives presented above to combine the advantages contained in the various approaches. An applied example is where the periphery of a precinct is defined by the urban blocks fronting the first street next to and around the railway stations.

2.5 Urban Heritage

According to García-Hernández and de la Calle-Vaquero (2019), the concept of urban heritage has two meanings. First, urban heritage can refer to the list of heritage elements located in urban areas: archaeological vestiges, historic buildings, vernacular architecture, historic gardens, social practices, rituals, and festive events, among others. Second, urban heritage can refer to the city as heritage, a special type of cultural property that is mainly associated with neighbourhoods, urban centres, and historic cities. Conservation of heritage urban areas is a major branch of urban planning and management, and one of the principal motives for urban regeneration plans and projects (Zancheti & Hidaka, 2011).

In recent years, governments, practitioners, experts, academics, and international organisations have considered urban heritage as urban areas rather than single monuments (Al-Saffar, 2018). Urban heritage reflects the local community's identity, memories, and authenticity (Shehata, 2022). This is easily connected to the concept of the spirit of place. ICOMOS (2008) defines the spirit of place as the tangible and intangible elements, the physical and the spiritual elements that give meaning, value, emotion, and mystery to a place. It further elaborates that the intangible cannot be separated from the tangible, since the two interact and mutually construct one another.

2.5.1 Twentieth Century Heritage

Al-Shomali (2020) traces the modern heritage story of how it started and became recognised by international organisations, through new conservation challenges that emerged as seminal architectural works of the modern movement reached fifty years of age, thereby becoming eligible for heritage protection. Al-Shomali (2020) also proposes that it is worth challenging ourselves to recognise our modern heritage not only for the balance of our appreciation of different cultures but also to generate self-

esteem and pride in this period of globalisation, when important values tend to be forgotten and ignored. ICOMOS's action plan on the 20th Century Heritage (MAP20) survey results confirm the under-representation of the modern heritage of Asia and Africa on their national inventory lists (Uskokovic, 2006).

According to Macdonald (2013), in many areas, twentieth-century structures dominate the urban landscape, and for older generations, their realisation is a living memory, but not necessarily positive. These places are yet to go through the Darwinian natural selection process, after which the survivors are appreciated as heritage. Consequently, Macdonald (2013) points out that questions are raised about what to protect and how to establish comparative levels of significance within existing frameworks used in the heritage identification and assessment process.

Uskokovic (2006) observes that the concept of modern heritage has recently emerged, which goes beyond the focus on individual monuments. Such a concept implies that consideration should be given to a broader range of sites, including those with associative and contextual value, that form the systems and networks that are traces and experiences of the processes of modernisation, modernity, and modernism. It is due to globalisation that conservation issues have been discussed in a much broader context, connecting them horizontally beyond geographic areas.

Macdonald (2013) lists five groups of challenges for conserving 20th Century heritage; adapting functionally obsolete buildings to new spatial and planning requirements, particularly if the use contributes to social significance (form follows function); retaining significant design features relating to the building's use that are obsolete or materially problematic; upgrading buildings for modern environmental performance (environmental sustainability); managing scale (identifying compatible uses for very large buildings); economic sustainability and the viability of repairing large buildings (cost of repair and adaptation. These are major challenges relating to harmonising the concepts of conservation with reuse while ensuring sustainability.

Buildings in the twentieth century represent various aspects that have not been present in previous centuries. These are generally classified under 'Modern Movement' or modernity (Jokilehto, 2003). Jokilehto further states that the roots of modernity, and

the modern concepts of historicity and the conservation of cultural heritage, are referred to as the age of reason, an era that established cultural paradigms that are deeply reflected in present-day society. Macdonald (2013) states that many national and local authorities now include twentieth-century heritage in their listing programs, and also that in many areas, twentieth-century structures dominate the urban landscape, and for older generations, their realisation is a living, but not necessarily positive, memory. Kenya faces similar issues in the towns along the railway station, having been established in the early 20th century.

The concept of modernity is also associated with an era in architectural history, and views vary on the exact timelines, between the 1900s and 1980s (Craven, 2018; DeCombo, 2019; Migdol, 2020). The built heritage of this era, which glorifies the dynamic spirit of the machine age, employed advanced technology that has not always withstood long-term stresses, and the functions for which the buildings were originally meant have changed significantly (Guillet, 2007). Guillet reports that techniques and materials, such as light concrete vaults, large panels of glass, high-alumina cement, plastic, and synthetic paints, which characterized the architecture of this era have deteriorated rapidly, due to the high level of experimentation involved in their use and over the past few decades, the architectural heritage of the modern movement has appeared more at risk than that of any other period.

The various forms of railway towns must be viewed as a component of the globalisation of the railway industry and economy that began in the second half of the 1800s. (Cuéllar, 2018). Railway towns that emerged can thus be understood as part of the railway management system and cannot be separated. The impossibility of managing from one central point the operation of the lines that extended, in some cases, through hundreds of kilometres, forced the location of structures of maintenance, supply, or distribution at strategic points. Conceived and realised at a time when European nations established empires around the globe by ruling colonies that were often far more extensive than the territory of the motherland, heritage from then and regions bear witness to the former world order and its transitory character (van Roosmalen, 2003). The story of the Kenya Railway, originally referred to as the

Uganda Railway, is significant to the birth of Kenya as a country, as well as cities and towns along it.

2.5.2 Conservation of Urban Heritage

The particular heritage and collective memory of each locality or community are irreplaceable and an important foundation for development, both now and in the future (ICOMOS, 1999). Said et al. (2013) argue that urban heritage as a link to history is a combination of tangible aspects, buildings and streetscape and intangible aspects; culture, religion, and myths. Therefore, in conserving urban heritage, the considerations of the underlying aspects are significant to ensure the survival of the heritage.

The Charter for the Conservation of Historic Towns and Urban Areas complements the Venice Charter, known as the International Charter for the Conservation and Restoration of Monuments and Sites, which is concerned with historic urban areas, large and small, including cities, towns, and historic centres or quarters, together with their natural and man-made environments. The charter defines the principles, objectives, and methods necessary for the conservation of historic towns and urban areas. It also seeks to promote the harmony of both private and community life in these areas and to encourage the preservation of those cultural properties, however modest in scale, that constitute the memory of mankind (ICOMOS, 1987).

In Railway towns, Llano-Castresana et al. (2013) observe that railway heritage is a heritage that is characterised not only by the circumstances of the time it was built, but also by the territory it serves, which influences (paths, bridges, tunnels, buildings, and styles) but also transforms. In effect, territory and railway form a combination that interacts inevitably. The Kenyan scenario is that towns along the railway line have stations at the core, exerting influence on the resultant fabric of various land uses on the periphery. However, this influence from the core waned with the decline in operations of the Kenya Railway.

ICOMOS (1994) defines conservation as all efforts designed to understand the cultural heritage, know its history and meaning, ensure its material safeguard, and, as required,

its presentation, restoration, and enhancement. Said et al. (2013) argue that urban conservation is viewed as the most relevant way to sustain historic cities and that to stay relevant and beneficial, historic cities have to catch up with modern, new cities in the forms of physical and economic attractions. It, therefore, calls for the adoption of an appropriate planning method to ensure that the historic components stay intact within the modern environment. Conservation aims to safeguard the quality and values of the resource, protect its material substance and ensure its integrity for future generations (Feilden & Jokilehto, 1998). In conservation theories and practical actions, heritage appears to be double-faced since the conservation objectives are to maintain its physical and material characteristics and to keep its cultural meanings (Zancheti & Hidaka, 2011).

The growth of towns is a continuous process, and changes are made to meet the needs of citizens. With time, these changes turn the fabric of towns into heritage. These Physical developments are a record of events and processes in time, bringing nostalgic attachment to places and features. The understanding of the heritage of the railway towns through meanings attributable to them is important in exploring sustainability in conservation.

While looking at the conservation of heritage in railway towns globally, Cuéllar (2018) observed that preservation offers contradictory results. A significant portion of the railway towns, on the one hand, continued to change and forget their history. As a result of significant urbanisation and new administrative endeavours, they lost nearly all of their historic footprints. On the other hand, many of these towns, especially in Spain, were depopulated and disappeared, partially or totally, because the railway operation was shut down; today, they are completely abandoned. The study also showed that each railway town had an individual trajectory, rendering each one unique. In relation, it is therefore important that the heritage footprint of towns along the Kenya railway is determined to understand the extent of the need for conservation.

According to Muhoro et al. (2016). The status in Kenya is that most listed buildings are privately owned and also well taken care of, albeit with the unbalanced costs of repair and maintenance. However, there are instances of the owner's inability to, or

refusal to, repair the listed property. Which means that the property's condition deteriorates, leading to the risk of its distinguishable qualities being lost.

2.6 Management of Change in the Urban Landscape

Change is unavoidable, even in the most cherished places, and conservation plays an intimate part in that wider process of development and change in the existing built environment, a process that affects everyone in society (Glendinning, 2013). Cities, by definition, are not confined to a closed and controllable boundary as used by their populations and visitors. This means that changes in the physical structure of the city happen over time and are necessary to ensure its viability and livability (Bandarin, 2019). Since changes are a natural component of landscape life, conservation concepts must be included in the value system. Under these circumstances, "management of change" turns into a procedure that is inextricably related to conservation. (Bandarin, 2019). According to Knox and Mayer (2013), small towns with deep agricultural roots and heritage face an uncertain future as the traditional use of their built environment does not fit with changed economic systems.

In response to changes in the urban space, UNESCO asserts that the key to understanding and managing any historic urban environment is the recognition that the city is not a static monument or group of buildings, but subject to dynamic forces in the economic, social, and cultural spheres that shaped it and keep shaping it (UNESCO, 2013). The historic urban landscape is the urban area understood as the result of a historic layering of cultural and natural values and attributes, extending beyond the notion of "historic centre" or "ensemble" to include the broader urban context and its geographical setting (UNESCO, 2011a).

As suggested by UNESCO (2011a), the historic urban landscape approach emphasises the whole human context with all of its material and immaterial aspects, going beyond the preservation of the physical environment. By considering the current built environment, intangible heritage, cultural variety, socioeconomic and environmental variables, as well as local community values, it aims to promote the sustainability of planning and design interventions (UNESCO, 2013). As an approach, it provides the basis for the integration of urban conservation within an overall sustainable

development framework through the application of a range of traditional and innovative tools adapted to local contexts (UNESCO, 2016).

2.6.1 Conservation Intervention

The minimum effective action is always the best; if possible, the action should be reversible and not prejudice possible future interventions (Feilden, 2007). As it concerns sustainability, Hobeika (2021) suggests seven ways heritage preservation can contribute to sustainable development. They include resisting cultural homogenisation; preserving climate-responsive buildings; incubating local traditions and values; strengthening community inclusion and intergenerational equity; conserving resources and reducing waste; developing tourism and diversifying jobs; and improving spatial attractiveness and property values. Kigadye (2014) points out that integrated conservation does not rule out the introduction of modern architecture into areas containing old buildings, provided that the existing context, proportions, forms, sizes, and scale are fully respected and traditional materials are used.

The International Network for Traditional Building, Architecture and Urbanism (INTBAU, 2007), clarifies the Venice Charter and its interpretation of conservation in article 4, that maintenance using new elements in a compatible character is not false historicism, provided the new elements can be readily distinguished by experts, or with the aid of interpretive materials. It further clarifies Article 5, that changes must be allowed where the alternative is a threat to the building's survival, where the changes are not inharmonious as called for in Article 6, and where careful documentation of the changes is maintained, and changes should also incorporate the building's original spatial quality and structure. Article 6 of the Venice Charter spells out that the conservation of a monument implies preserving a setting which is not out of scale. Wherever the traditional setting exists, it must be kept, and no new construction, demolition or modification which would alter the relations of mass and colour must be allowed (ICOMOS, 1964).

By bridging the gap between culture and nature, Khalaf (2020) offers a different conceptual and practical framework for nomination, assessment, preservation, and

management that situates heritage between continuity and change across time, as shown in Figure 2.11.

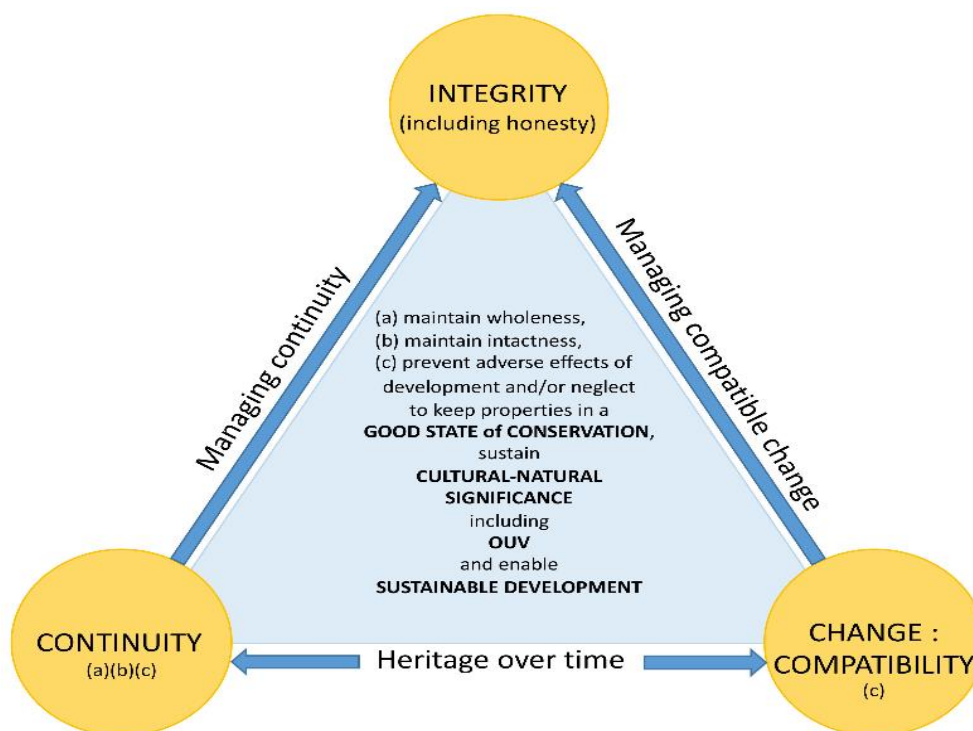


Figure 2.11: Policy Proposal for the Implementation of UNESCO-WHC

Source: (Khalaf, 2020)

For heritage to continue to be relevant to people, continuity and change are required; however, suggested modifications, like new development projects, should be compatible to avoid negative repercussions. (Khalaf, 2020).

The mismatch caused by obsolescence in the fabric has its source in either (i) the urban fabric and its environment, or (ii) the change in activities in the fabric, and renewal can stem from either end. In the first end, the fabric is adapted to contemporary requirements, either by using the existing structure, including extension or reduction, as a base for adaptation or by sweeping it away for replacement–redevelopment (Hmood, 2019). On the other hand, changes in activities in the fabric of the work can be tackled by way of different interventions. The interventions include: Conservation methods are consolidation, reproduction, reconstruction, preservation, prevention of

deterioration, rehabilitation, and restoration (Hmood, 2019; Houbart, 2020; ICOMOS Australia, 2013; Jeleński, 2018; Lichfield, 2009). The key conservation interventions and their meanings are outlined in Table 2.3.

Table 2.3: Meanings of the Key Interventions on Heritage

No.	Intervention	Meaning
1.	Adaptive reuse	Adapting a building to a contemporary use that will be capable of sustaining it (also called reconditioning, renovation, remodelling, adaptive use)
2.	Anastylosis	Use of fallen decayed material, where possible, in the reconstruction of cultural heritage monuments.
3.	Conservation	Action/s are applied directly to a building fabric to prolong its life without the loss of authenticity and significance. It includes preventive and remedial conservation, thus involving both maintenance and stabilisation interventions. Adding or applying supportive materials to the actual fabric to ensure its continued durability and structural integrity.
4.	Demolition	Action/s of removing existing materials and/or part/s of the building. It cannot be defined as an intervention, i.e. a physical change or alteration of a building.
5.	Façadism	The practice of preserving façades or elevation outlook of historic buildings deemed to have cultural value, and the construction of new ones behind them.
6.	Maintenance	Routine, cyclical, non-destructive interventions (i.e. combination of technical, administrative, and managerial actions) during the life cycle of a building to secure its uninterrupted use at the desired level of activity. It includes both preservation and preventive conservation actions.
7.	preservation:	Keeping the object in its existing state of repair to prevent further decay; Act/process of applying measures necessary to sustain the existing materials, form, and integrity, minimising decay. It is part of ordinary maintenance, it includes indirect measures, e.g. monitoring as the process of measuring, surveying and assessing the material properties and factors of the environment, which may change over time.
8.	Prevention of deterioration	Through an example of a sound maintenance programme and controlling environmental pollution. Also referred to as indirect conservation.
9.	Reconstruction	Rebuilding anew in imitation of the old, as necessitated by disasters such as fire, earthquake, or war. The reconstruction could take place on the same site or, in extreme cases, another.
10.	Rehabilitation	Action/s that modify an existing building to bring it to an improved, acceptable condition. It includes both alteration and intervention, i.e. facelift or refit (i.e. superficial or cosmetic) to the envelope to enhance its appearance/ function, and/or extensive maintenance and repairs to reach modern standards (e.g. energy retrofitting).
11.	Repair	Action/s applied to a building or part of it to recover its functionality and/or its appearance (original condition). Minor repairs of damaged or deteriorated materials can be part of maintenance.

No.	Intervention	Meaning
12.	Reproduction	Copying an existing artefact to replace some missing or decaying parts, or, in extreme circumstances, moving the object to a more suitable environment.
13.	Restoration	Reviving the original concept, either or both concerning the fabric or use (also called restitution). Action/s to bring the existing building back to its former condition. It is normally restricted to major adaptation work for derelict or ruinous buildings. It can include substantial reconstruction works of part/s of the building.

Source: Adapted from Hmood (2019); Jeleński (2018); ICOMOS Australia (2013); Lichfield (2009); Houbart (2020); Plevoets (2021)

Some of the stated conservation practices, such as preservation, rehabilitation, restoration, and reconstruction of cultural sites, have helped to build resilient cities (Jeleński, 2018). Accordingly, community-driven historical reconstructions of architectural assets, especially when smartly combined with technical improvements of living standards, help people to reconnect with their past, or, if those places are new to them, to understand the places in which they are going to live.

2.6.2 Adaptive Reuse

Ekimci et al. (2019) argue that creating a successful adaptive reuse project is crucial to the preservation of these areas, which are left empty and subject to the demands of urban growth. Plevoets & Van Cleempoel (2012) confirm that the alteration of existing buildings for new functions is not a new phenomenon; in the past, structurally secure buildings have been adapted to fit changing needs or new functions without question or theoretical reflection. The Burra Charter ICOMOS Australia (2013) provides guidelines for adaptive reuse.

Article 21 of the Charter, on adaptation, explains that additions, the implementation of new services, a new usage, or modifications to protect the area are all examples of adaptation. According to the contemporary theory of conservation, functional views stress that conservation should not just consider the artistic and historic functions of a heritage object, but also its other, more mundane functions, such as tourist attraction, economic value for the owners, place of work, social icon, and as a personal icon. In relating function and the contemporary theory of conservation, Muñoz-Viñas (2012) asserts that a value would be directly related to an object's ability to perform a given

function, and emphasises that value-led and functional conservation are very similar in their grounds and principles.

Macdonald (2013) points out that buildings, including heritage buildings, distinguish themselves from artworks when it comes to conservation simply because, for the most part, to survive, they have to be used. Only those functioning as “monuments” or as building museums are not continuously adapted to sustain them, although they, too, may require adaptation to fulfil their role as public venues. Adaptive reuse can transform heritage buildings to become accessible and usable places and also provide the additional benefit of regenerating an area sustainably (Bullen & Love, 2011). Harney (2017) asserts that adaptive reuse of redundant places is a sustainable conservation practice and is often the only way of ensuring that they are conserved for future generations, as buildings that are no longer relevant are subject to decay, neglect, and ultimately demolition.

The conservation, preservation, protection, reuse, and enhancement of heritage features for subsequent generations will promote the prevention of valuable assets from permanent loss (Umar, 2018). Additionally, Ijla and Broström (2015) acknowledge that adaptive reuse of existing abandoned buildings can be used as a tool to revitalise urban areas' economies and the environment through job creation, tax revenues, and historic preservation.

One of the challenges related to adaptive reuse is that it can be detrimental to the preservation of the spirit of a place because renovation projects and the implementation of new uses can drastically change the original experience. According to Harney (2017), understanding the importance of the heritage asset is necessary to preserve the "spirit of place," which includes a range of values: architectural, historic, social, cultural, and spiritual. Bullen & Love (2011) point out that the change of use may require refurbishment or even complete renovation of the existing built environment. Additionally, they suggest that adaptive reuse may just require minimal restoration works where the building's functional use is the only thing that changes.

ICOMOS Australia (2013) states that adaptive reuse may involve adding to the place, introducing new services, new uses, or changes to safeguard the place. It also stipulates

that a place should have a compatible use and that adaptation is acceptable only where the adaptation has minimal impact on the cultural significance of the place. Rani (2015) affirms that adaptively reusing heritage buildings is a method that promotes sustainability and adds that adapting old buildings for new purposes helps reduce the demand for virgin materials and also reduces the carbon footprint. Harney (2017) argues that the remodelling of existing buildings should, wherever possible, be compatible, reversible, and authentic and that the work should convey site-specific narratives that give a place symbolic meaning; interpret the significance and express collective memory.

Mısırlısoy & Günçe (2016), through content analysis of literature, establish five key categories of factors that affect the decision-making process in adaptive reuse projects. The categories are: actors, analysis of existing fabric, conservation actions, adaptive reuse potentials, and functional changes. They further develop a decision-making model with five distinct procedural steps related to the aforementioned categories of factors.

2.6.3 Challenges of Urban Heritage Conservation

A significant challenge to urban heritage in contemporary society is the economic desire for urban growth and urban areas' densification (Phetsuriya & Heath, 2021). Soini & Birkeland (2014) posit that the main challenge related to the conservation and preservation of heritage is derived from the increasing effects of globalisation, in the form of human mobility and trade and their impacts on languages, ethnic heritage, identity, and the distinctiveness of landscapes.

As concerns heritage conservation, Soutinho (2018), asserts that the main challenges faced by the cities are becoming clear, and they include: how to promote engagement and mobilisation of local stakeholders and citizens; how to develop and use innovative methods for culture management, and how to measure, monitor and evaluate impacts and changes in the city. In addition, a new set of challenges that have emerged more recently are the documentation, protection, and proper management of cultural heritage, climate change, greenhouse gas emissions, and other environmental problems, which are adding challenges. The historic buildings have also encountered

the catastrophic effects of natural hazards such as floods, earthquakes, and extreme climatic conditions (Khalid, 2021).

There is a need to address the various challenges, ranging from better interpretation of heritage sites, their appropriate use or adaptation, use of appropriate conservation techniques and materials, and how the procedure and the result support the local community's cultural and historic continuity as well as the environment (Badyal, 2016). Thus, to overcome these challenges, a thoughtful understanding of heritage conservation as a social process is essential. This process will foster community involvement and capacity-building and will have a catalytic effect on local restoration and conservation efforts (Badyal, 2016).

2.6.4 Heritage Conservation Needs

According to the Global Heritage Fund (2010) Report on 'Saving our Vanishing Heritage', hundreds of sites are endangered and experiencing ongoing neglect and unchecked deterioration. This diminishes their authenticity, integrity, and universal value, key criteria for UNESCO World Heritage designation. The report identifies five primary threats to humanity's cultural heritage in developing countries: development Pressures, unsustainable tourism, insufficient management, looting, war, and conflict. In the Kenyan scenario, threats to heritage in towns could include abandonment, vandalism, and demolition. Where conservation is being carried out, the approaches could be inappropriate.

As maintained by Llano-Castresana et al. (2013), the most immediate step towards the effective protection and proper management of railway heritage would be the creation of an accurate digitised inventory of the railway heritage, through display, query, and spatial analysis of cartographic maps, data, graphics, and photographs. The other proposed step would be to perform a diagnostic analysis that brings out the real state of conservation in which the asset is currently, as well as the analysis at different scales of the territory in which it is located and the historic, economic, social and cultural impact that it has had on that territory. This kind of data aids in drawing, in each case, adequate and appropriate strategies for the recovery and revaluation of the elements (Llano-Castresana et al., 2013).

2.6.5 Determining Conservation Needs

Conservation involves a set of identification, analysis, judgment, and decision actions (Zancheti and Hidaka, 2011). In this way, the end of the conservation exercise is to identify the conservation needs before action is taken. Value-based decision-making for conservation has become a standard in the heritage field (Rudolff, 2005). Each choice to protect a heritage treasure for future generations is predicated on a person's or a group's assessment of its worth (Clark, 2019). Kaufman (2006) underscores that in planning, it is paramount to distinguish between ends and means and that to do reasonable and justifiable planning, we have to focus on ends and not means, and thus use 'need' only as a noun. The need is then understood as a gap between current and desired results, as illustrated in Figure 2.12. The use of 'need' as a noun in Kaufman's assertion enables the justification of useful objectives, and what is done to deliver based on costs-consequences analysis. In the needs assessment, therefore, understanding the current state of heritage conservation and the desired state is key to identifying the actions or the means that are required.

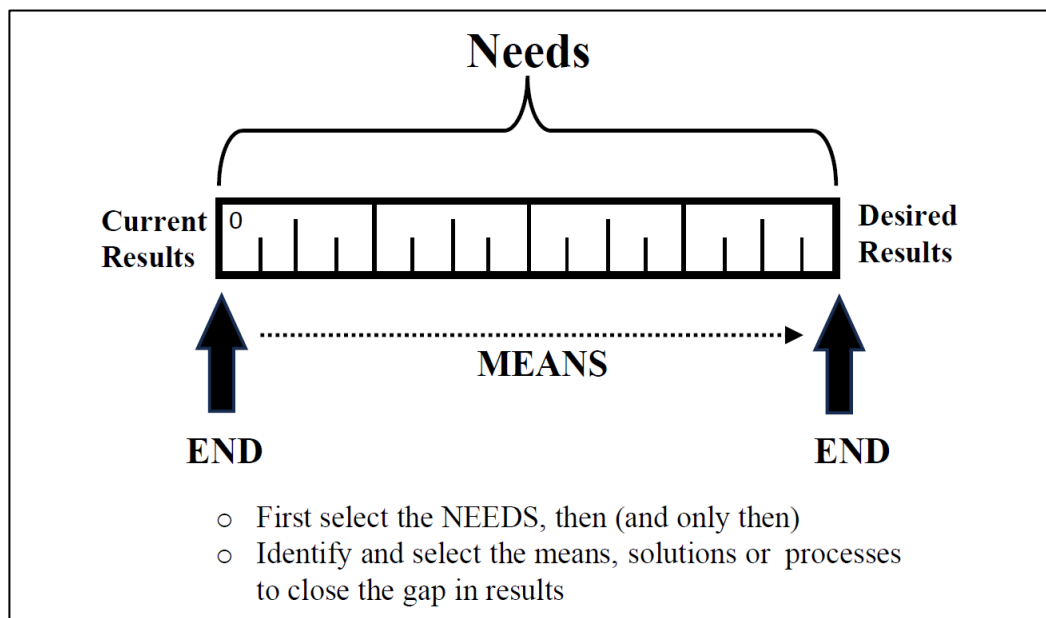


Figure 2.12: Need, as a Gap between the Current and Desired State

Source: (Kaufman, 2006)

Bertolin and Loli (2018) present a set of interventions that can be applied to an existing building with elements that have signs of weakness, deterioration, or hazardous conditions and may not work properly or have a decrease in performance. The interventions include preservation, conservation, maintenance, repair, refurbishment, replacement, rehabilitation, renovation, restoration, and demolition. However, demolition is an option that cannot be considered for a historic building as all the efforts to retain its historic, artistic, cultural, and social value have to be guaranteed over time to present and future generations (Bertolin and Loli, 2018).

Although Sahraiyanjahromi & Türker (2019) emphasise the significance of a value-based approach, they also note that the conservation goal encompasses the preservation of all the many values associated with the cultural heritage in addition to the protection of the asset itself. They add that the decisions for the selection of heritages can be subjective and that there is a necessity for a comprehensive and objective framework to support those decisions. In a study on the improvement of the process of prioritising decision-making for cultural heritage conservation for tourism, they further propose a conceptual framework that is designed to help the process of decision-making in prioritising heritage conservation alternatives of the townscape heritage, as shown in Figure 2.13. It entails the integration and aggregation of the findings and results of evaluating heritage significance through heritage values by stakeholders and the evaluation of the heritage by experts. This work, however, does not show how the integration and aggregation of the findings and results should be carried out.

The case of heritage in towns along the Kenya railway can borrow from the processes illustrated in the conceptual framework that starts with the consideration of various thematic alternatives before carrying out the heritage survey, where all stakeholders and experts are involved in evaluating significance and the level of deterioration, respectively. In this instance, the townscape history associated with Kenya's railway development was the singular thematic alternative that was pursued. Based on the outcomes, conservation actions can be prioritised based on the level of need.

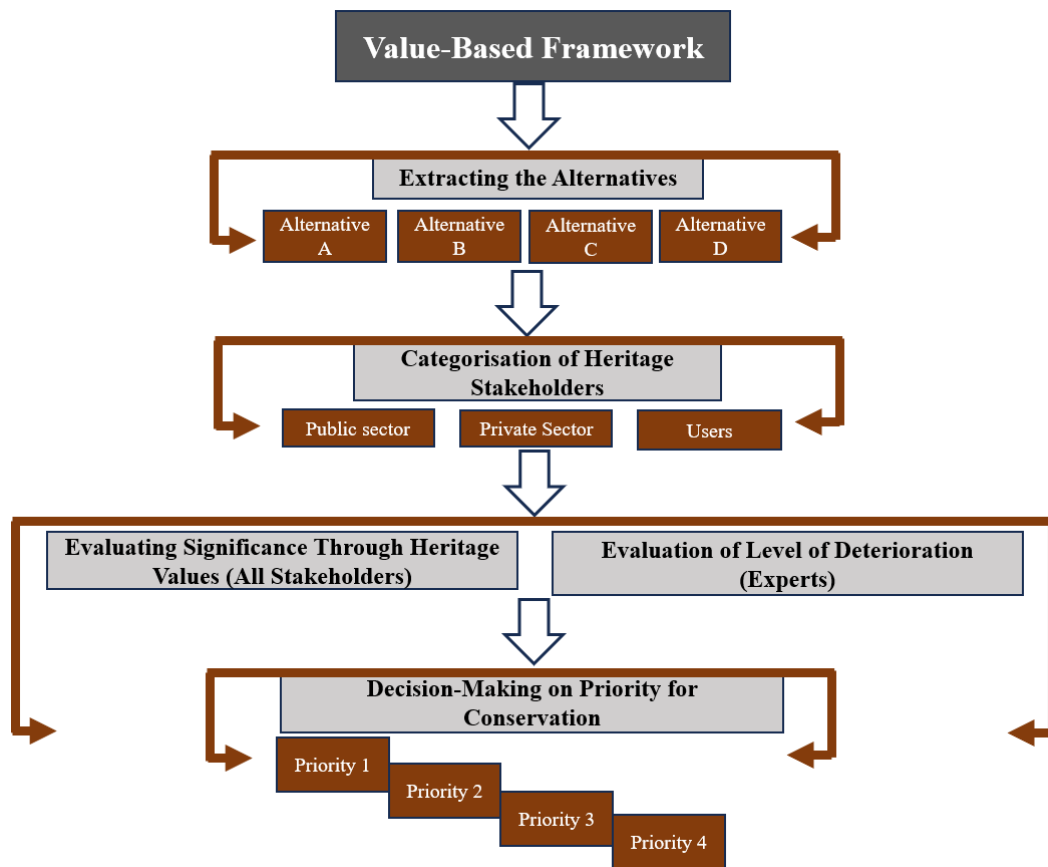


Figure 2.13: Value-Based Decision-Making Framework

Source: Adapted from Sahraiyanjahromi & Türker (2019)

It is beyond any argument that the criteria used in a ranking process and their weightings may be different for various projects to reflect the differences in the objectives, complexity, and environmental constraints of these projects. Therefore, attempting to arrive at a universal set of weightings may be far from practical (Yau, 2009).

2.6.6 Approach to Management of Heritage

Silverman (2015) affirms that heritage is ultimately a matter of spatial, cultural, economic, and social rights whose discussion is current. Urban heritage conservation must retain the inclusive character of the heritage city, prioritising the enhancement of the living conditions of the people and their contribution to the production of heritage, as well as the benefit from its outcomes (González Martínez, 2017). Kigadye (2014)

argues that although there may be some inherent value(s) in heritage places, conservation approaches must be coupled with integrated strategies for managing the built environment as a whole and with participatory processes that engage communities and stakeholders in decision-making about their heritage.

Conservation of historic towns is a tool among many to steward cultural resources, foster a sense of community and identity, promote sustainability in building and construction, and improve quality of life (Kigadye, 2014). The Historic Urban Landscape (HUL) recommendation provides a framework for urban conservation that addresses 21st-century societal demands while acknowledging and honouring the world's vast array of cultural and spiritual dimensions. (Bandarin, 2019).

2.7 Historic Planning Practice

Historic planning deals with planning for places which have special architectural or historic merit, worthy of conservation or enhancement, but present sustainability challenges (Leung, 2013; Slack, 2020). Historic planning, therefore, aims to contribute to the achievement of sustainable development objectives: social, economic, and environmental (Historic England, 2023). One of the main goals of urban regeneration plans and initiatives is the preservation of urban history, which is a major branch of urban planning and administration. (Zancheti & Hidaka, 2011). The necessity to provide cities with a unique identity and a "quality" has grown in importance among national and municipal politicians as industrial models dominate the creation of cities. Many of these demands can be met by urban heritage, which serves as a store of enduring social practices in place-making as well as a location that symbolises history and customs (Bandarin, 2019).

In their discussion on contemporary approaches to conservation, Zeayter & Mansour (2018) appreciate that since the early 1990s, the influence of urban planning has been widely recognised in the conservation field. He points out that in the past two decades, the approaches that were established internationally are the “sustainable approach, the “culture tourism approach,” the “living heritage approach,” and the “historic urban landscape approach.” In addition to preserving historic structures and land, heritage

conservation aims to harmoniously integrate modern man's creations into the surrounding landscape (Fram & Weiler, 1984).

Three interrelated objectives, physical, spatial, and social, have to be addressed in conservation (Nasser, 2003). Physically, it is linked to building preservation and the type of new development to ensure that a town's past, its present, and its future combine to create a recognisable unit, so that its growth can be seen and felt to be continuous (Worskett, 1969 as cited in Nasser, 2003). It involves improving old environments to bring them into modern use by adapting the townscape (Nasser, 2003). Additionally, in the spatial sense, historic planning views the townscape as a holistic entity, with its relationships between spaces and their use, as well as circulation and traffic, while socially, concerning the users, local community, and the urban population.

According to the Vancouver Heritage Foundation (2016), a successful conservation plan requires consensus resolution of the heritage of the place, including social, economic, and environmental values, to mitigate the negative effects often stemming from ambiguity in the identification and management of value. It should provide the policy framework for the sustainable use, maintenance, repair, alteration, and management of the historic place. ICOMOS (1987) advocates for the harmony of both private and community life in these conservation areas and encourages the preservation of those cultural properties, however modest in scale, that constitute the memory of mankind.

While discussing culture and the new urban conservation paradigm, Bandarin (2019) argues that urban heritage preservation should not be viewed as an "alternative" to urban growth, but rather as a crucial component of a city development strategy that necessitates a thorough comprehension of local cultural values to succeed. The New Urban Agenda (NUA), which pledges member states to support the use of cultural heritage for sustainable urban development and acknowledges its role in promoting responsibility and participation, reflects this principle. (United Nations, 2017).

Veldpaus, Pereira Roders, & Colenbrander (2013) highlight a shift in perspective of scale from that of a "monument" or object to that of an urban scale, as is the case with

the Historic Urban Landscape approach. The new emphasis is on the townscapes, which include the train stations as the core, the surrounding infrastructure and heritage buildings, and the urban area in which they are located, as opposed to stand-alone buildings in the precincts. Further, a question arises, at a larger scale, such as a region, what kind of issues need to be taken care of in the large areas between one town and another?

In England, much of Liverpool's 1830 railway heritage remains in use, testifying to the rigorous quality of the original engineering. Equally, this means that historic integrity needs to be balanced against improvements to meet contemporary requirements (Connelly and Hebbert, 2011). On the other hand, Zancheti (2014) emphasises that urban managers and other stakeholders take action based on the characteristics of legacy artefacts that communicate cultural meanings discovered through intersubjective processes to ensure sustainable conservation. These qualities could be intangible or tangible. He presents three reasons why sustainable conservation seeks to maintain the conditions for the interpretation of the relation of attributes to values and meanings between generations. The reasons are: to preserve records of meanings passed down from previous generations for the benefit of current and future generations, to preserve the current meanings of heritage for future generations, and to allow future generations the opportunity to interpret and connect new meanings with both current and historical heritage.

Participation in the planning process is also an important theme in heritage studies; bottom-up approaches may contribute to the formulation of long-term efforts that are specifically adapted to local conditions and needs (Nilson & Thorell, 2018). The values associated with the bottom-up approach include history, art, Indigenous knowledge, aesthetic, ethnological and anthropological.

Janssen, Luiten, Renes, and Rouwendal (2014) present the Belvedere Memorandum and its incentive programme (1999–2009) by which the Dutch government actively encouraged the integration of heritage conservation with spatial planning. In addition, they argue that the Belvedere innovation programme redefined and boosted the relationship between heritage and spatial planning in the Netherlands. Its strategy was

designed not to turn townscape heritage into museum pieces but to keep it in social, functional, and economic circulation. The ten years of the programme were an exercise in uniting the heritage sector and finding new, more productive links between heritage and nature management, heritage and water management, heritage and property development, and heritage and leisure.

The notable results of the programme are that interest in the history of buildings, neighbourhoods and landscapes has seen a sharp increase in the Netherlands. Also, in large parts of the heritage sector, the old defensive attitude has cautiously made way for a more offensive, future-oriented attitude. The link between heritage preservation and spatial planning was incorporated into policy in all kinds of ways over the ten years and into new collaborative practices in heritage management, planning, and design. They finally conclude that the focus of Dutch heritage management has finally shifted from an object-based approach to a more area or region-based approach. However, going forward, they also point out the new context in which heritage management is now taking place, in which structural changes in the field of spatial planning, ranging from growth to stabilisation or depopulation and changes in commissioning will define how it develops.

A research project was also conducted for the City of Matlosana in the North-West Province, South Africa, aimed at developing proposals to integrate urban conservation and urban development in Klerksdorp, the second-oldest city in the old Transvaal Republic (Puren and Jordaan, 2014). Findings in this study also suggested a shift in how urban conservation is viewed in the sense that it should move from preserving heritage resources as isolated objects towards a more integrated view where heritage resources are proactively integrated into the contemporary uses and future development of cities to ensure the continued existence of these assets. The Project report emphasised the proactive role of urban planning in combining the past with contemporary use and possible levels of integration of urban conservation and urban development. The approach suggested integrating townscape heritage into the current urban milieu to fulfil current needs, such as social, cultural, and economic needs, without destroying or altering them negatively.

2.8 Frameworks for Conservation Planning

Feilden and Jokilehto (1998) present a critical process for restoration and conservation. They argue that the process should be based on a clear definition of the heritage resource and its relationship to its setting. The process has four distinct steps: survey and documentation of the resource, its historical setting, and its physical environment; critical historic definition and assessment of the object and its setting to give it its significance; scientific analysis and diagnosis of the material substance and associated structural system; long-term and short-term strategies for conservation and management of change. In this argument, however, they fall short by not addressing the place of values in the restoration and conservation process.

The review of conservation planning frameworks below presents a local and an international case of Lamu Old Town in Kenya and the Burra Charter of Australia. For Lamu, the review presents the background, values and justification for conservation, the strategies of the conservation plan and a critique. Furthermore, the review of the Burra charter focuses on the outline process for the planning and management of heritage.

2.8.1 Historic Planning for Lamu

Lamu is a historic Swahili town within an archipelago on the northern coast of Kenya. It is listed as a UNESCO World Heritage Site. The old town was strongly influenced by cultural and religious factors, particularly by trade and the spread of Islam before the fifteenth century (Ghaidan, 1974). The interaction between the Bantu, Arabs, Persians, Indians, and Europeans is expressed in Lamu Old Town's architecture and town planning (*Lamu Old Town - UNESCO World Heritage Centre*, 2001). This influence gave rise to the unique Arab-African culture called Swahili that has continued to sustain the existence of the town. Lamu presents as a remarkably well-preserved historic town. The introduction of the Uganda Railroad from Mombasa to Lake Victoria in 1901 isolated Lamu as the railroad's terminus at Mombasa became the main seaport of the East African coast (Young, 1986).

According to Siravo & Pulver (1986), Lamu's main value lies in its sense of continuity with a rich past, a sense which is carried on by its traditional values and way of life. Further, the absence of automobiles reinforces an image of a thriving but seemingly pre-industrial Islamic town. These present the unique townscape characteristics and values of Lamu town. More of Lamu's original character is preserved than in any other Swahili settlement. It has withstood both physical destruction and tourism-related activities (Ghaidan, 1974). Young (1986) identified the serious conservation challenges facing the town as: lack of maintenance, population increase and expanding numbers of tourists. These are the key justification points for heritage conservation in Lamu.

The Lamu Conservation Plan was published in 1986, after a cooperative study and heritage survey involving the Lamu community, the Department of Physical Planning, the Ministry of Local Government, and the National Museums of Kenya (Young, 1986). The plan sought to address neglect and decay on one side, and new, unregulated construction and radical alterations on the other threatened the structures (Siravo & Pulver, 1986). It zoned out land uses in the town and outlined development guidelines for the conservation area. Demolition of buildings of historical interest and architecturally significant streetscape was prohibited. Additionally, all applications for repair, alterations, and new development in the conservation area were to be reviewed by a special planning and conservation authority currently known as the Lamu World Heritage Site and Conservation Office (*Lamu Old Town - UNESCO World Heritage Centre*, 2001). It recommended the improvement of the infrastructure; water distribution networks, open drain systems, pit latrines and electricity supply.

According to Young (1986), the plan, though progressive, failed to address financial issues relating to conservation regulations set forth by its implementation. The plan recognised the importance of values but did not attempt to specifically identify them. Therefore, the actions proposed in the plan were not guided by the meanings held by the community.

2.8.2 Burra Charter

The Burra Charter by ICOMOS Australia (2013) presents a model example at a national level of steps in planning for and managing a place of cultural significance, as presented in Figure 2.14. The charter advocates a cautious approach to change: “do as much as necessary to care for the place and to make it usable, but otherwise change it as little as possible so that its cultural significance is retained”. This is the theoretical approach that is favoured in global heritage conservation practice.

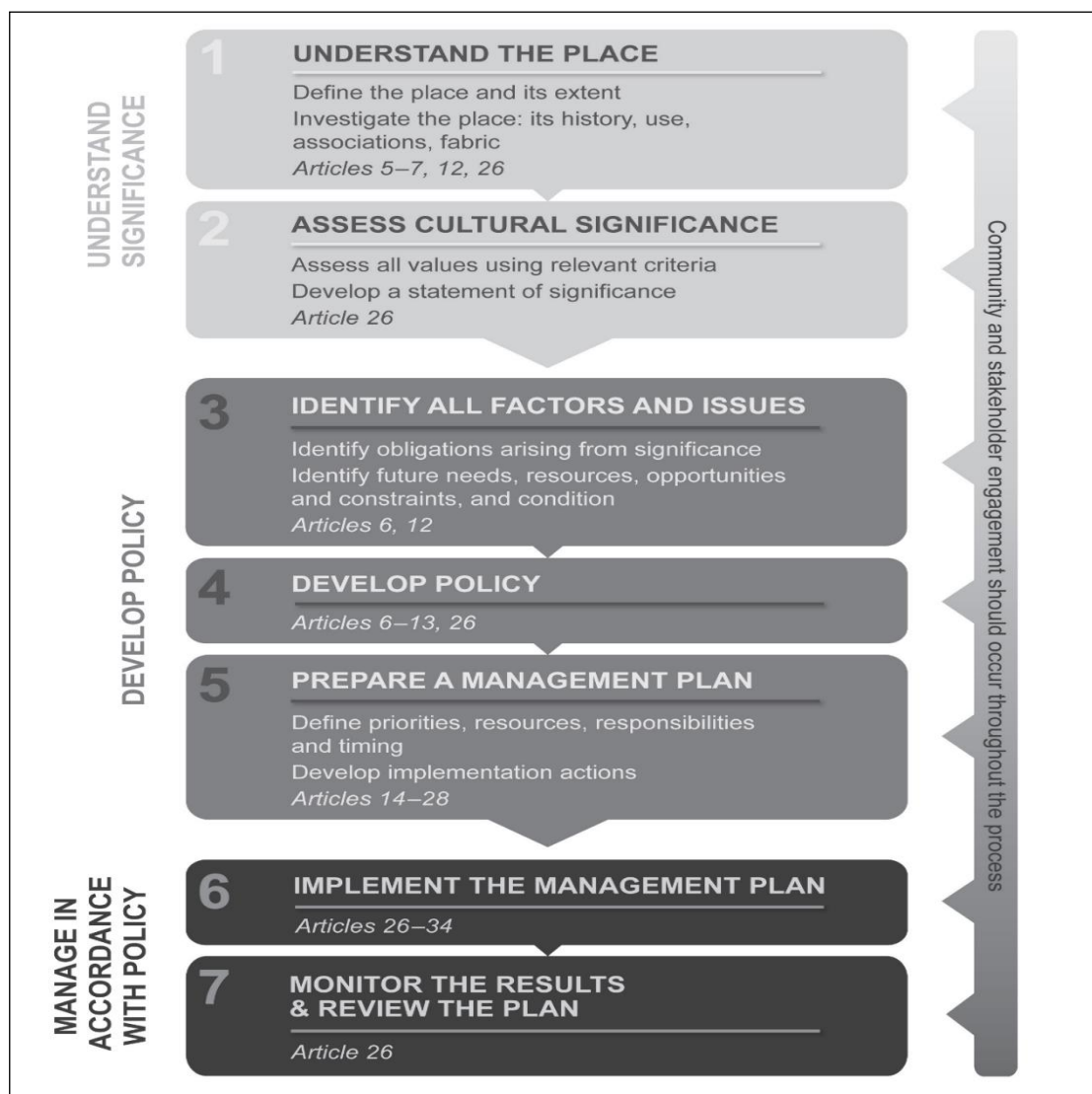


Figure 2.14: Steps in Planning and Managing a Place of Cultural Significance

Source: (ICOMOS Australia, 2013)

The reshaped planning process and the steps in planning for and managing a place of cultural significance outlined in the Burra Charter can easily be compared by drawing similarities in the flow of the stages involved in each, from establishing the need, and analysis of factors and conditions at hand, to proposing actions and implementing them.

Patrick Geddes and Lewis Mumford considered cities as ‘cultural entities’ and called on city planners to observe the ‘intangible systems’ that supported the physical and natural features, to plan the most proper course of action or change in favour of their development (Garcia & Cardoso, 2019). The need to plan for and manage change or even continuity has largely been ignored by experts. Yet, within the context of planning in historic environments, a dichotomy exists between preserving the past for its intrinsic value and the need for development in response to changing societal values (Nasser, 2003).

Therefore, planning needs to respond to this conflict between the need for continuous development in urban areas and the need to conserve historic messages by bringing harmony to the urban areas. Consequently, any sustainable future for historic contexts must be intrinsically linked to its past, not just in the continuity of the built heritage and urban spaces but also in the living culture that created and is still shaping the distinct townscape, or *genius loci*, that characterises heritage places. This, therefore, calls for a value-based approach as well as the living heritage approach that aims at achieving sustainability in conservation.

2.9 International Instruments for Urban Conservation

2.9.1 UNESCO Urban Heritage Conservation Principles

The phrase "International Principles of Conservation and Preservation" primarily refers to globally accepted and cooperatively created principles and standards for the preservation, maintenance, and handling of cultural assets, both immovable and movable (Merbach and Stamm, 2014). During the twentieth century, since the Second World War, the protection of cultural heritage has grown to international dimensions, involving international organisations such as UNESCO, ICCROM, ICOM, and ICOMOS, the definition of charters, recommendations, guidelines, and conventions,

as well as promoting awareness campaigns and developing specialised training activities (Jokilehto, 2017). There are numerous worldwide charters and conventions that include criteria, guidelines, and principles for the preservation of different facets of cultural and natural heritage. Over the years, several charters have been accepted by professional associations and international bodies to direct heritage management initiatives.

The evolution of the ideas of heritage and conservation in modern times, which are now recognised as essential components of national culture since they are an integral part of creating and maintaining a group's cultural identity (Merbach and Stamm, 2014). The concepts of heritage and conservation are reflected in the various global conservation principles, which have continued to evolve since the publication and adoption of the Athens Charter (1931), promoting modern conservation policy at an international level. Merbach & Stamm (2014) add that conservation principles evolve as a reaction to major transformations in the socio-political, cultural, or economic context of life. Conservation of cultural heritage is the basic reference and the line of conduct for international charters and recommendations (Jokilehto, 2017).

International principles of conservation and preservation have been developed over time to guide countries and their experts in the practical implementation of this doctrine. These principles all identify and define the following: the conservation subject (what), the conservation meaning and context and aim (why and for whom, the relevance of context), and the conservation rules and methods (how, scientific and technical aspects) (Merbach & Stamm, 2014).

Internationally recognised guidelines for architectural and site conservation are codified in the Venice Charter. It lays out conservation principles founded on the idea of authenticity and the significance of preserving a site's or building's historic and physical context (ICOMOS, 1964). The most important international conservation agreement is still the Venice Charter. It declares that monuments should be preserved as historical evidence in addition to being works of art. Additionally, it lays forth the preservation rules that apply to restoring structures that have been constructed during various eras (ICOMOS, 1964).

The Charter of Venice affirms the 1994 Nara Document on Authenticity, which serves as the primary criterion with regard to values. The knowledge of authenticity plays a key role in all scientific investigations of cultural assets, in conservation and restoration planning, as well as within the inscription methods employed for the World Heritage Convention and other cultural heritage inventories (ICOMOS, 1994).

Historic urban areas of all sizes, including cities, towns, and historic centres or quarters, as well as their natural and man-made surroundings, are covered under the Washington Charter for the Conservation of Historic Towns and Urban Areas (Washington Charter 1987). It asserts that all urban communities, whether they have developed gradually over time or have been created deliberately, are an expression of the diversity of societies throughout history. The charter states that today, many such areas are being threatened, physically degraded, damaged, or even destroyed, by the impact of the urban development that follows industrialisation in societies everywhere. This charter, therefore, seeks to preserve the memory of mankind concerned with the expression of the diversity of societies throughout history. Finding the heritage values within the cultural context allows for the extraction of variety. The charter outlines the values, goals, and procedures required for historic towns and metropolitan areas to be preserved (ICOMOS, 1987).

According to UNESCO (2011a), the historic urban landscape approach goes beyond preserving the physical environment and concentrates on the whole human environment, including all of its material and immaterial components. By considering the built environment as it now exists, intangible heritage, cultural variety, socioeconomic and environmental considerations, and local community values, it aims to make planning and design interventions more sustainable (UNESCO, 2013). As an approach, it provides the basis for the integration of urban conservation within an overall sustainable development framework through the application of a range of traditional and innovative tools adapted to local contexts (UNESCO, 2016).

The Nizhny Tagil Charter for the Industrial Heritage by The International Committee for the Conservation of the Industrial Heritage. (TICCIH) outlines the values of industrial heritage; the importance of identification, recording, and research; legal

protection; maintenance and conservation; education and training; and presentation and interpretation (TICCIH, 2003). TICCIH (2003) states that the buildings and structures built for industrial activities, the processes and tools used within them, and the towns and landscapes in which they are located, along with all their other tangible and intangible manifestations, are of fundamental importance.

Joint ICOMOS – TICCIH Principles for the Conservation of Industrial Heritage Sites, Structures, Areas, and Landscapes acknowledges that around the world, Numerous locations, buildings, complexes, towns and settlements, regions, landscapes, and routes are evidence of human industrial production and extraction operations. (ICOMOS, 2011a). The principles state that, in many places, this heritage is still in use and industrialisation is still an active process with a sense of historic continuity, while in other places it offers archaeological evidence of past activities and technologies. It encompasses numerous intangible aspects that are represented in the abilities, recollections, and social lives of employees and their communities, in addition to the material history connected to engineering, town planning, architecture, and industrial technology and procedures. The principles guide the documentation and understanding, conserving, presenting, and communicating the heritage dimensions and values that concern industrial heritage structures, sites, areas, and landscapes and their values.

The fact that human settlements in general and historic towns and urban areas in particular are changing, and that mankind must deal with these changes now (ICOMOS, 2011b). The primary goal of the Valletta Principles is to offer guidelines and strategies that may be used for any kind of intervention in urban and historic municipalities. The goal of these guidelines and strategies is to protect historic towns' and their environments' worth, as well as their integration into the social, cultural, and economic life of our times.

ICOMOS Charter- Principles for the Analysis, Conservation and Structural Restoration of Architectural Heritage (2003) acknowledges that structures of architectural heritage, by their very nature and history (material and assembly), present several challenges in diagnosis and restoration that limit the application of modern

legal codes and building standards (ICOMOS/ISCARSAH, 2003). Recommendations are desirable and necessary to ensure rational methods of analysis and repair methods appropriate to the cultural context. These recommendations are intended to be useful to all those involved in conservation and restoration problems, but cannot in any way replace specific knowledge acquired from cultural and scientific texts.

The International Network for Traditional Building, Architecture & Urbanism (INTBAU) is an active network of individuals and institutions dedicated to the creation of humane and harmonious buildings and places that respect local traditions. INTBAU (2001) acknowledges that local, regional, and national traditions provide the opportunity for communities to retain their individuality with the advance of globalisation and that traditional buildings and places maintain a balance with nature and society that has been developed over many generations. INTBAU brings together those who design, make, maintain, study or enjoy traditional buildings, architecture, and places.

Principles for the Recording of Monuments, Groups of Buildings and Sites (1996) acknowledges that a distinctive manifestation of human effort, cultural heritage, is constantly in danger, and is one of the principal ways available to give meaning, understanding, definition, and recognition of the values of the cultural heritage (ICOMOS, 1996). The responsibility for conserving and maintaining the cultural heritage rests not only with the owners but also with conservation specialists and the professionals, managers, politicians, and administrators working at all levels of government, and with the public (ICOMOS, 1996). The principles serve to outline the main justifications, roles, planning procedures, contents, administration, and sharing concerns for the preservation of cultural assets

The Declaration of ICOMOS Marking The 50th Anniversary of the Universal Declaration of Human Rights (1998) (ICOMOS, 1998) affirms that Given the irreplaceable nature of the tangible and intangible past it represents and the fact that it is in danger in a world that is always changing, the right to cultural heritage is an essential component of human rights. ICOMOS (1998) states that this right carries

duties and responsibilities for individuals and communities as well as for institutions and states.

Five rights are laid out in the declaration: the right to have the authentic testimony of cultural heritage, respected as an expression of one's cultural identity within the human family; the right to better understand one's heritage and that of others; the right to the wise and appropriate use of heritage; the right to participate in decisions affecting heritage and the cultural values it embodies; the right to form associations for the protection and promotion of cultural heritage. They assume appropriate development strategies and an equitable partnership between society, the private sector, and individuals to harmonise interests affecting cultural heritage and to reconcile preservation with development (ICOMOS, 1998).

The concept of cultural heritage has been broadened from historic monuments and works of art to include ethnographic collections, historic gardens, towns, villages, and landscapes (Jokilehto, 2017). The increase in scale and the recognition of diversity in cultures and physical conditions have led to a new situation, where the meaning of cultural heritage itself, and the policies for its safeguard, have required reassessment (Jokilehto, 2017).

2.9.2 Sustainable Development Goals

This study has identified Sustainable Development Goals (SDGs) 1,3,4,8,9,11,12, and 16 that are related directly (United Nations, 2015). The findings of the study contribute to the specific targets of the goals. Specific and practical ways in which urban heritage will contribute to the identified goals are identified. SDG 1 aims at eradicating poverty. From an economic point of view, leveraging heritage in all its forms can provide sustainable livelihoods for all. SDG 3 focuses on achieving good health and well-being. Conservation can involve proper planning and provision of decent housing, taking into account opportunities for adaptive reuse of built heritage and associated practices, as well as creating healthy environments. SDG 4 aims to achieve quality education. This study envisages heritage sites and practices to enhance the variety of learning environments, content, and curricula.

SDG 8 focuses on decent work and economic growth that can be achieved by the promotion and management of tourism in ways that respect and enhance the integrity of heritage and living cultures of host communities and their environments, SDG 9 on industry, innovation, and infrastructure can be related to the urban conservation research by pursuing the protection of tangible and intangible heritage resources from threats posed by infrastructure construction, industrialization, inappropriate regulation, and commercial exploitation.

SDG 11 on sustainable cities and communities is in the realm of urban planning and development. To ensure the sustainability of urban areas, the protection, conservation, and management of heritage as a priority component of urban planning has to be considered. SDG 12 advocates for responsible consumption and Production. Heritage conservation can be recognised as part of a strategy for using and reusing existing resources and contributing to ‘zero waste’ and circular economy policies. SDG 16 deals with peace, justice, and strong institutions. It is therefore possible to achieve spaces and opportunities for intercultural encounters and communication through cultural heritage sites and practices, by engaging all groups of people.

2.9.3 New Urban Agenda

The New Urban Agenda - Habitat III (2017), which is a framework that was adopted as a shared global vision for sustainable urban development, where cultural heritage conservation is seen as one of the most important components in accomplishing its objectives. Leveraging both real and intangible natural and cultural assets is one of the transformative commitments for sustainable urban development, in cities through integrated urban policies and adequate investments. The agenda further commits members to promote planned urban extensions while preserving cultural heritage; encouraging creative and sustainable use of architectural monuments and places to create value via respectful repair and adaptation; and supporting heritage conservation initiatives as a means of bolstering urban economies (*The New Urban Agenda - Habitat III*, 2017).

2.9.4 African Union Agenda 2063

Aspiration 5 of the African Union Agenda 2063 envisages an Africa with a strong cultural identity, common heritage, values, and ethics. It argues that African cultural identity, values, and ethics as a critical factor in Africa's re-emergence on the global stage in the decade of the 2010s, will be promoted and strengthened by 2063 (African Union Commission, 2015). The agenda importantly acknowledges the threats to conservation of Africa's cultures, heritage and values; one of them being Africa's poor representation in the list of protected world cultural heritage sites. This threat risks hastening the erosion of these sites and their loss. From an African standpoint, heritage is a resource whose loss cannot be afforded. There is a need to leverage Africa's history, culture and heritage to contribute to the sustainable development of the continent.

2.9.5 Protocol on the Establishment of the EAC Common Market

The Protocol on the Establishment of the East African Community (EAC) Common Market (2009) recognises cultural heritage as part of the "environment" in its broad definition. Article 39 (4) (a) on the harmonisation of social policies, the protocol requires that partner states promote, preserve and integrate cultural activities and heritage in development initiatives. Article 43 (4) (a) on the co-operation in intellectual property rights. The Protocol requires partners to establish mechanisms to ensure the legal protection of traditional cultural expressions, traditional knowledge, genetic resources and national heritage.

2.10 Legal, Policy and Institutional Frameworks for Historic Planning

2.10.1 Legal Framework for Historic Planning

The main legal frameworks for historic planning in Kenya are the Constitution of Kenya, the National Museums and Heritage Act, Cap. 216, Physical and Land Use Planning Act and the County Governments Act. Their relevance and application are discussed below.

2.10.1.1 The Constitution of Kenya

Article 11. (1) of Kenya's constitution recognises culture as the foundation of the nation and as the cumulative civilisation of the Kenyan people and nation. Article 11. (2) (a) commits the state to “promote all forms of national and cultural expression through culture and heritage” (Republic of Kenya, 2010). In addition, article (3) (a) mandates the parliament to enact legislation to ensure that communities receive compensation or royalties for the use of their cultures and cultural heritage.

2.10.1.1 National Museums and Heritage Act Cap. 216

The National Museums and Heritage Act Cap. 216, (2012) defines “cultural heritage” as “monuments, architectural works, works of monumental sculpture and painting, elements or structures of an archaeological nature, inscriptions, cave dwellings, and combinations of features, which are of universal value from the point of view of history, art or science”. It also includes “groups of separate or connected buildings which, because of their architecture, their homogeneity, or their place in the landscape, are of outstanding value from the point of view of history, art, or science; works of humanity or the combined works of nature and humanity”. It also considers areas including “archaeological sites which are of outstanding value from the historic, aesthetic, ethnological, or anthropological point of view, and include objects of archaeological or palaeontological interest, objects of historic interest, and protected objects”.

Section 4 of the National Museums and Heritage Act Cap. 216, (2012) on the functions of National Museums gives it authority to “identify, protect, conserve and transmit the cultural and natural heritage of Kenya”. Section 5 on Powers of the National Museums, the act permits the National Museums to “sell, lease or exchange immovable property from time to time vested in the National Museums which is no longer, or not, for the time being, required for any such purpose”. It also allows for the “erection, maintenance, and improvement of buildings, including staff quarters, to be used for any such purpose”.

Section 25 on the declaration of monuments, the law gives authority to the “minister concerned with heritage after consultation with the National Museums to declare by notice in the Gazette the following: an open space to be a protected area within the meaning of this Act; a specified place or immovable structure of historic interest, and a specified area of land under or adjoining it which is required for maintenance thereof, to be a monument within the meaning of the Act; a building and a specified area of land adjoining it which is required for the maintenance thereof to be a protected building within the meaning of the Act”.

Section 6 of The Heritage and Museums (Amendment) Bill (2023) on the functions of the National Museums proposes strengthening the obligation of the National Museums of Kenya. Among the functions proposed is to “develop principles and standards and make recommendations on policies for the management of the national heritage resources.” This is perhaps in response to the current global discourse on the subject of universal conservation principles. The resulting principles and standards should coordinate and guide conservation activities undertaken to protect sites of Outstanding Universal Value in Kenya.

2.10.1.2 Physical and Land Use Planning Act

On principles and norms of physical and land use planning, the Physical and Land Use Planning Act (2019) directs that physical and land use planning shall be inclusive and must take into consideration the culture and heritage of the people concerned. On the preservation of heritage sites, the law states that, subject to the provisions of the National Museums and Heritage Act, Cap. 216 (2012), a county government may, after consultation with the Cabinet Secretary responsible for national heritage, serve on the owner or occupier of a building which, in the opinion of the county government, is of special architectural value or historic interest, an order prohibiting the demolition, alteration or extension of such building. According to the Act, all physical and land use development plans shall take into account and record all heritage sites declared or deemed to have been declared under the National Museums and Heritage Act, Cap. 216 (2012). It further sets out that the owner of any building which shall be declared a national monument shall be compensated for the loss of use and income.

2.10.1.3 The County Governments Act

Article 103. (g) stipulates the objectives of county planning to include the protection of historic and cultural heritage, artefacts and sites within the county (Republic of Kenya, 2012a). Additionally, Article 104. (4) of the County Governments Act obligates counties to promote public participation, and non-state actors shall be incorporated in the planning processes by all authorities, which is an important component required in historic planning.

2.10.2 Policy Framework for Historic Planning

2.10.2.1 National Policy on Culture and Heritage

The National Policy on Culture and Heritage (2009) addresses challenges posed by modernisation, free trade, democracy, good governance and the need for the respect of human rights, as well as balancing the diversity of cultural expression with economic and sustainable development. The policy also highlights that Kenya adheres to UNESCO's definition of culture, the whole complex of distinctive, spiritual, material, intellectual and emotional features characterising a society or social group. The National Policy on Culture and Heritage outline some key policy Statements on historical sites, monuments and the physical environment.

The policies commit the government to, establish and fund institutions at different levels to ensure the conservation and promotion of Kenya's immovable heritage; encourage the participation of local communities in the planning and management of sites and monuments; the protection and promotion of Kenyan contemporary architecture, and well thought out urban planning; and encourage sustainable projects in areas with immovable heritage to contribute to people's social welfare, improved quality of life and sustainable development.

2.10.2.2 National Urban Development Policy

The National Urban Development Policy (NUDP,2016) also identifies key issues under conservation and urban heritage. They include a lack of a unified policy on urban heritage; inadequate collaboration between planning authorities and the National

Museums of Kenya; a lack of awareness and appreciation of the urban heritage; conflict between the economic and intrinsic value of heritage sites; inadequate budgetary allocations to conservation of urban heritage; and loss of heritage sites to the development of urban areas.

In response to the issues sighted in the NUDP, five key recommendations are made. The recommendations include legislating on the criteria for identification and classification of urban heritage sites; establishing mechanisms for the awareness of the importance of the conservation of urban heritage; establishing collaboration mechanisms among players in the conservation of urban heritage; developing an integrated urban heritage conservation strategy; and domesticating international heritage treaties and conventions on urban heritage.

2.10.2.3 Kenya Vision 2030

Kenya Vision 2030 (2007) acknowledges that some national heritage, such as indigenous technology, remains unmapped and is exposed to misuse by external interest groups. It aims to take measures to identify and protect such heritage. There is appreciation that the effort to recognise Kenya's heritage resources is not adequate for the potential heritage available in the country, and therefore, more action is required.

The framework envisions that urban planning is properly integrated to entrench local level participatory planning and development, where heritage conservation should be part of the process. To encourage heritage tourism, the key strategies employed are: gazettelement of new heritage sites; monument rehabilitation and maintenance promotion; heritage research programs; and new museums and associated establishments at strategic areas in counties (*Development of Niche Products Programme, Kenya Vision 2030, 2025*)

In 2022, the Kenya Vision 2030 Delivery Board reported some major activities related to the promotion of heritage conservation (*Kenya Vision 2030 Flagship Programmes and Projects Progress Report (FY 2020/2021), 2022*). One is related to the enhancement of awareness on heritage sites through the sensitisation of stakeholders on mapped out cultural and historical circuits in the Coast, Nairobi, and Western

regions of Kenya. Another is the Best Monuments Programme, which involved the selection of two monuments per county based on public perception ratings, and where the selected monuments would be marketed and promoted as tourism niche products alongside the seven UNESCO World Heritage Sites. Such activities help in increasing the national heritage inventory and the sustainability of the social-cultural environment.

2.10.3 Institutional Frameworks for Historic Planning

National Museums of Kenya (NMK) is a government corporation established by the National Museums and Heritage Act, Cap 216 (2012). NMK is a multi-disciplinary institution whose mandate is to collect, preserve, study, document and present Kenya's past and present cultural and natural heritage (National Museums of Kenya, 2022). NMK also manages Museums, Sites and Monuments of national and international significance as well as collections of Kenya's living cultural and natural heritage. It is obliged to work with county governments in Kenya to achieve sustainable heritage conservation. However, the envisioned collaborative action of identifying and conserving heritage seems to be weak. Perhaps NMK needs to initiate possible heritage identification processes and prompt counties into action, with a feedback process to list the urban heritage.

The 47 County Governments in Kenya are mandated through the County Government Act in Article 104. (2) have the obligation to plan through a county planning framework that shall integrate economic, physical, social, environmental and spatial planning (County Governments Act No. 17, 2012). According to Article 105. (1) (a), a county planning unit shall be responsible for coordinating integrated development planning within the county. The counties, as the key planning agencies, should direct historic planning within their jurisdictions in coordination with the national government and the National Museums of Kenya.

The planning law in Kenya envisions that planning takes into account the culture and heritage of the people concerned. In this context, during the urban planning processes, it would be expected that conservation plans would be developed to respond to existing urban heritage resources. In the case of Kiambu and Nakuru counties, where the towns

under study are located, there seem to be commendable conservation programmes for the natural and cultural heritage (*Kiambu County Integrated Development Plan 2023 - 2027, 2023; Nakuru County Integrated Development Plan 2023 - 2027, 2023*). However, the counties appreciate the need to map out more heritage resources. Consequently, there is a need to address historic townscape heritage conservation as a special urban planning program.

2.11 Related Theories

This study operates on the framework of various theories that include the figure-ground theory, the theory of ecological footprint, the contemporary theory of conservation, theories of attitude and the theory of likeability. The figure-ground theory was used to explain the spatial distribution of townscape heritage, the theory of ecological footprint was adapted to account for the density of the townscape heritage in the urban space, while the contemporary theory of conservation accounted for the process and action of urban conservation for sustainability. The city is an ecosystem, in the form of a compilation of past and present layers, providing a framework for the contemporary mechanisms of urban economy and life. No living environment is the product of a single historical period, and even the most puritanically planned cities have experienced change within several years of completion (Orbasli, 2002).

Attitude theories related to bringing forth opinions and value assessment are: functional theory, dissonance theory, learning theory and congruity theory. For this study, the theory of likeability dealt with evaluative responses among groups of people expressed as either liked or disliked.

2.11.1 Figure-Ground Theory

The communicative power of the figure-ground technique traces its roots in Gestalt psychology in the early 20th century (Hebbert, 2016). However, the concept and its use originated in 1748 when Giambattista Nolli, an Italian architect and surveyor published the *La Pianta Grande di Roma* in Figure 2.15 after he was commissioned in 1736, by Pope Clement XII to draw an accurate map of Rome to reorganise urban society and (Ji & Ding, 2021)gement system (Ji & Ding, 2021). Figure-ground plans

offer an extreme example of reductionism, omitting most levels of information typically mapped in built-up areas – topography, highway infrastructure, administrative boundaries, landscape features, and street names – to show just the plan form of buildings (Hebbert, 2016). The precision of the plan enables the analyst to work directly on it, finding axes, angles and alignments that are not evident elsewhere.

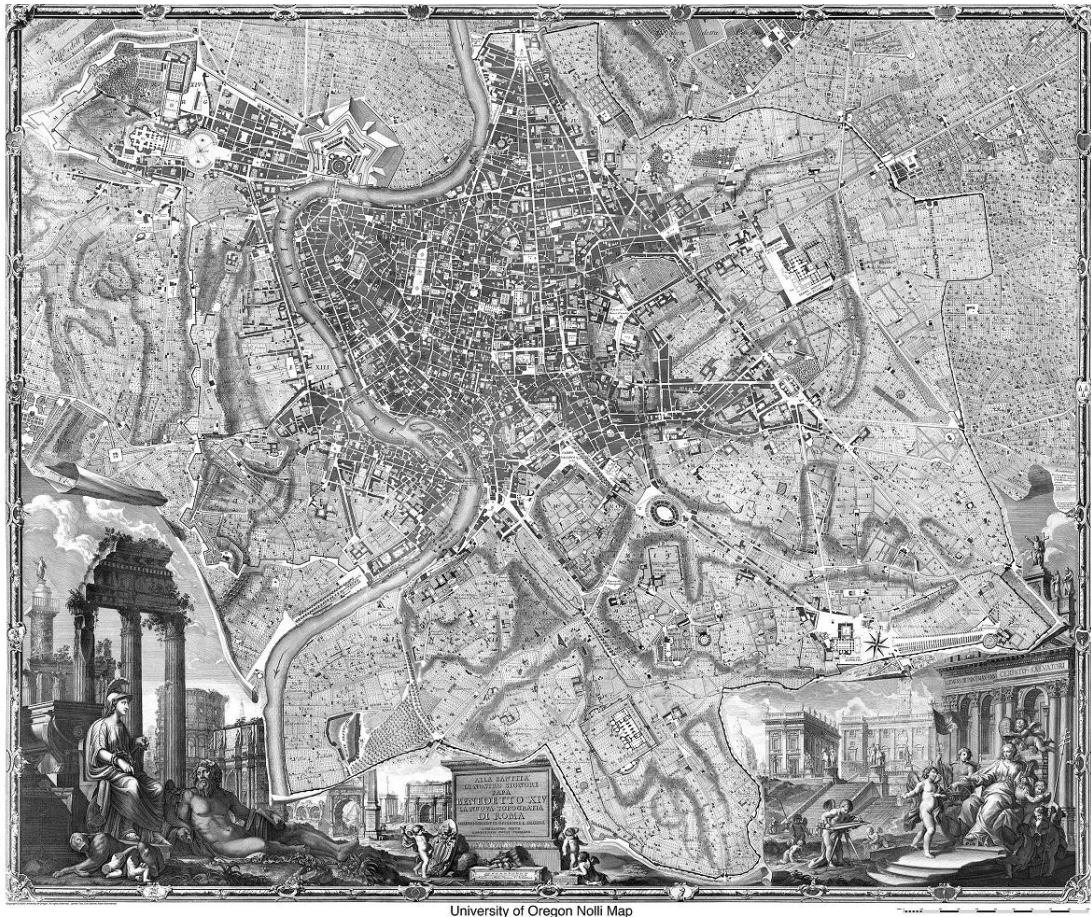


Figure 2.15: Giambattista Nolli's *La Pianta Grande di Roma*, 1748.

Source: (Tice, 2018)

An urban environment has a pattern of solids and voids, which together establish the city's spaces, streets, and built forms as shown in Figure 2.16. Built forms are perceived as solids, while open spaces and streets are perceived as voids. The figure-ground theory is commonly illustrated as a two-dimensional abstraction in plan view, where solids are black, and voids are white (Månsson, 2017).

According to Trancik (1986), the essence of the figure-ground theory lies in the manipulation and organisation of urban solids and voids. If the relationship of solids to voids is poorly balanced, fragments become disjointed, falling outside the framework; the result is lost space. The design of the object must be considered in conjunction with structuring the void so that building and space can effectively coexist.



Figure 2.16: Typical Figure-Ground Plan of a Portion of Boston City

Source: (Trancik, 1986)

Figure-ground analyses are especially useful in revealing the relationships of solids and voids that make up the fabric of the city and establish the physical sequences and visual orientation between places. Figure-ground studies revealed that the urban form is a combination of patterns of solids and voids that present in six typological patterns, namely, grid, angular, curvilinear, radial concentric, axial and organic, as shown in Figure 2.17. The patterns represent spatial organisation and influence how people experience the townscape, how they use the spaces and how they navigate through an urban area. Depending on the patterns, there can be experiences such as predictability and ease of wayfinding; unpredictability and surprise, aesthetics, focus or leisure.

Planning intentions can therefore be achieved by the manipulation of the patterns of solids and voids.

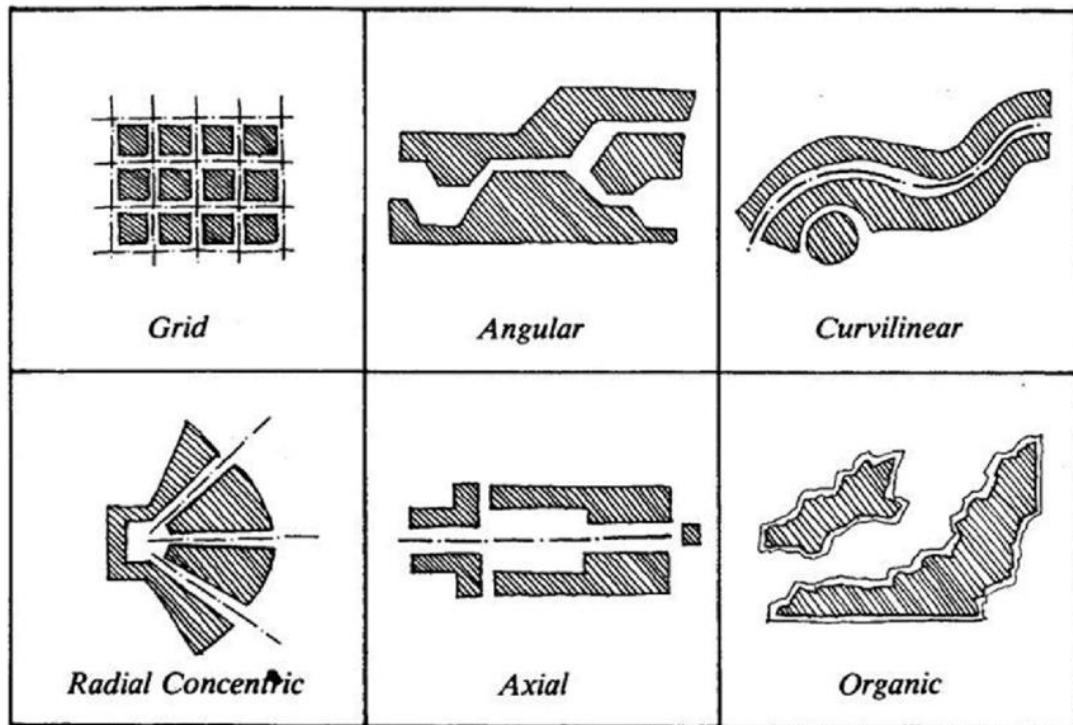


Figure 2.17: Typological Figure-ground Patterns

Source: (Trancik, 1986)

In his presentation of the figure-ground theory, Trancik (1986) explored the types of urban solids and voids. Urban Solids types were three, as shown in Figure 2.18, coded sequentially *A-C*. The first was characterised as freestanding public monuments that serve as centrepieces in the city fabric - *A*. The second was the predominant field of urban blocks, which might also be formed by neighbourhoods or districts of a consistent group form - *B*. The third was formed by directional or edge-defining buildings that are nonrepetitive, often linear in configuration - *C*.

On the other hand Figure 2.18, urban void types, as illustrated in, were coded sequentially *D-H*. First was the entry foyer space that establishes the important transition from personal domain to common territory - *D*. The second was the enclosed semi-private residential space for leisure or utility and circulation - *E*. The third was

the primary network of streets and squares that correspond to the predominant field of blocks and contains the active public life - *F*. The fourth was represented by public parks and gardens, which are larger voids that contrast architectural urban forms - *G*. While the linear open space system, commonly related to major water features such as rivers, waterfronts, and wetland zones, constitutes the fifth type of urban void - *H*.

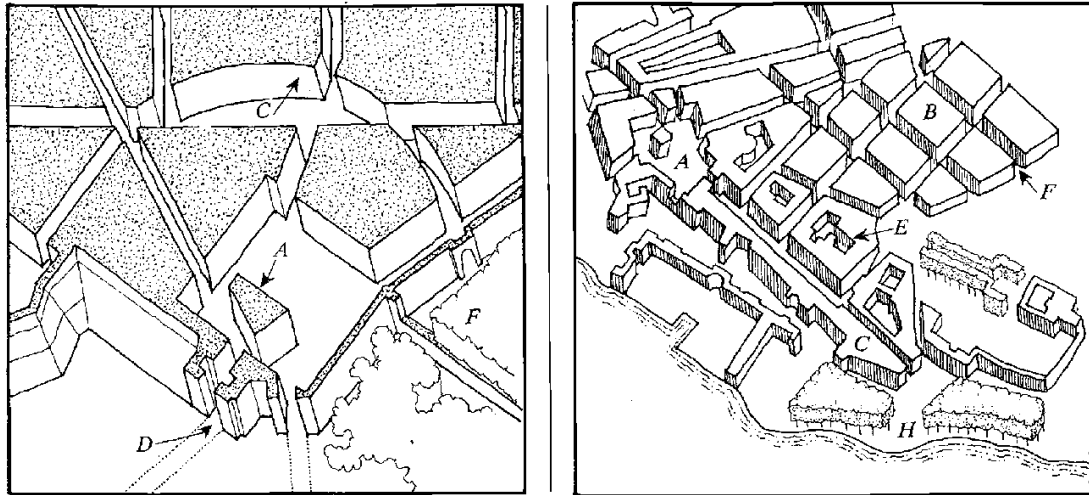


Figure 2.18: Types of Urban Solids and Voids

Source: (Trancik, 1986)

In this study, the figure-ground techniques were used to analyse the heritage footprint proportions in towns and also represent them graphically using a different shade. In addition, Trancik (1986) presented the linkage theory as well as place theory as being important in urban form analysis alongside the figure-ground theory. The linkage theory is the organisation of lines connecting parts of the city, and the design of a spatial datum from the lines relates buildings to spaces to create unity, described as ‘connectedness’. On the other hand, place theory involves understanding the cultural and human characteristics of the physical space described as ‘placeness’. The figure-ground theory interrelates with the linkage theory as well as place theory because it is the two-dimensional spatial depiction of places relative to other elements in space and their datum, therefore allowing for urban spatial analysis that is effective.

2.11.2 Theory of Ecological Footprint

Human demand for ecosystem services continues to increase, and this demand is outpacing the regenerative and absorptive capacity of the biosphere. As a consequence, the productivity of natural capital may increasingly become a limiting factor for human endeavour (Abdelwarith, 2013). According to Wackernagel and Rees (1998), the Ecological Footprint (EF) of a specified population or economy is the area of ecologically productive land and water that would be required continuously to provide all the energy or material resources consumed and to absorb all the wastes discharged by that population with prevailing technology, wherever on earth that land is located.

The ecological footprint can also be viewed as consumption (measured in, for example, kg) times production efficiency (hectares/kg) (Barrett, Birch, Cherrett, & Wiedmann, 2005). Production efficiency in ecological footprint terms means simply how much bio-productive area it takes to produce one unit of service of a given product (Barrett et al., 2005). EF, as an indicator, however, represents an original method of quantification of human use of natural resources, built on older concepts that relate human consumption of natural resources to the limited capacity of the natural environment (Aboelnaga, Tóth, & Neszmélyi, 2021). The original concepts include “appropriated carrying capacity” (Rees, 1992) and “carrying capacity” (Hardin, 1976).

This study borrows directly from the foundation of the theory, which is the area of land that is required to provide for a population, which in this case translates to the area within an urban area that is occupied by townscape heritage (Obatsa, Njuguna, Munala, Wahome, & Gitau, 2025). This adapted approach aims to establish densities of the townscape heritage in the urban space. EF is aimed at accounting for land that is needed to sustain the production of energy and material needed to support a population and absorb all waste produced. On the other hand, the proposed idea of Heritage Footprint (HF) in this study can be thought of as an accounting index for the area of land occupied by cultural heritage within an urban precinct.

The many forms of legacy, such as structures, monuments, streets, and locations, should be considered in measurements. In order to convey the distribution, densities, types, and linkages, the data can then be graphically and spatially depicted as a figure-

ground map. Productive land is equated to the area of land occupied by townscape heritage of cultural significance within the urban space (Obatsa, Njuguna, Munala, et al., 2025). Consequently, the heritage footprint can therefore be expressed in the form of a ratio of the area occupied by the identified heritage to the total area of land of the delimited precinct. For this study, the calculation of the heritage footprint involved the following stages:

1. Delimit the precinct of interest within an urban area and identify the heritage objects.
2. Compute the total area (ta) in hectares of the delimited precinct.
3. Calculate areas of the identified heritage objects (ha) singularly 'i' within the delimited precinct that includes buildings, monuments, streets, and sites, to include associated spaces.
4. Compute the total heritage footprint of a precinct ('hf') i.e., the heritage footprint by summing all heritage areas (ha_i) by all identified heritage areas (n) in the precinct.

$$hf = \sum ha_i \quad (2.2)$$

Where i=1 to n

5. Calculate the heritage footprint ratio (hf_r) by dividing the heritage footprint obtained by the total area of the precinct of interest.

$$hf_r = hf : ta \quad (2.3)$$

Where: hf_r is the heritage footprint ratio.

hf is the heritage footprint in the precinct, and

ta is the total area of the precinct

After the quantification of the heritage of a townscape in the form of a ratio and expressed as a percentage, it can then be considered as a historic planning decision-making tool (Obatsa, Njuguna, Munala, et al., 2025).

2.11.3 Theories on Attitudes and Likability

Olufemi (2012) states that attitudes are concerned with evaluations people make about objects, ideas, events or other people. Therefore, attitude is the feelings, beliefs and reactions of an individual towards an event, phenomenon, object or person. Further, attitude could be used to predict, control and modify human actions towards an object, issue, situation or abstract entity. Attitudes also serve an important social role, aiding in one's self-expression and social interaction (Katz, 1960; Nelson & Shavitt, 2002). According to Katz (1960), opinion is the verbal expression of an attitude, but attitudes can also be expressed in nonverbal behaviour.

The theories related to attitudes discussed hereafter are: functional theory, dissonance theory, learning theory and congruity theory. On the other hand, Hamedan (2019) asserts that environmental psychology has established attributes associated with preference or likeability. Consequently, he notes that likability refers to the probability that an environment will evoke a positive evaluative response among the groups of people experiencing it, and it contains two kinds of variables: visual aspects of scenes and human evaluative responses. The theories of attitude and the concept of likeability relate to each other in the sense that the latter is concerned with how attitude is formed, while the former provides an explanation for the measurement of preference, like or dislike.

2.11.3.1 Functional Theory

The functional approach, as advanced by Katz (1960), is the attempt to understand the reasons people hold the attitudes they do. One of the key predictions of functional theory is that messages will be persuasive to the extent that they match the functional underpinnings of the attitude they target (Nelson & Shavitt, 2002). The reasons to evaluate some symbol object or aspect of his world favourably or unfavourably are at the level of psychological motivations and not of the accidents of external events and circumstances (Katz, 1960). Four functions which attitudes perform for the individual identified by Katz include the adjustive function of satisfying utilitarian needs; the ego-defensive function of handling internal conflicts; the value-expressive function of maintaining self-identity and of enhancing the self-image; and the knowledge function

of giving understanding and meaning to the ambiguities of the world about us. This theory provides a way of understanding the relationship between specific attitudes and usefulness.

2.11.3.2 Dissonance Theory

The core of the theory of dissonance advanced by Festinger (1957) holds that there may exist dissonant relations among cognitive elements; the existence of dissonance gives rise to pressures to reduce the dissonance and to avoid increases in dissonance, and manifestations of the operation of these pressures include behaviour changes, changes of cognition, and circumspect exposure to new information and new opinions. According to Olufemi (2012), dissonance occurs when our thoughts and behaviour are inconsistent - a feeling of unpleasant arousal caused by noticing an inconsistency in one's cognition. The basic hypotheses stated in the theory are that the existence of dissonance, being psychologically uncomfortable, will motivate the person to try to reduce the dissonance and achieve consonance, and when dissonance is present, in addition to trying to reduce it, the person will actively avoid situations and information which would likely increase the dissonance (Olufemi, 2012).

According to M. Miller, Clark, & Jehle (2015), early dissonance theory did not offer clearly defined terms, methods or operational rules. Critics have questioned whether attitude change was a result of dissonance drive or reinforcement effects of the activity. The theory has withstood these key criticisms and has gained general acceptance through decades of experiments, which have confirmed its basic propositions. In its application, Tueanrat & Alamanos (2022) acknowledge that it has been used to explain and predict the motivational nature of dissonance that led to attitude and behaviour changes at both the individual and organisational levels.

2.11.3.3 Learning Theory

The learning theory was first proposed by psychologist Carl I. Hovland (1912 - 1961), stating that a change in attitude can be likened to a message learning process, where an attitude can be changed but only if the message stimulating this change is clear (N.Sam M.S., 2013; Olufemi, 2012; Simonson & Maushak, 1996). There are five steps

to this process- exposure, attention, comprehension, yielding and retention, all of which are important for overall success (N.Sam M.S., 2013; Simonson & Maushak, 1996). Hovland, Janis, & Kelley (1953) proposed that opinions tended to persist unless the individual underwent some new learning experience (Hovland et al., 1953 as cited in Simonson & Maushak, 1996). Persuasive communications that both present a question and suggest an answer serve as learning experiences. Acceptance of the suggested answer depends on the opportunity for mental rehearsal of the attitude response and the number of incentives included in the communication (Simonson & Maushak, 1996).

In their work, Hovland et al. (1953) assumed that as people processed persuasive message content, they rehearsed the message's recommended attitudinal response, as well as their initial attitude. Further, for attitude change to occur, they emphasised the role of incentives in reducing aspects of persuasive messages as mechanisms for reinforcement, to create acceptance of new beliefs or attitudes. They identified three classes of variables that influenced the effectiveness of the message: source characteristics, setting characteristics, and communication content elements.

2.11.3.4 Congruity Theory

The Congruity theory predicts that if there are two sets of information or concepts on which a judgment must be made by a single observer, the observer will experience pressure to change their judgment on one of the sides (Osgood & Tannenbaum, 1955). However, if the two sets of information are similar or congruent, then there will be harmony, and the observer will not experience pressure. This theory is integrally involved with Osgood's semantic differential, a close relationship of theory and scaling technique (Suedfeld, 2017). The theory proposes that attitudes tend towards simplicity, meaning that they tend to lie at the extremes of the good-bad dimension. It also proposes that when two objects that are rated differently become related, they are subsequently given ratings more nearly alike.

2.11.3.5 Likeability

Likeability concerns qualities that account for a strong evaluative response among the public, and has two components: affect and imageability. To appear on the evaluative map, a feature must evoke a feeling of ‘like or dislike’ and must stand out as memorable (Nasar, 1998). Environmental elements are important in influencing a city’s image and community’s appearance (Lynch, 1960 and Nasar, 1998, as cited in Alalhesabi & Moradi, 2020).

Image evaluation or likeability extends the work of Kevin Lynch’s *Image of the City*, where Nasar (1998) sought to find meaning by evaluating people in the visual environment around them to find out the concealed meaning in the observer’s mind (Alalhesabi & Moradi, 2020). They acknowledge that Lynch (1960) recognised the importance of meaning and evaluation, but that the measurement problems and individual differences made them impractical to study, yet it was found that shared evaluations by individuals.

Nasar (1998) demonstrated that environmental evaluation was more measurable and less idiosyncratic than Lynch had thought. To demonstrate the evaluative image of the city, Nasar considered similarities in likeability between two cities, Knoxville and Chattanooga, through surveys using evaluative maps. It was found that the public agreed on its visual likes and dislikes as revealed by the evaluative maps. Also, the city's appearance could be enhanced by increasing the visibility of vegetation, landscaping, and views of the mountains and the river and decreasing the visibility of chaotic signs, poles, wires, parking lots, unsightly industries and dilapidated areas.

2.11.4 The Contemporary Theory of Conservation

According to Muñoz-Viñas (2012), the contemporary theory of conservation underscores subjective decisions and values. It calls for common sense, gentle decisions, and sensible actions (Obatsa, Njuguna, Wahome, Munala, & Gitau, 2025). These are determined by the uses, values, and meanings that an object has for people. The main aim of conservation, according to the theory, is to retain or improve the meanings the subject has for a group of people. The key constructs in the theory are:

objects of conservation, a variety of shared meanings or intersubjectivity, and sustainability or adaptability.

Contemporary ethics asks conservationists to consider the different meanings that an object has for different groups of people and to decide not just which meanings should prevail, but also how to combine them to satisfy as many views as possible. Factor analysis, as a method that is used to reveal the underlying values, is therefore important in combining these meanings. One of the key advantages of contemporary conservation ethics is that it is adaptive to the needs of the users. Since people hold varied meanings for things, the theory calls for understanding why, and for whom, things are conserved, and answering these concerns is aimed at achieving sustainability in conservation, particularly a common sense of ownership and belonging.

According to Muñoz-Viñas (2012), the contemporary theory of conservation is developed around current democratic narratives; otherwise, it would not be acceptable at all and resorts to another contemporary conceptual tool that is sustainability. Decisions should be made with future users in mind, according to the conservation principle of sustainability. This is particularly critical to conservation professionals, in the sense that it is the experts who are likely to have to speak for these yet-to-be users.

2.12 Theoretical Framework

After the review of relevant theories, the constructs were extracted to formulate an appropriate theoretical framework. Historic planning can be seen as a dynamic field that draws its substance mainly from disciplines of urban planning, cultural conservation and psychology. The theoretical framework sought was envisioned to enable heritage survey and conservation planning to build on constructs from all the relevant theories reviewed, as illustrated in Figure 2.19. The nature and structure of historic planning dealing directly with cultural conservation must answer the tripartite question of what needs to be conserved, why it should be conserved and how it should be conserved. An effective answer to this question would lead to social, environmental and economic sustainability. The historic planning must therefore identify the heritage being pursued, provide it with significance and pursue sustainability through sensible actions.

First, the contemporary theory of conservation gives rise to three constructs: objects of conservation, a variety of shared meanings or intersubjectivity, and sensible actions. The question of what should be conserved is concerned with the identity of the heritage objects. On the other hand, the idea of the existence of heritage needs to be given meaning and reinforced by heritage values. Meanings emanate from the attitudes of people towards objects, ideas or events evoked after an experience with them over time. Sensible actions can be translated into conservation needs based on the physical conditions of the historic townscape.

The theories of attitude and likability introduce attractiveness and association as two constructs associated with attitude formation. They are consequential in the description of myriads of meanings associated with objects, places or events. Consequently, attitudes can be measured on a scale of like and dislike among groups of people. The evaluation of attitudes answers the questions related to why an object is significant, bringing forth the concept of heritage values.

While the identity of historic objects is important, it is not an exhaustive acknowledgement of their existence. Other planning dimensions, such as their spatial distribution within their townscape context, add to the attributes of the heritage. Here, patterns of solids and voids are a construct from the figure-ground theory. The figure-ground map is the tool used for townscape analysis of patterns of solids and voids that establish the town's spaces, streets, and built forms. Using the figure-ground maps townscape heritage can be represented as solids or voids to show their spatial distribution.

The idea of heritage footprint is a construct derived from the reverse interpretation of the aims of the ecological footprint (Obatsa, Njuguna, Munala, et al., 2025). It is intended to account for the spread of the heritage area within a defined urban space. It can be expressed as a ratio between townscape heritage and the defined urban area being considered.

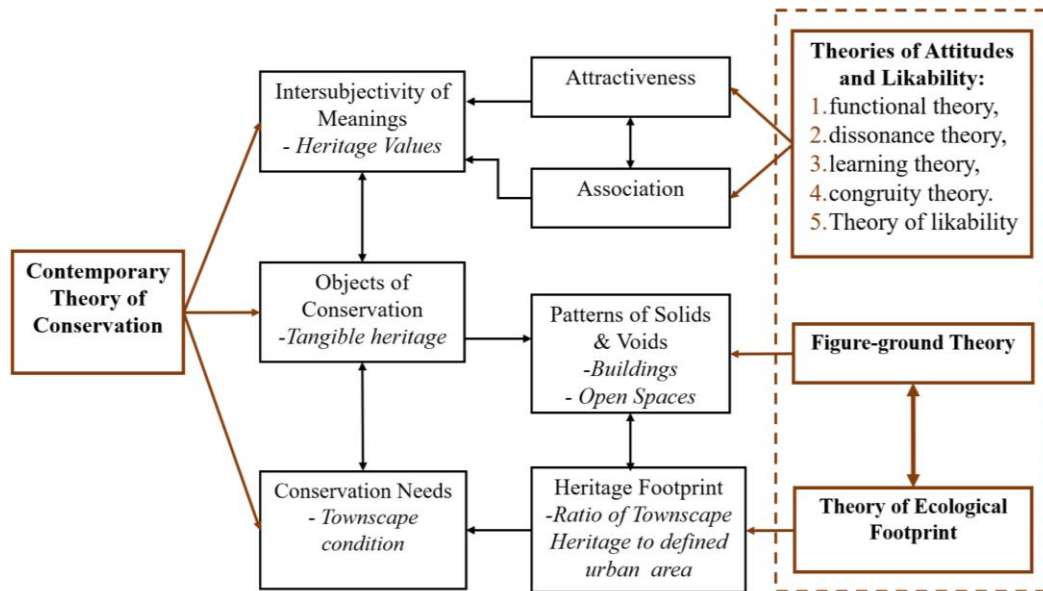


Figure 2.19: Theoretical Framework

2.13 Conceptual Framework

Heritage townscape are presumed to contain objects of conservation with heritage significance. The townscape characteristics can be read and interpreted to describe the heritage context. The components are: the figure-ground characteristics, the objects of conservation, the heritage footprint, and the status of conservation. In the urban area, people live, work and interact with the urban environment, and as they do, they go through many experiences that form attitudes that can be expressed verbally. Such attitudes and expressions in their raw form are infinite. For ease of interpretation, the infinite expressions or attitudes can, by way of the factor analysis method, be organised into themes which are comprehensible components referred to as heritage values. The underlying factors or heritage values, in essence, are shared meanings about places, objects or events by a group of people.

On the other hand, conservation needs can also be identified to indicate the action required in the historic townscape's physical space. Further, townscape heritage, townscape conservation needs and the set of heritage values extracted should be considered conclusively to achieve sustainable planning for historic townscape based on social, economic, environmental and political facets. The consideration is case by

case since experiences and prevailing physical circumstances vary from place to place. This framework exists in the environment of continuity with change. Change is inevitable, and prudence is in the sensible management of change where the community is at the centre. The conceptual model for planning historic townscapes is presented in Figure 2.20.

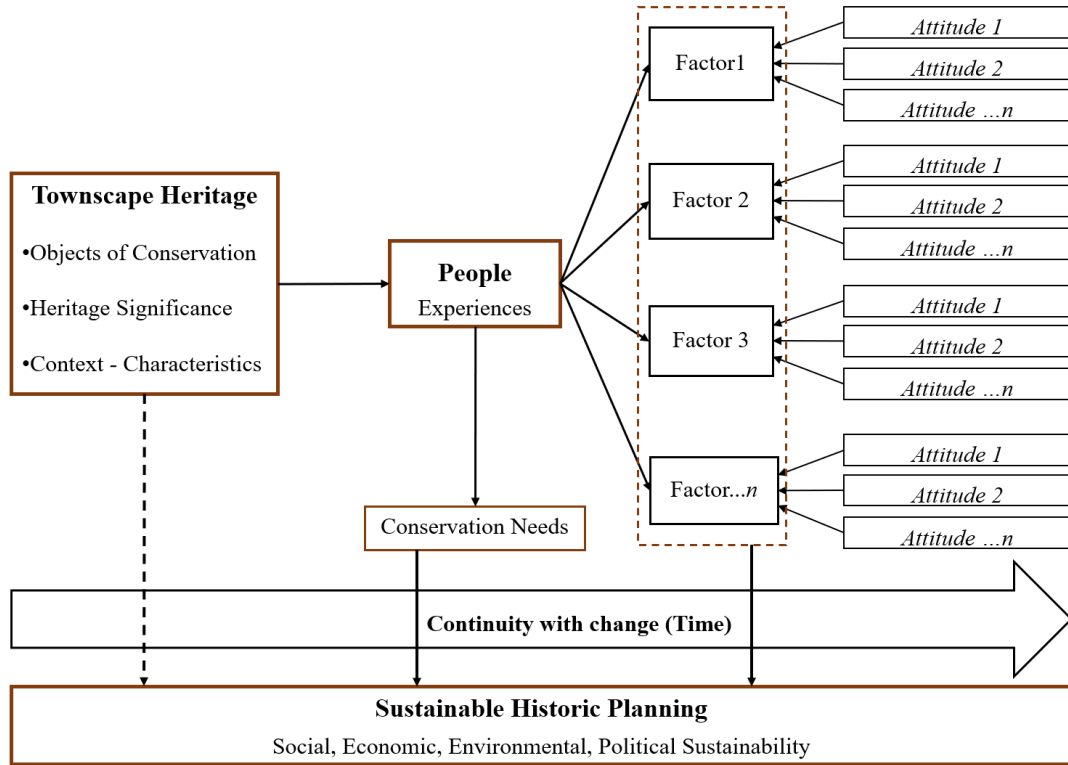


Figure 2.20: Conceptual Model for Planning for Historic Townscapes

2.14 Research Hypothesis

The Research Hypothesised that there are latent underlying factor structures associated with residents' attitudes towards heritage in historic townscapes along the Kenya Railway. Applying the factor analysis model, where p are the observed variables ($X_1, X_2, \dots, X_p$) and m are the number of underlying constructs ($F_1, F_2, \dots, F_m$). The factor analysis model is mathematically expressed as:

$$\mathbf{X} = \mathbf{LF} + \epsilon \quad (2.4)$$

Where: $\mathbf{X}$ = matrix of observed variables

$\mathbf{L}$ = matrix of factor loadings

$\mathbf{F}$ = matrix of latent underlying constructs

ϵ = matrix of error terms or residuals

Alternate Hypothesis (H_a):

There are latent underlying factor structures associated with residents' attitudes towards heritage in historic townscapes along the Kenya Railway ($m \neq 0$), and the correlation matrix is not an identity matrix. Mathematically expressed as: $\mathbf{X} \neq \epsilon$

Null Hypothesis (H_o):

There are no latent underlying factor structures associated with residents' attitudes towards heritage in historic townscapes along the Kenya Railway; all variables load equally ($m = 0$) and the correlation matrix is an identity matrix. Mathematically expressed as: $\mathbf{X} = \epsilon$.

2.14.1 Statistical Assumptions

The four statistical assumptions made here are those that relate to the principal component analysis method (Shlens, 2014). The first is linearity, which is the assumption that the data set is a linear combination of the variables and there is a possibility to interpolate between data points. The second is that mean and variance are sufficient statistics to describe a probability distribution. The third is that large variances have important dynamics where principal components with larger associated variances represent interesting dynamics, while those with lower variances represent noise. The fourth assumption is that the principal components are orthogonal to provide an intuitive simplification that makes principal component analysis (PCA) soluble with linear algebra decomposition techniques.

2.15 Operational Definition of Key Terms

- i. **Attitudes:** They are evaluations people make about objects, ideas, events or other people. They involve the feelings, beliefs and reactions of an individual towards an event, phenomenon, object or person shown through social expressions (Katz, 1960; Nelson & Shavitt, 2002; Olufemi, 2012). They are measured when people express their opinions towards heritage. Further, attitude can be used to predict, control and modify human actions towards an object, issue, situation or abstract entity. Opinion is the verbal expression of an attitude, but attitudes can also be expressed in nonverbal behaviour. Consequently, attitudes are numeric scores by a group of people on a seven-point Likert scale of statements related to heritage conservation, where one represents strongly disagree, and seven is strongly agree.
- ii. **Heritage values:** the degree of the relative social attribution of qualities to heritage. It is aesthetic, historic, scientific, social, or spiritual worth for past, present, or future generations (ICOMOS Australia, 2013). These values come about as a process of growth and people's experiences in the towns (Orbasli, 2002). They are expressed as attitudes verbally. Therefore, heritage values are identified as inherent themes extracted through factor analysis of scores of attitudinal statements by a group of people on a seven-point Likert scale, where one represents strongly disagree, and seven is strongly agree.
- iii. **Historic Townscapes:** is the built-up area's landscape that demonstrates exceptional traits, incorporates structures, and takes into account the many kinds of urban open spaces as well as the interplay between buildings and open spaces (Landscape Institute, 2017). Specifically, it includes human settlements or land uses, and living traditions of outstanding universal significance. The concept of Outstanding Universal Value refers to cultural and/or natural significance that is so remarkable that it transcends national boundaries and is of shared relevance for all individuals, both now and in the future (UNESCO, 2021). Historic townscapes have elements of character or appearance that are desirable to preserve or enhance (Historic England, 2019). Accordingly, Historic townscapes are urban areas made up of tangible elements and places, some of which have historic significance identifiable through the heritage values a group of people have for them.

2.16 Discussion and Research Gap

A review of the literature revealed various variables associated with this research. These variables are categorised under the various objective themes. Under historic townscape characteristics, there are four variables: figure-ground characteristics, objects of townscape heritage, townscape heritage footprint, and the status of townscape heritage. Figure ground characteristics can be analysed through patterns of solids and voids; other identifiable characteristics are nodes, landmarks, boundaries, paths and zones. The objects of townscape heritage are of different types, varied ownership types, land uses and levels of occupancy. Townscape heritage footprint is measurable as an area ratio between townscape heritage and the defined urban area being considered. The status of townscape heritage is measured through attributes such as types of threats, type and level of conservation action, as well as the physical conditions.

The basis of urban conservation is the value held in the heritage through scientific, political messages and symbolism; the social sense of place and cultural identity and economy. Heritage values are a key variable in assessing the variability of attitudes people hold toward heritage. Heritage values can be extracted from a set of expressions of meanings by a group of people associated with a given place. All expressions are considered in the extraction through factor analysis.

Further, for conservation needs, four variables were revealed. First, the condition of the physical environment is measurable through the level of cleanliness of the environment, the safety of spaces, and the infrastructure. The level of accessibility is measurable through the quality of lighting in public spaces, pedestrian walkways, roads, and parking. Economic capacity with measurable attributes of capacity to provide employment, tourism, usability of the existing buildings, and the level of railway functions. Lastly, social and cultural status is measured by the state of important heritage places, and education or knowledge of heritage.

Finally, various gaps related to the focus of this research emerged. First, heritage significance and values are discussed extensively; however, specific actions responding to specific values in historic planning have not been addressed. Further,

evidence of the application of the constructs from the contemporary theory of conservation locally is weak. In addition, in examining urban heritage and townscape characteristics, the application of the idea of the heritage footprint in accounting for heritage in the urban space has not been applied. In the management of change in the townscapes and historic planning locally, actions related to specific heritage values in historic planning frameworks have not been dealt with. Moreover, a gap exists in the local planning framework on heritage survey and the application of values to conservation.

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

3.1 Introduction

This chapter discusses the approach adopted for the research, as well as outlining the research design. It identifies the geographical areas of the towns that were the focus. The suitable research methods, sampling basis, and procedures are discussed. It also outlines the framework upon which research data collection and analysis were based. Finally, it presents the data analysis methods that were used. A mixed methods research approach was adopted to collect and analyse data, while the research methods were mainly direct observations and interviews in the selected towns. The specific methods used in this study are presented and discussed in the sections that follow.

3.2 Research Approach

This study adopted a mixed methods approach, which involved an integrated qualitative, quantitative, and spatial inquiry. The mixing of methods provided the best understanding of the research problem, which was naturally integrated as spatial and socio-cultural. The mixed methods approach was selected due to its appropriateness to explain and interpret the status and condition of heritage townscapes along the Kenya railway and also to explore the phenomenon related to shared meanings by people (Walliman, 2011).

The philosophical underpinning for the selected mixed methods approach was pragmatism. Pragmatism calls for adaptability and practicality, which are the philosophical basis for mixed methods research. The adoption of the pragmatism worldview allowed flexibility to provide an appropriate research design based on examining the spatial context and identifying what meanings people held for their historic townscapes. In addition, pragmatists agree that research always occurs in social, historical, political, and other contexts (Creswell & Creswell, 2017). In this sense, a theoretical framework that reflects social justice and political objectives may be incorporated into mixed methods research.

The ontology of this research was premised on the assumption that reality is constantly negotiated, discussed, and interpreted in the light of its usefulness in unpredictable circumstances. The surveys in selected towns showed spatial unpredictability, and methodological flexibility had to be adopted in response. The epistemology of this research was linked to experience, action, and the real-world applications of beliefs. In Interviews, respondents seemed to rely on their past experiences and acquired knowledge to express their attitude on heritage significance. The intersection of philosophy, research approach, and specific methods for this research is represented in Figure 3.1.

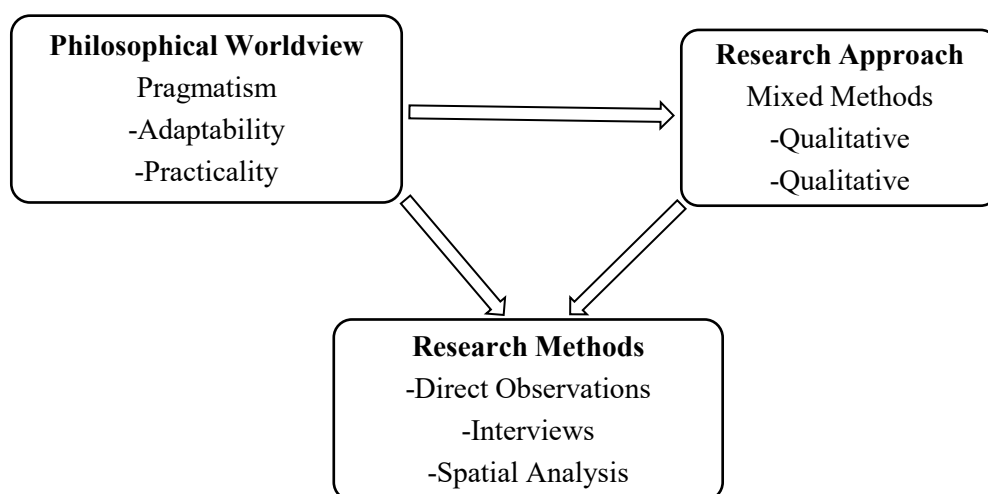


Figure 3.1: Adapted Framework for Research

Source: Adapted from Creswell & Creswell (2017)

3.3 Research Design

A cross-sectional design was applied since it involved more than one case, data was collected more or less simultaneously, and patterns of association between variables were drawn (Bryman, 2016). The research adopted a place-based and people-centred method, as advanced by Garcia and Cardoso (2019), to carry out a townscape heritage survey of sampled towns and evaluate meanings and values through people's attitudes. This is also advocated for by the contemporary theory of conservation by Muñoz-Viñas (2012) for the identification of meanings and the theories of attitudes and likability, which are at the core of identifying places of importance within the urban

environment. Three towns were sampled, and areas of study were defined on a case-by-case basis.

The framework for data collection outlined in Figure 3.2 was structured in five distinct but interrelated stages. The first stage involved the identification of towns to be studied by sampling from a sampling frame. Second was the preparation for a field survey that involved delimiting precincts for each of the sampled towns and the preparation of their figure-ground maps. Third, transect walks were carried out within the precincts and their immediate context to familiarise oneself with the townscape layout. Data was then collected through observation guides and interview schedules. Thereafter data was analysed and interpreted in the fourth and fifth stages, respectively.

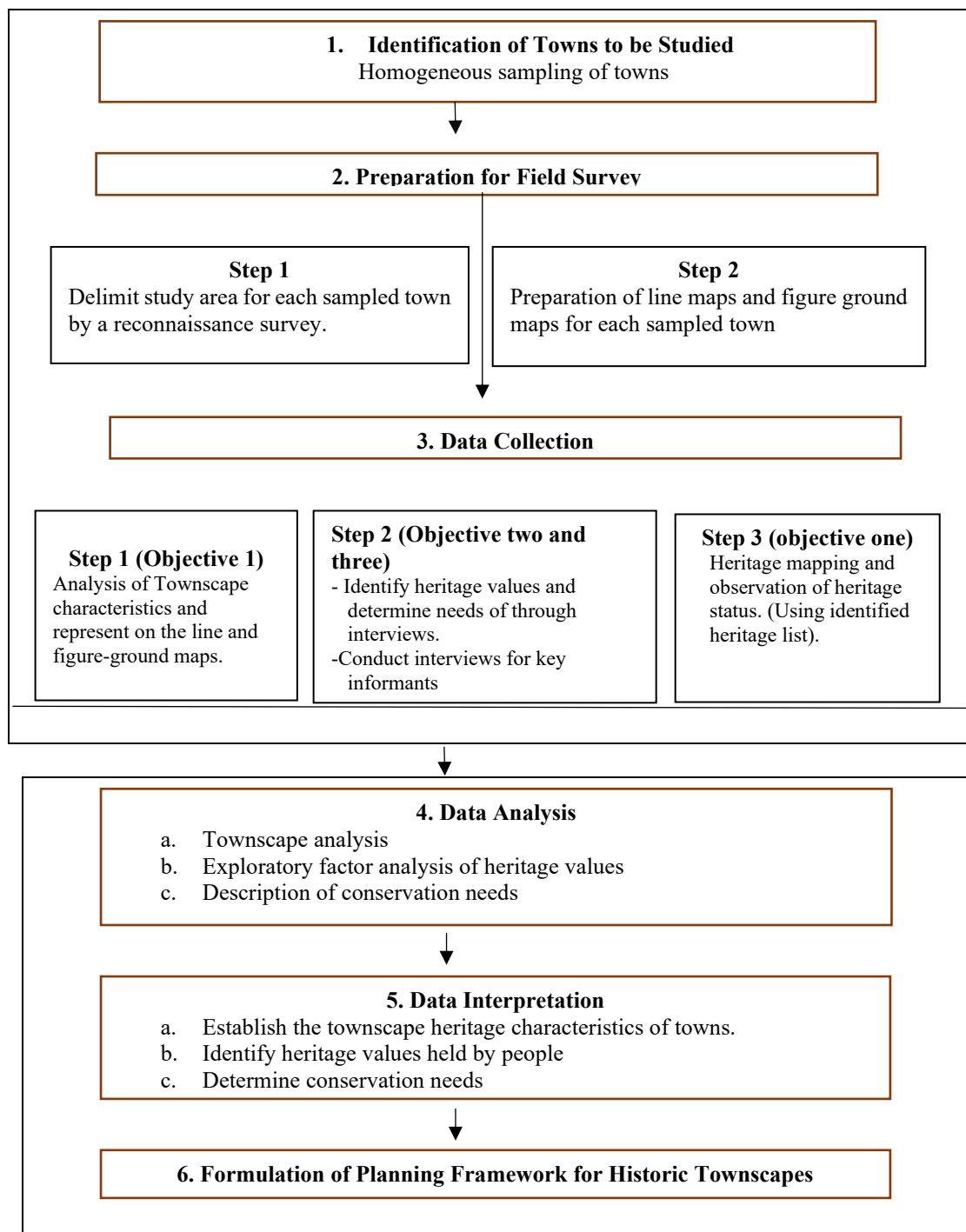


Figure 3.2: Framework for Data Collection and Analysis

3.4 Study Area

The study took place in three selected towns along the Kenya Railway line between Nairobi to Kisumu Cities. The choice of this section of the railway line was based on three main reasons: the stations between the two cities are vibrant in rich agricultural

zones; more towns were between the two cities than any other section, and were easily accessible. The sampled towns were Limuru, Naivasha and Molo.

3.4.1 History of the ‘Lunatic’ Railway Line

The story of the Kenya railway, informally known as the ‘Lunatic’ line during its early years, can be traced back to 1895 when the British government founded the East African Protectorate, present-day Kenya, which was administered by the Imperial British East Africa (IBEA) Company. However, as Gunston & Macdonald (1989) point out, IBEA had built a 0.6 metre gauge railway street trolley system on Mombasa Island. Another 11-kilometre railway line ambitiously named “Central Africa railway” to demonstrate the possibility of railway building upcountry was constructed between Mombasa inland, between Kipevu and Mazeras. Before then, movement was limited with footpaths as the main transport routes (Ogonda & Onyango, 2002).

According to Ogonda and Onyango, (2002), the proposed meter gauge railway started from Mombasa and ran parallel to the caravan trail, earlier established across the Rift Valley, down to Port Victoria. Further, the IBEA Company established caravan stations along its trade routes into the hinterland. The territory later, in 1920, became a British colony known as Kenya. The construction work for other branching and extension lines in the country was undertaken up to 1930.

It is astounding that at the time when the construction was decided on in the 1890s, there appears to have been no idea of the value, or even of the existence, of the high-temperate region to the east of Lake Victoria. The intention was to access the source of the Nile and to provide access to the landlocked Uganda, which was perceived as being endowed with natural resources. There was perhaps an exaggerated idea of the resources and fertility of Uganda, with a large and exceptionally intelligent native population. However, it had not yet proved to yield what would approximately repay the cost of the line, which cost the British people £5.3 million (Eliot, 1905). This amount is equivalent to £611 million today, based on the Bank of England (2025), and approximately KSh 106 billion. Based on this scepticism, British critics named the project a “lunatic express”. It was variously called the Uganda Railway, the Permanent Way, and the Iron Snake.

Beginning in Mombasa in 1896, the railway's construction progressed to Nairobi in 1899, Nakuru in 1899, and Kisumu in 1901 (Kenya Railways, 2022). However, the construction of the railway faced a myriad of challenges, such as diseases, unpredictable terrain, attacks from wild animals, and constant resistance and hostility from the inhabitants of the localities the line traversed.

3.4.2 Establishment of Towns along the Railway Line

The origin of the railway can be traced back to the Greek *Diolkos* - a railway with a track made from stone, six kilometres in length across the Peloponnese, used for transporting ships from the 6th century BC until the 9th century AD – an extraordinarily long period (Coullus, Divall, & Lee, 1999). Further development took place in Britain in the early 19th century, particularly in England and Wales. To cement this argument further, according to Robbins (1998), most historians agree that the prototype of the ‘modern railway’ arrived with the opening in 1830 of the Liverpool & Manchester Railway in northwest England. These are early examples of how railway lines and their services influenced the establishment and growth of towns. As can be observed, the railway was later used late 19th century by Britain to access and explore the hinterland of colonial territories, as is the story of the Kenya Railway. The availability of terrain, the access to water, the appearance of new railway junctions due to the construction of new lines, or the frequent merger of companies were some of the motives behind the change of plans initially laid out for long-standing and most important railway towns (Cuéllar, 2018).

The development of the first railway system in Kenya from Mombasa to Kisumu and beyond is significant to the existence and development of Kenya as a country since 1896 (Obatsa, Njuguna, Munala, et al., 2025). As stated by Aalders (2021), in the early period of British colonial rule in East Africa, Kenya was mainly perceived as an inconvenient obstacle in the path to Uganda. The development of the railway in Kenya was therefore secondary to the main objective of its construction. Before then, in the hinterland, there were invisible towns or periodic markets, meaning that spatial organisation existed, but town structures may not have (Owuor, 2012). However,

urbanisation had already taken place in the coastal zone as a result of a triangular trade between East Africa, India, and Arabia.

In order to explore and develop the hinterlands of Kenya and farther into Uganda from the Indian Ocean, the British colonists relied heavily on the railway infrastructure. The decrease in internal trade costs had a strong and unexpected effect on the settlement of British farmers, who established cities and towns from where they could manage their coffee farms and specialise in urban production activities (Obatsa, Njuguna, Munala, et al., 2025). The indigenous population also increased along the railway line, in the surroundings of the towns, as cash crop cultivation required unskilled labour. This saw the development of agricultural and pastoral centres into urban centres.

A study on how colonial railroads defined Africa's economic geography, carried out by Jedwab, Kerby, & Moradi (2017), showed that European settlement was significantly impacted by the railway, which created towns from which the settlers ran their commercial farms and engaged in urban-related enterprises. Eliot (1905) observed that as a civilised territory and a possible residence for Europeans, East Africa may have gradually come into existence at the same rate as the rails advanced, and around the time of its completion in 1901, the most important question that can be asked about any locality is, "How far is it from the line?" The line, therefore, became the attraction to settlements and other developments that probably relied heavily on the convenience of transportation and the connectivity revolution that had just been completed.

With the existence of the railway corridor and established Railway stations, towns and cities developed to play an important economic role in growth until the decline of the Kenya railway. As Kerby, Moradi, & Jedwab (2014) point out, the spatial arrangement of economic activity depended on earlier infrastructure investments such as the railway and persists long after the investment itself has declined. Colonial railroads causally determined the location of European settlers in Kenya. The settlements happened in high-potential areas for farming along the railway (Obatsa, Njuguna, Munala, et al., 2025). This gave rise to numerous new urban centres whose main functions included

administrative centres, caravan towns, and mission stations. Many of these towns have continued to exist and function even in the face of the decline of the railway system.

As long as settlers continued their economic activity, the established towns thrived, and as Jedwab et al. (2017) report, the decline of the railway was because European settlers left following the Lancaster House Agreement of 1962, which required settlers to choose their citizenship after independence and also due to mismanagement and a lack of maintenance in the sector. Further, the decline was due to the mismanagement and lack of maintenance in the rail sector, as well as investments in roads, and a reduction in coffee production due to low international prices and the exhaustion of coffee soils. As a result of the decline, areas along the railway lines lost their initial advantage of transportation, human capital of the white settlers, and commercial agriculture.

Even with the decline, areas along the railway lines remain fairly urban and economically developed. Approximately 60 years later, the problem of decline and neglect of the built environment directly associated with the operations of the railway is observable in many of the towns. With an estimate of 142 railway stations with some of their associated towns along the entire Kenya railway network, it can be considered a large footprint of the heritage of urban areas, since many of them are the origins of their associated towns. As summarised by Njuguna et al. (2018), urban historic areas with significant heritage properties that need to be preserved and improved were established by the Kenya Railway. Currently, there are efforts to revitalise the railway line by rehabilitating the existing railway infrastructure. The rehabilitation work involves track restoration, installation of signalling and communication systems, and the rehabilitation of station buildings (*Rebuilding Railway Transport in Kenya: Milestones and Ongoing Works by Kenya Railways* | *Daily Nation*, 2021).

3.4.3 Location of Railway Towns

As described by Eliot (1905), the total length of the Kenya railway line is approximately 584 miles or 940 kilometres, with a general direction of north-west from Mombasa to as far as Nakuru, then nearly due west across the Mau range to Lake Victoria. It is a paradox that the “Uganda Railway” was not in Uganda at all, but

entirely in Kenya, previously known as the East Africa Protectorate under British Colonial rule, the whole breadth of which from the sea to Lake Victoria (Jedwab, Kerby, & Moradi, 2013). There were 19 towns established along the railway stations from Nairobi to Kisumu.

3.4.4 Physiographic Characteristics of the Railway Route

The Kikuyu escarpment and the rift valley leading to the Lake Victoria basin make up the terrain that the railway travels through on its trip from Nairobi to Kisumu, illustrated in Figure 3.3 and Appendix IX. This section of the railway route offers clear views of the landscape, which includes turbulent terrain, generally fertile arable land, swamps, and rift valley lakes interspersed with urban settlements (Eliot, 1905). The urban centres along the Kenya Railway grew around stations and benefited from the business activities along the railway. These physiographic characteristics provided land conditions suitable for agriculture and settlement for white settler farmers and therefore influenced the location of railway stations.

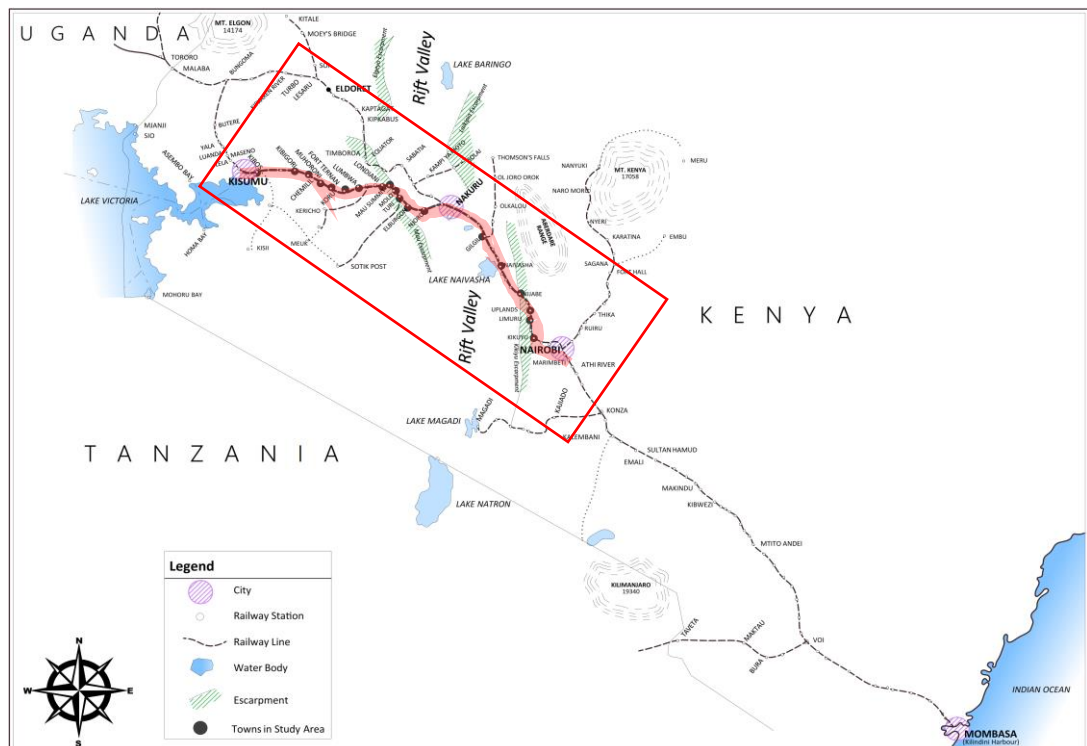


Figure 3.3: Towns in the Area of Study

Source: Adapted from Gunston (2004); McCrow, n.d.; Molesworth (1899)

3.4.5 Socio-Economic Conditions

In the colonial era, the west side of Nairobi, along the railway line, was occupied by Europeans, and most of the development that took place there was agricultural. This led to the area being labelled ‘the white highlands’ because of the white population that settled there (Morgan, 1963). The origin of white settlement was the need to establish an economy which would be able to pay for the necessary expenses involved in developing and governing the new country.

In the first half of the 20th century, when the railway was established, towns developed around stations, and railway transport activities remained vibrant. The towns worked as efficient interconnected urban centres with idiosyncratic planning and development characteristics, with railway stations as the nuclei and other complementary land uses on the periphery. The construction and siting of the early built environment were influenced by the railway development. Later, due to changes in political and economic systems, the towns began to receive another layer of development, disconnected in planning and development characteristics from the original. The new development took place to sustain economic systems that relied less on the railway due to its decline.

African Development Bank Group (2011) describes the economic activities between Nairobi to Kisumu along the railway line in three parts: the central highlands, the rift valley, and the lake basin. In the central highlands, the land use along the railway is mainly subsistence farming. The key towns in this section include Kikuyu, Limuru and Kijabe. The largest section of the railway line navigates through the scenic rift valley, descending from the central highlands to the valley floor towards Naivasha and Nakuru. The Land use is mainly subsistence farming. In the lake basin, the line enters through Muhoroni to traverse Kisumu County towards Lake Victoria, where the land use is mainly commercial farming.

3.5 Data Collection Methods

3.5.1 Direct Observation

Observation becomes a scientific tool, and the method of data collection for the researcher, when it serves a formulated research purpose, is systematically planned and recorded, and validity and reliability are ensured (Kothari, 2004). The advantages of this method were that subjective bias is eliminated, secondly, the information obtained is current, and thirdly, in this study, the townscape heritage can be observed directly. Observation was conducted by the researcher and research assistants who were trained on the specific themes of inquiry and how to carry out the observation in the townscape. The themes were: analysis of townscape characteristics, mapping the townscape heritage, measurement of heritage footprint, and assessing the status of townscape heritage.

Observations took place within pre-delimited precincts where the method used was a fusion between two approaches from the four proposed by Bertolini and Spit (2005). The methods are ‘functional-historical elements’ and a ‘development perimeter’. In applying the ‘functional-historical elements’, the railway station area was considered as the core of influence as a transport centre for the establishment of immediate developments around it. Additionally, in the application of the ‘development perimeter’, the area around the railway station with immediate urban blocks was considered. In this context, the periphery of the precinct was defined by the urban blocks fronting the first street next to and around the railway stations and also taking cognisance of the railway centre's influence beyond this development perimeter but relating to the centre.

Once towns were sampled and precincts delimited, the variables under the first objective on townscape characteristics were observed and data recorded using the observation and mapping guide in Appendix I and Appendix III and the urban area maps while undertaking urban walks through the streets.

For the figure-ground characteristics, the observation examined patterns of solids and voids; boundaries, corridors, landmarks, nodes, and zones were recorded. Furthermore, the identified townscape heritage was confirmed through observation

and subsequently represented on figure-ground maps for spatial analysis. The attributes that were observed were the type of heritage, ownership status, category of land use, and level of occupancy. Finally, for the status of townscape heritage, the observed attributes were: the threats to heritage, conservation action and townscape conditions around the identified heritage.

3.5.2 Interviews

Interviews took place within the urban centres at points where respondents were identified. This location was useful during interviews for the ease of reference to the townscape heritage as the subject matter. Interviews were conducted by the researcher and research assistants who were trained on the specific themes of inquiry and how to carry out the interviews. The themes were the identification of heritage and the appraisal of heritage value statements and heritage needs.

In the identification of townscape heritage, interviewees were each asked to identify three important places in the town that they considered for conservation and also provide reasons for their choices. These identified places were then located on the maps by highlighting for further analysis to determine if they fell within the defined precinct areas. The lists generated from all responses were consolidated for each town and later formed the basis for rapid analysis of the heritage areas through observation.

Further, Roget's Thesaurus was used to identify all appropriate synonyms under the various heritage value subcategories. Redundant words were removed after they were examined for similarities. Thereafter, attitudinal statements under each variable were exhaustively generated as shown in Appendix V. The order of the list of attitudinal statements generated was thereafter randomised to break succession similarities and to ensure underlying factors were not pre-empted based on the original heritage value categories demonstrated in Appendix II under the 'Attitudinal Survey' section. Attitudinal statements were aimed at providing a local contextual understanding of the heritage values. Sampled residents within the precincts were interviewed using an interview schedule made up of attitudinal statements that were scored on a seven-point Likert scale, where 1 represented strongly disagree, while 7 represented strongly agree.

Further, in the interview, conservation needs were also examined using a series of questions associated with the idea of needs assessment for desirable results by Kaufman (2006), as well as the relevant SDGs discussed in the literature review. Four variables were examined under the research question on conservation needs: physical environment, accessibility, economic and socio-cultural. The attributes under physical environment needs were: cleanliness of the environment, safety of spaces, and condition of infrastructure. Accessibility needs had conditions of lighting in public spaces, pedestrian walkways, roads and parking as the attributes. Economic needs had the following attributes: capacity to provide employment; town as a place for tourism; usability of the existing buildings; and the level of railway functions. Finally, the attributes for social cultural needs were: state of important heritage places and Knowledge of heritage by the residents. For each of the variable attributes, residents were interviewed using an interview schedule made up of attitudinal statements that were scored on a seven-point Likert scale, where 1 represented very poor and 7 represented very good.

Through the interviews with residents, key informants who had lived in each town and had firsthand knowledge of its development were identified, and they were interviewed using the interview guide included in Appendix IV. Corroborating the information gathered on the preservation of the townscape history was the goal of the key informant interviews.

3.5.3 Archival Method

The material for archival study, including relevant history books on Kenya, photographs, journals, and maps, was sought. The historical information on Kenya railways and associated towns obtained was previously recorded and stored by heritage conservation entities and newspapers such as the Kenya Railways Museums, the Heritage Trust Kenya, the Daily Nation, and the Standard Newspaper. The internet resources were: Save the Railway by Chao (2015) and East African Railways and Harbours by McCrow (2022). The information sought was used to historically contextualise current urban heritage settings. The archival method aided in the process of selecting towns by providing information on individual stations and their sequential

locations along the railway line. Thereafter, the presence of towns was ascertained by satellite imagery.

3.6 Data Collection Techniques

The techniques used were: mapping, direct observations and the administration of structured interview schedules. Mapping involved the use of maps to record townscape features, locate townscape heritage and calculate heritage footprints. Direct observations of the identified townscape heritage were made using observational guides on the function, physical condition and conservation status. Administration of structured interview schedules was by reading out questions and guiding respondents in answering. The data collection techniques related to the identified research methods.

3.6.1 Techniques for Observation

The techniques used for direct observation were recording on observational guides of figure-ground characteristics; locating the identified townscape heritage physically and recording on maps; using a tape measure to obtain ground floor areas or footprint of the heritage; using a checklist to ascertain the condition of each heritage, and rating the townscape conditions. Photographs of the townscape character and the heritage were taken for further desk analysis. For every sampled town, a structured observation and mapping guide was used to record the townscape characteristics within the precincts of each of the selected towns, as shown in appendix I. Additionally, a structured observation checklist for rapid assessment of identified heritage, shown in Appendix III was used to assess the physical and conservation status of each identified townscape heritage.

3.6.2 Techniques for Interviews

Individual respondents from Limuru, Naivasha and Molo towns were interviewed face to face using structured interviews in Appendix II. Research assistants administered the interviews after they were trained and undertook a pilot study to familiarise themselves with the contents of the interview schedules. For the first objective, structured interviews were employed to identify townscape heritage. The second

objective involved scoring heritage value attitudinal statements. In the third objective, townscape heritage conservation needs were identified by rating the townscape. Additionally, unstructured interviews were later conducted for key informants who were selected as being more knowledgeable during the structured interviews. This was aimed at obtaining local knowledge and the historical perspectives of the historic railway towns.

3.6.3 Techniques for Archival Method

Historical records in the form of railway route maps, the Kenya Railway stations directory and newspaper articles were reviewed to enrich literature on the establishment of towns along the Kenya Railway line. Route maps and Railway station directories from the Kenya Railways Museum and the internet were reviewed to establish the number of railway stations between Nairobi and Kisumu. The techniques for the archival method were reproducing the Kenya railway route map and recording the presence of towns associated with the respective railway stations.

3.7 Sampling Design

A non-probability sampling design was used. Non-probability sampling design involved selecting homogeneous samples of towns where the key characteristics were the size and population of the towns. Three towns that were municipalities within Kiambu and Nakuru counties were selected. Further, the towns were observed to have larger precinct areas than the rest. In addition, non-probability sampling was used to select respondents in the assessment of attitudes in the selected towns. Resident respondents were sampled conveniently, where the precincts were divided into spatial zones from which respondents were drawn.

3.7.1 Purposive Sampling for Towns

Purposive sampling is a non-probability form of sampling, also referred to as judgment sampling or deliberate sampling requires researchers to use their subjective judgment to select sampling units that appear to be representative of the population (Frankfort-Nachmias, Nachmias, & DeWaard, 2015; Kothari, 2004; Ruel, Wagner III, &

Gillespie, 2015). Purposive sampling is considered more appropriate when the universe happens to be small and a known characteristic of it is to be studied intensively (Frankfort-Nachmias et al., 2015). Bryman (2016) adds that the goal of purposive sampling is to sample cases/participants strategically so that those sampled are relevant to the research questions that are being posed. As a non-probability sampling approach, purposive sampling does not allow the researcher to generalise to a population (Bryman, 2016).

As Papageorgiou (1971) underscores, for a town or an urban sector to be regarded as a historic element, it must exhibit characteristics that include: an original urban structure, significant architectural qualities, and continuing social life. Similarly, the key characteristic for purposive sampling was towns along the railway line with precincts around the railway core as the embodiment of an original urban structure. Consequently, the sampling frame was prepared by a prior survey of the towns along the railway line between Nairobi and Kisumu to establish the presence of precincts around the railway core. Thereafter, the towns with larger precinct areas were sampled to obtain more information on the intensity of townscape heritage. This homogeneous sampling method was used to select three towns. As shown in Figure 3.4, three towns with upper values were selected because it was envisaged that they would generate more townscape heritage to be examined than those with smaller values. Kikuyu town was excluded from the selection since it had been used for the pilot study. The sampled towns, Limuru, Naivasha and Molo, are represented on the map in Figure 3.4. The selected towns are, notably, municipalities and therefore homogeneous in terms of the level of development and population size.

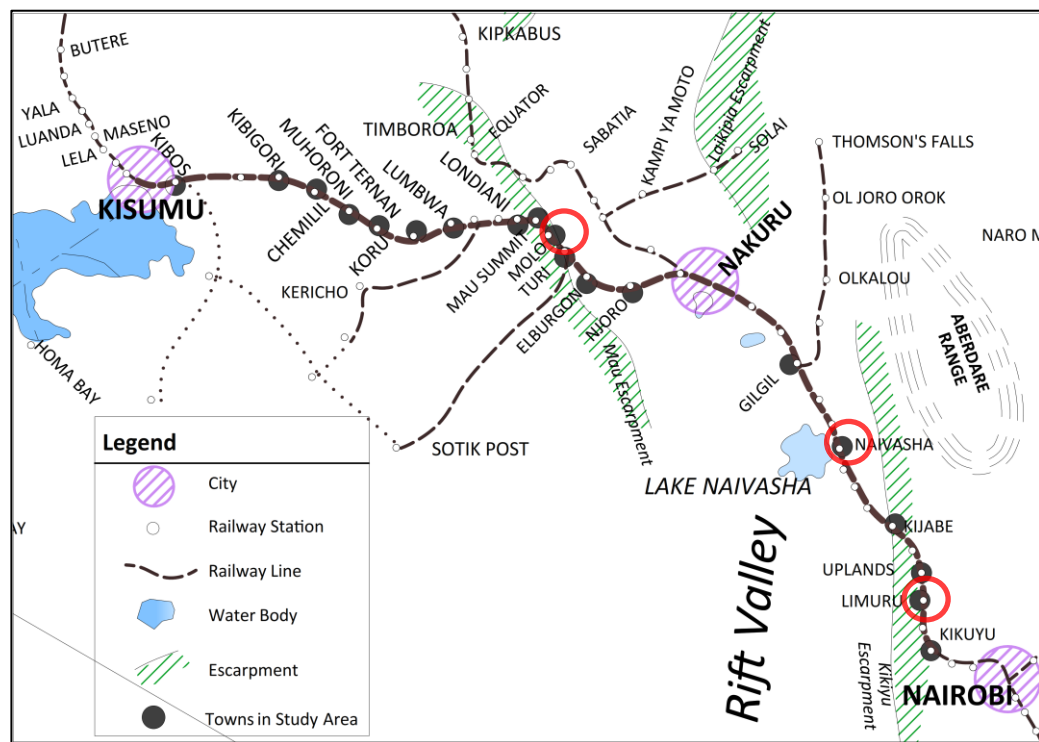


Figure 3.4: Map of Selected Towns

Source: Adapted from Gunston, 2004; McCrow, (2022); Molesworth, (1899)

3.7.2 Sampling Frame

There were two sampling frames, one for the selected towns and another for the residents of the towns. The former sampling frame included all towns between Nairobi and Kisumu along the railway line. Table 3.1 shows 30 railway stations arranged sequentially from Nairobi to Kisumu. It listed towns with defined precincts in the context of the associated railway station. 19 out of the 30 stations have towns that were established around them, as shown in the sampling frame in Table 3.2. The sampling frame for respondents on the heritage values assessment included adults who were available in the selected towns during data collection.

Table 3.1: Stations along the Railway Line between Nairobi and Kisumu

S.No	Station Name	Presence of a Town	
		Yes	No
1.	Kikuyu	✓	
2.	Limuru	✓	
3.	Uplands	✓	
4.	Matathia		✓
5.	Kijabe	✓	
6.	Longonot		✓
7.	Suswa		✓
8.	Munyu		✓
9.	Naivasha	✓	
10.	Morendat		✓
11.	Ilkek		✓
12.	Gilgil	✓	
13.	Kariandus		✓
14.	Mbaruk		✓
15.	Nakuru junction		✓
16.	Njoro	✓	
17.	Elbourgon	✓	
18.	Turi	✓	
19.	Molo	✓	
20.	Mau Summit	✓	
21.	Londiani	✓	
22.	Kedowa		✓
23.	Kipkelion	✓	
24.	Fort Ternan	✓	
25.	Koru	✓	
26.	Muhoroni	✓	
27.	Chemilil	✓	
28.	Kibigori	✓	
29.	Miwani		✓
30	Kibos	✓	
	Total	19	11

Later, railway stations without associated towns were eliminated, and the result was 19 towns. Thereafter, measurements by Google Maps satellite imagery were done to estimate the precinct areas of the railway stations for all the towns, as shown in Table 3.2.

Table 3.2: Sampling Frame for Towns

S.No	Town	Approximate Area of Precinct in Ha
1.	Kikuyu**	32.60
2.	Limuru*	31.56
3.	Uplands	9.78
4.	Kijabe	No Associated Town Precinct
5.	Naivasha*	21.09
6.	Gilgil	15.06
7.	Njoro	18.70
8.	Elbourgon	15.81
9.	Turi	6.64
10.	Molo*	26.24
11.	Mau Summit	5.97
12.	Londiani	16.35
13.	Kipkelion	No Associated Town Precinct
14.	Fort Ternan	8.05
15.	Koru	3.99
16.	Muhoroni	12.55
17.	Chemilil	2.78
18.	Kibigori	5.84
19.	Kibos	2.61

* Selected Towns

**Kikuyu Town was used for the pilot study.

3.7.3 Sample Size

For survey research, it is common to sample 10% to 20% of the population (Mills & Gay, 2019). Of the 19 towns listed in the sampling frame, three towns that make up 16 % of the towns lined along the railway line in the study area were an adequate sample. Kikuyu town, whose precinct areas were among the largest, with the highest population of 323,881 of all the towns in the sampling frame according to the Kenya National Bureau of Statistics (2019), was used for the pilot study. This basis was to sufficiently represent the intensity of the townscape characteristics, heritage and opinions. Additionally, a sample size of 150 and above, as stated by Pallant (2020), is sufficient for principal components analysis, and there should be at least five cases for each of the variables. Further, Mills & Gay (2019) assert that beyond a certain point, about $N = 5,000$, the population size is almost irrelevant, and a sample size of 400 is adequate, as was the case in this research that had an infinite population. There were

71 variables in the form of heritage value statements that were responded to by residents. This gave a sample of 355 respondents when the 71 variables were multiplied by five to fulfil the 1:5 ratio required for principal component analysis. Overall, 360 respondents were interviewed, which is 10% within the range of the recommended 400 samples.

3.7.4 Units of Observation and Units of Analysis

The units of observation were each of the selected town precincts, the identified heritage, and the sampled residents who were interviewed. Similarly, the units of analysis were the selected towns, the identified townscape heritage, and the sampled residents.

3.8 Sampling Method

3.8.1 Multi-stage Sampling for Residents

From the homogeneously sampled towns, residents were conveniently sampled. Sampling took place within an average walkable radius of 400 to 800 meters from the centre of the railway station in the selected towns. On the subject of walkability distance, authors agree on a standard walkable access distance of five to ten minutes, or 400 to 800 metres, also traceable to the concept of the “neighbourhood unit (Bertolini & Spit, 2005; Layton, 2017; Morphocode, 2018). For each sampled town, the walkable radius area was divided into smaller spatial units bounded by streets and using the respective town maps to enable uniform spatial distribution of samples. Thereafter, residents were sampled conveniently from each of the spatial zones. The interviewees targeted were residents who acknowledged familiarity with it. Using respective ratios for representativeness, each town was allocated its sample size from the total sample size based on the (Kenya National Bureau of Statistics, 2019) report on the distribution of the population by urban centres, as shown in Table 3.3.

Table 3.3: Residents' Sample Size per Town

S.No	Station Name	Urban Centre Population	Ratio	Sample Size	Sample Size Interviewed
i.	Limuru	81,316	0.19	67	70
ii.	Naivasha	198,444	0.45	160	160
iii.	Molo	156,732	0.36	128	130
	Total	436,492	1.00	355	360

3.8.2 Preparation for Field Survey

After determining the towns to be sampled, the next stage involved preparing for the field survey. The preparation was aimed at dealing with two aspects, including delimiting the precincts for each of the sampled towns and preparing line maps and figure-ground maps. Delimiting the study area for each sampled town was aimed at defining the precinct areas, while the maps were used for townscape analysis.

In delimiting the areas of study of the towns, it was taken that the railway stations formed the core of the precincts. The periphery of a precinct was defined by the urban districts fronting the first street next to and around the railway stations in each of the selected towns shown in Figure 3.5, Figure 3.6, and Figure 3.7. These are the immediate developments related to the railway stations owing to their proximity. Pre-visits to the sampled towns were done to authenticate the line maps generated from satellite image maps, as illustrated in the example presented in Figure 3.8. Later, figure-ground maps of precincts for each sampled town were generated from line maps, as in the example of Figure 3.9, showing solids and voids. Line maps guided the urban walks during data collection. It is also on these line maps that townscape heritage was mapped out. Later, the identified townscape heritage was represented on the figure-ground maps and highlighted in a different colour shade for visual illustration at the townscape level.

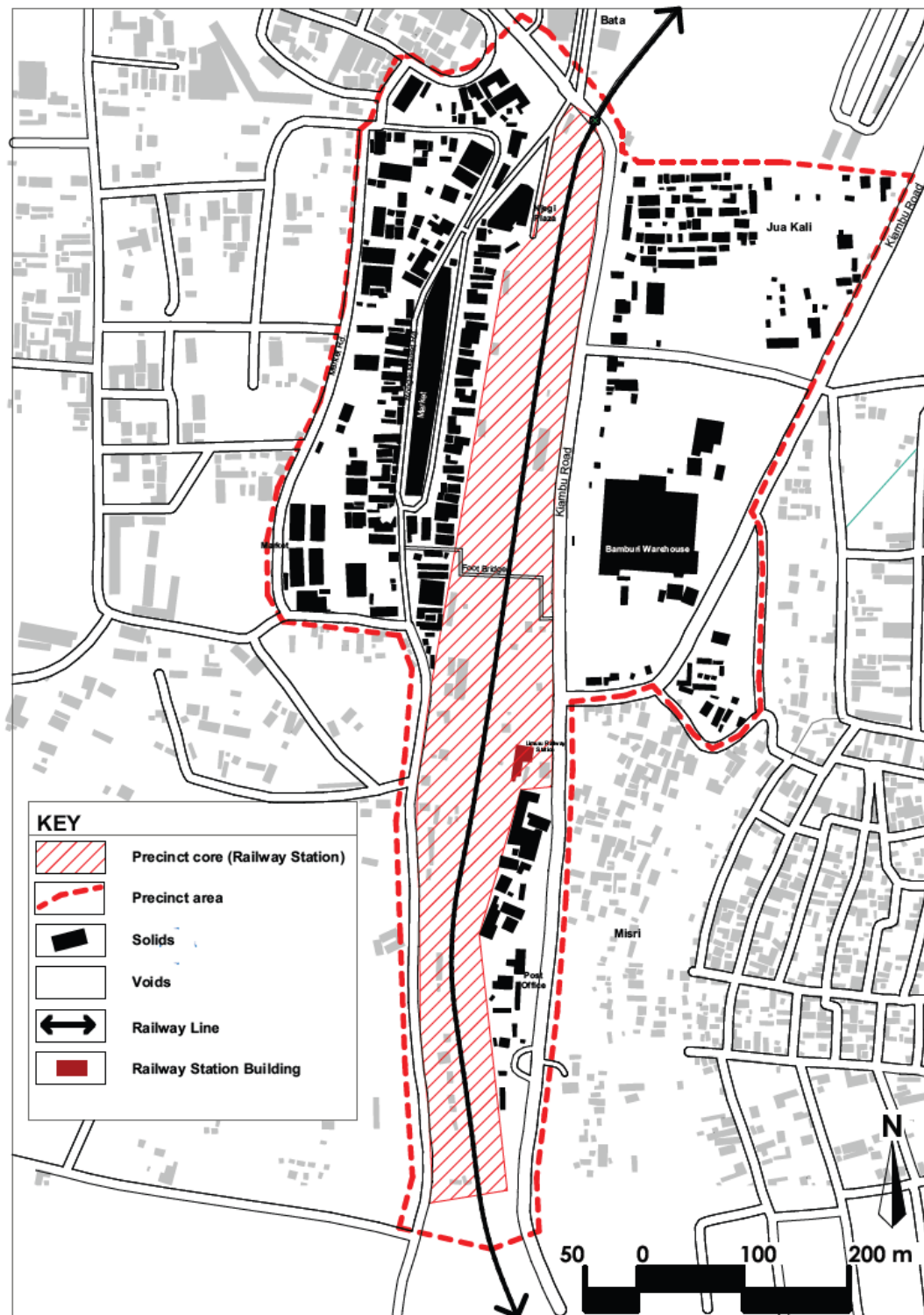


Figure 3.5: Delimited Precinct for Limuru Town

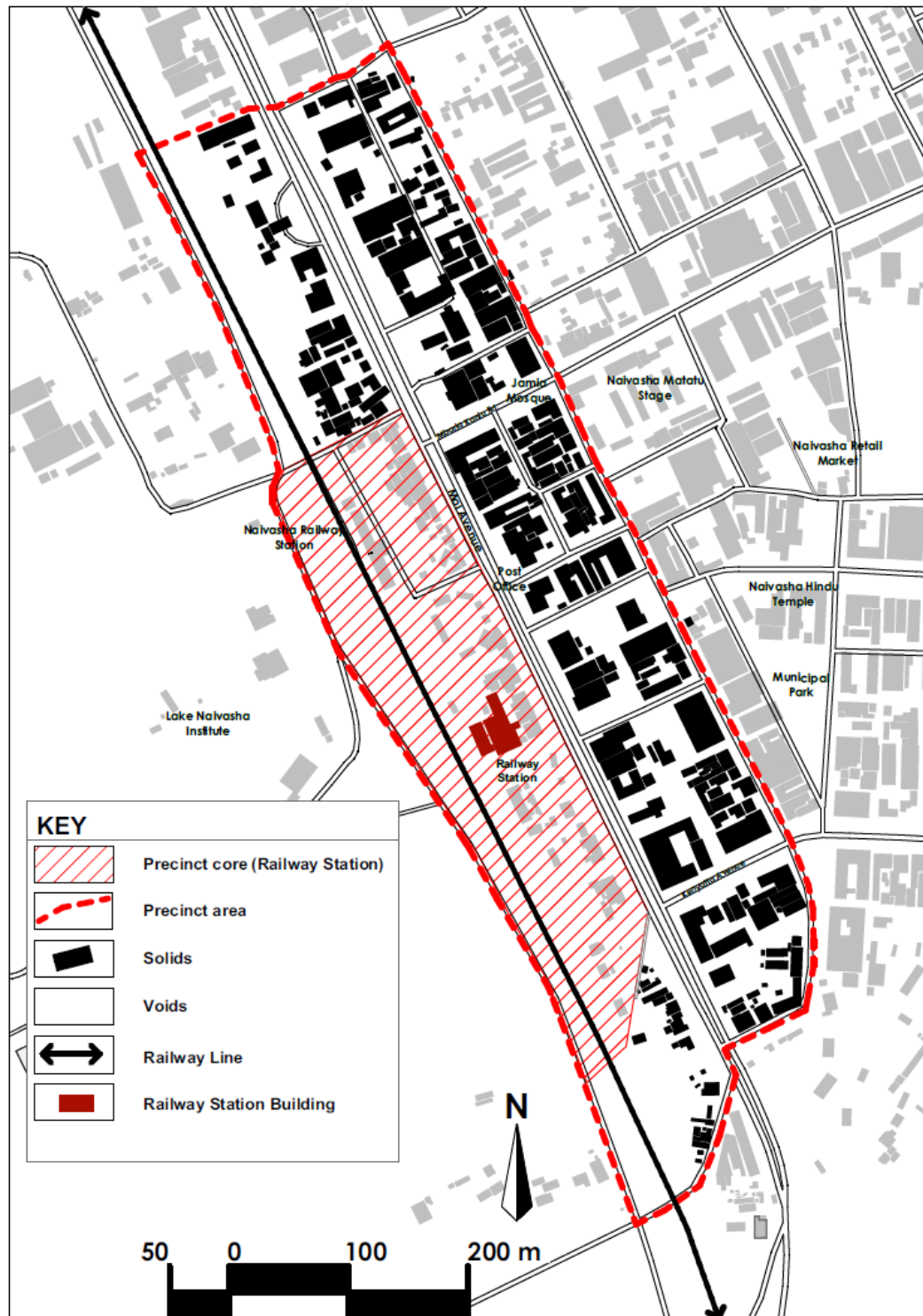


Figure 3.6: Delimited Precinct for Naivasha Town

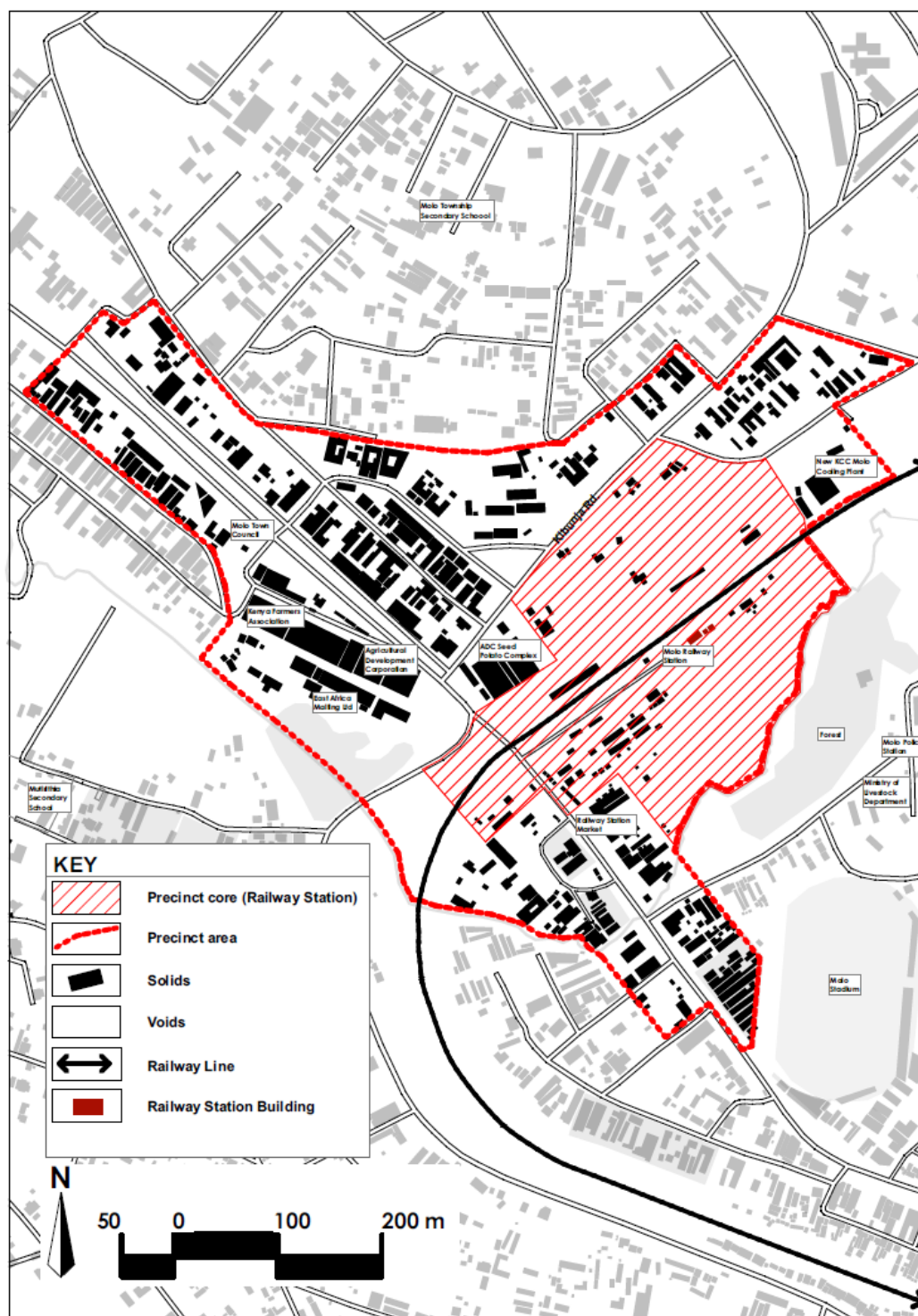


Figure 3.7: Delimited Precinct for Molo Town



Figure 3.8: Molo Town Line Map



Figure 3.9: Molo Town Figure-ground Map

3.9 Data Processing

Raw data was collected by various tools that included observation and mapping guides, and interview schedules were organised systematically to aid in the data analysis. The raw data collected using the tools was reviewed for errors and gaps. The data was then entered into the computer for analysis by use of IBM SPSS Statistics (Version 27) software. The data was organised thematically according to the research objectives and the research questions.

3.10 Pilot Study

A field pretest of the instrument and procedures was done when the data collection tools were prepared. The reason for pretests was to find out how the data collection procedures and the survey instruments worked under practical conditions. The research assistants in this case played two roles in such pretests: they were interviewers and observers carrying out the procedures. They observed the data collection process and reported back about ways in which the procedures and survey instruments could be improved. Therefore, the pre-test was carried out to expose any weaknesses of the proposed data collection tools and also of the survey techniques. Improvement was made to the sequence and clarity of questions in the interview schedules and observation guidelines. Redundant questions and guidelines were removed.

A pilot study was conducted in Kikuyu town in preparation for the main survey from July 17th 2023, to July 21st 2023. Kikuyu town, a sample complete unit of the study, which was not part of the full study sample, was used for the pilot study. An observation schedule was applied to the study of the Kikuyu townscape characteristics. In the selected town, 30 respondents were interviewed using the interview schedule generated to assess heritage values. Ruel et al. (2015) advise that the inclusion of more than 50 “test respondents” may lead to the identification of more problems, but there comes a point of diminishing returns, as the financial and time costs of further pretesting outweigh the benefits of discovering more relatively small issues and inconsistencies in the instrument. 30 respondents were sampled from a delimited precinct of an average walkable radius of 400 meters from the centre of the Kikuyu railway station. The precinct was divided into three smaller urban districts. Thereafter,

samples of residents who lived in the sampled towns and acknowledged familiarity were drawn conveniently from each of the defined urban districts. The sampling technique for respondents in the heritage value survey was purposive, the same as the main study. As indicated by Bryman (2016), piloting an interview schedule provided interviewers with some experience in using it, and it infused in them a greater sense of confidence.

The pilot study established the content validity of scores on the instruments; provided an initial evaluation of the internal consistency of the items; improved questions, format, and instructions; assessed how long the study would take; and identified potential concerns with participant fatigue. Three research assistants were trained beforehand and engaged for the pilot study. The research assistants got involved in testing the adequacy and appropriateness of the data collection tools and cross-sectional research design. The observations on research tools adequacy and appropriateness were incorporated into the final revision of data collection tools. Analysis of the Pilot study data was used to clean up the list of attitudinal statements to ensure that statements were comprehensible and not ambiguous. The attitudinal statements were reduced from 82 to 71 based on the cleanup.

3.11 Data Analysis and Interpretation

The data for the first objective on examining the characteristics of selected heritage townscapes along the Kenya Railway was analysed through spatial and descriptive analysis. The analysis was carried out based on the four research questions under this objective on the figure-ground characteristics, objects of townscape heritage, townscape heritage footprint, and the status of townscape heritage. Townscape analysis took a spatial form of using maps to answer the research questions on figure-ground characteristics. Patterns of solids and voids making up townscapes were analysed by the application of the figure-ground theory, a spatial analysis method to interpret the interaction between networks or links and places. The identified townscape heritage was represented on maps using a different colour shade for the ease of visual evaluation of the heritage footprint proportions. The heritage footprint ratio (hfr) calculations were done by dividing the heritage footprint obtained by the

total area of the precinct of interest. The townscape heritage footprint ratios for Limuru, Naivasha and Molo towns were calculated, and the values were presented as ratios using the mathematical expression below:

$$\text{hfr} = \text{hf} : \text{ta} \quad (3.1)$$

Where: hfr is the heritage footprint ratio
 hf is the heritage footprint in the precinct, and
 ta is the total area of the precinct

Additionally, data of the identified heritage, its physical and conservation status, was analysed using descriptive statistics as counts and presented in tables and bar graphs.

The data for the second objective on identifying the inherent heritage values associated with selected towns along the Kenya Railway was analysed using exploratory factor analysis. The singular research question under the objective was, what are the attitudes of residents toward the townscape heritage? The attitudes were expressed variedly among the population based on the provided attitudinal statements on seven-point Likert scales. An exploratory factor analysis of the expressed attitudes was carried out to determine the underlying values. In the factor analysis model, p are the observed variables. $(X_1, X_2, \dots, X_p)$ and m are the number of underlying constructs $(F_1, F_2, \dots, F_m)$. Appendix VI explains in detail the basis of principal component analysis. The factor analysis model, mathematically expressed below, was applied:

$$\mathbf{X} = \mathbf{LF} + \epsilon \quad (3.2)$$

Where: $\mathbf{X}$ = matrix of observed variables
 $\mathbf{L}$ = matrix of factor loadings
 $\mathbf{F}$ = matrix of latent underlying constructs
 ϵ = matrix of error terms or residuals

The data on the third objective on “determining the conservation needs in selected towns along the Kenya Railway” was analysed descriptively. The singular research question was concerned with the challenges associated with conservation in towns

along the Kenya Railway. As recommended by Frankfort-Nachmias et al. (2015), the analysis of the degree of dispersion relative to the mean of the distribution, to enable comparison of conservation needs among Limuru, Naivasha, and Molo towns, analysis by coefficient of variation was employed. The Coefficient of Variation formula below was applied:

$$V = \frac{s}{\bar{X}} \quad (3.3)$$

Where: V = the coefficient of variation

s = the standard deviation

$\bar{X}$ = is the arithmetic mean

The conservation needs analysed were physical environment, accessibility, safety, economic, and social cultural.

3.12 Reliability

The issues of reliability were matters relating to the quality of the measures that are used to address the concepts in which the researcher is interested. The most important form of reliability for multi-item instruments is the instrument's internal consistency, which is the degree to which sets of items on an instrument behave in the same way (Creswell & Creswell, 2017).

The pilot study produced alpha values between 0.882 and 0.889 for the 82 attitudinal statements, categorised as being fairly high. This proves internal consistency among the sets of items in the instrument. Taber (2018) summarises the description of alpha values as excellent (0.93–0.94), strong (0.91–0.93), reliable (0.84–0.90), robust (0.81), fairly high (0.76–0.95), high (0.73–0.95), good (0.71–0.91), relatively high (0.70–0.77), slightly low (0.68), reasonable (0.67–0.87), adequate (0.64–0.85), moderate (0.61–0.65), satisfactory (0.58–0.97), acceptable (0.45–0.98), sufficient (0.45–0.96), not satisfactory (0.4–0.55) and low (0.11). Consequently, on a value scale of 0 to 1, optimal values range between 0.7 and 0.9 (Creswell & Creswell, 2017; Frankfort-Nachmias et al., 2015; Pallant, 2020). Hence, a high alpha beyond 0.70 is an acceptable level that indicates that the items in the scale are highly correlated.

3.13 Validity

The validity of a scale refers to the degree to which it measures what it is supposed to measure (Frankfort-Nachmias et al., 2015; Kothari, 2004; Pallant, 2020). Validity is thus the extent to which differences found with a measuring instrument reflect true differences among those being tested. Construct and content, and validity are the two types of validity that were considered, each concerned with a different aspect of measurement. In the construction of the data collection instruments, the relevant theories were evaluated as a foundation to achieve construct validity. Then, themes and sub-themes were defined based on existing literature and expert judgement for content validity.

Various validity strategies were engaged to enhance the validity and ensure the accuracy of the findings. Content validity was established through a comprehensive literature review on Historic townscape planning and relevant theories such as the contemporary theory of conservation, theories of attitude and likability, figure-ground theory and the theory of ecological footprint. The strategies employed to establish construct validity were: triangulating different data sources by examining evidence from the sources and using it to build a coherent justification for themes; using peer expert debriefing after review of proposed data collection tools to enhance the accuracy of the account; and spending adequate time in the field to develop an in-depth understanding of the physical context and heritage conservation.

3.14 Research Ethics

Attention was directed towards ethical issues before conducting the study, beginning the study, during data collection and data analysis, and in reporting, sharing, and storing the data. This study was carried out with integrity during the various stages of literature review, fieldwork, and reporting. This report has endeavoured to provide accurate descriptions of what has been done, how it has been done, the information obtained, the techniques used, the analysis carried out, and the results.

Concerning data and interpretation, and where the study involved personal judgments, the rationale for these was communicated to allow for objectivity in opinions.

Declaration and full disclosure of research intentions were communicated to interviewees, as well as any other people within the research area, as was necessary. According to Walliman (2011), there are two aspects of ethical issues in research, which include the individual values of the researcher relating to honesty, frankness, and personal integrity; and the researcher's treatment of other people involved in the research, relating to informed consent, confidentiality, anonymity, and courtesy. Consequently, honesty and forthrightness were expressed to interviewees during the introductory session of each interview to foster trust. As Fowler Jr (2013) advises, and as is desirable, the links between answers and identifiers such as e-mail or postal addresses, and telephone numbers were minimised to protect interviewees from undue exposure of personal details.

It is a basic premise of ethical survey research that respondents should be informed about what it is that they are volunteering for (Fowler Jr, 2013). Participants were informed about the purpose of the study and how data would be used to gain informed consent during interviews. Further, the benefits of the research outcome, that is, the sustainable planning and conservation of cultural resources, were communicated as a way of seeking acceptability. After the benefits were outlined, a question was posed on whether the prospective respondents would like to participate in participating in the interview. During Urban walks, urban photography, and townscape observation, informed consent to enter the premises was also sought.

Further, the privacy and anonymity of participants were respected. Three aspects of privacy were considered: the sensitivity of the information, the setting in which observations are made, and the extent of the dissemination of information obtained when deciding how private certain information is and what safeguards must be used to protect research participants (Frankfort-Nachmias et al., 2015). Personal data concerning individuals collected was not shared or published.

Other ethical concerns were the benefits to participants and respect for social-cultural factors. In most surveys, the main benefits to respondents are intrinsic: enjoying the process of the interview or feeling they contributed to a worthwhile effort (Fowler Jr,

2013). Further, research assistants were sensitised to be courteous to participants by exercising sensitivity to culture, religion, and gender.

Honesty was upheld in the way data was collected, analysed, and interpreted from the sampled towns, and it also explained how conclusions were arrived at. Interviewees were treated with due ethical consideration in the way they were selected, and dealt with personally, and how the information they provided was used in dealing with data analysis and interpretation, scientific objectivity was upheld while bias was avoided (Walliman, 2011). In addition, a research permit presented in Appendix X was obtained from the National Commission for Science, Technology, and Innovation (NACOSTI), which is mandated with research licensing in Kenya.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 Introduction

This chapter presents the results of the study and further interprets them in a discussion. The analysis of data and discussion are presented under the themes of the three study objectives and structured to answer the various research questions. The first objective was concerned with examining the characteristics of selected heritage townscapes along the Kenya Railway. The second sought to identify the inherent heritage values associated with selected towns along the Kenya Railway. The third objective was to determine the conservation needs in selected towns along the Kenya Railway. The fourth objective on the formulation of a planning framework for historic townscapes along the Kenya Railway is entirely addressed in Chapter Five.

4.2 Objective One: Characteristics of Townscape Heritage

The first objective, concerned with the characteristics of the townscape heritage, was studied by analysing the figure-ground patterns of three towns: Limuru, Naivasha, and Molo. Within the three townscapes, the heritage objects were similarly identified. Additionally, each town's heritage footprint was computed. Finally, the status of heritage in each of the selected towns was presented.

4.2.1 Figure-Ground Characteristics of Railway Precincts

4.2.1.1 Townscape Analysis of Limuru Town

The townscape in Limuru was clearly defined by a primary path that acts as the main organising element, as illustrated in Figure 4.1. A key feature that also acts as the edge of the town in the south-eastern direction is a hill. There was also a clear hierarchy of paths from one primary path of 55 - 60 meters, secondary paths of 18 - 30 meters, and tertiary paths of 12 - 24 meters. Seven urban districts in the town were defined by the primary and secondary paths. There were seven key nodes within the precinct area, with five of them being important since they accommodate various commercial activities and were also at the end of secondary and tertiary paths. In Limuru, nine

heritage places were identified. Some of the heritage areas also serve as landmarks due to their unique physical character, form or size. There was no park within the precinct area. The railway station was at the core, even though it does not open directly into the larger precinct area. A footbridge has been provided to connect the railway station area to the urban precinct. A footbridge has been provided to connect the railway station area to the urban precinct.

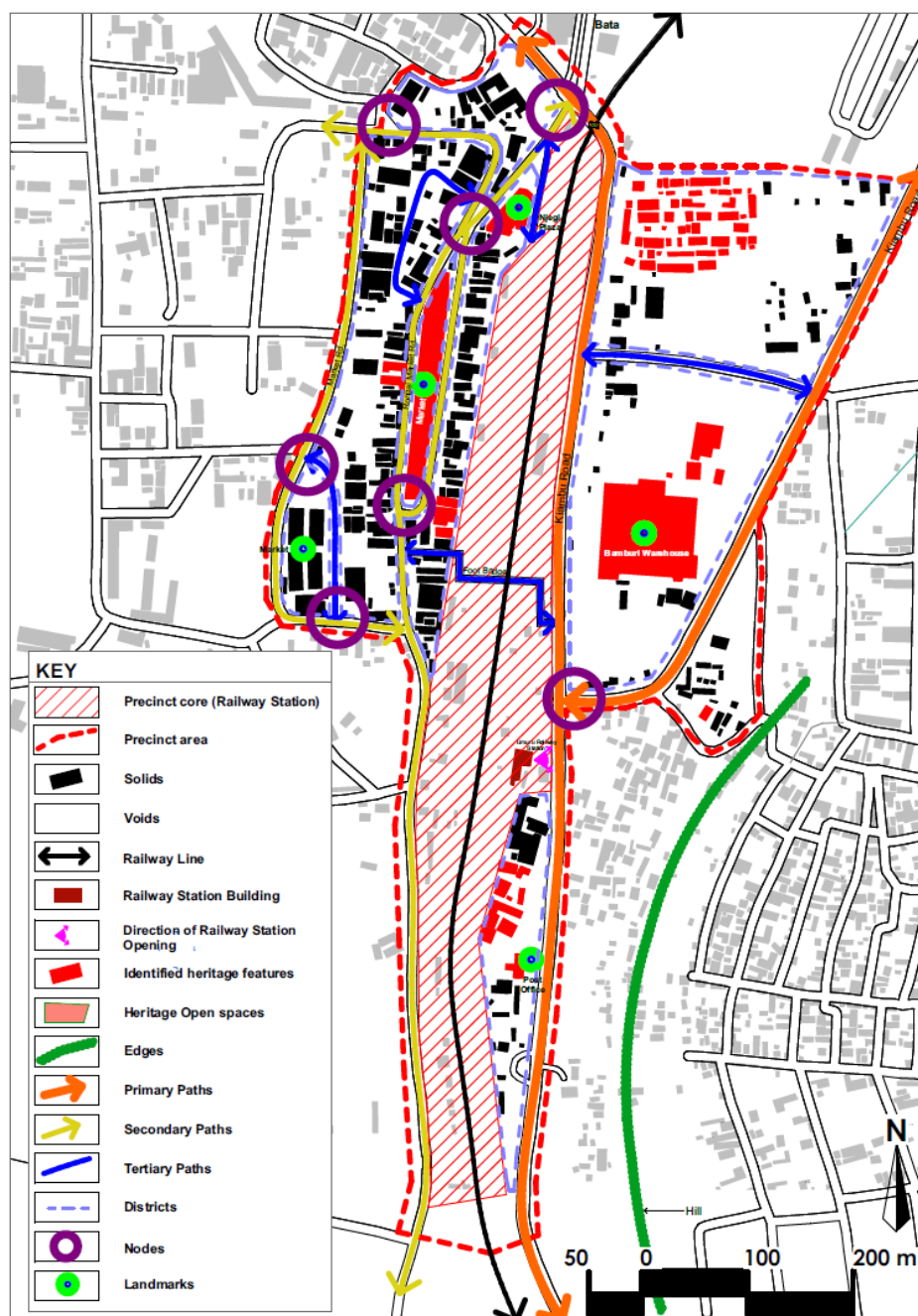


Figure 4.1: Main Features in Limuru Town

Further, the figure-ground maps of the three towns were analysed for their patterns of solids and voids. It was found that the townscape in the Limuru railway station precinct area was made up of a combination of two types of patterns of solids and voids. The identified typological patterns of solids and voids were linear and organic, as illustrated in Figure 4.2

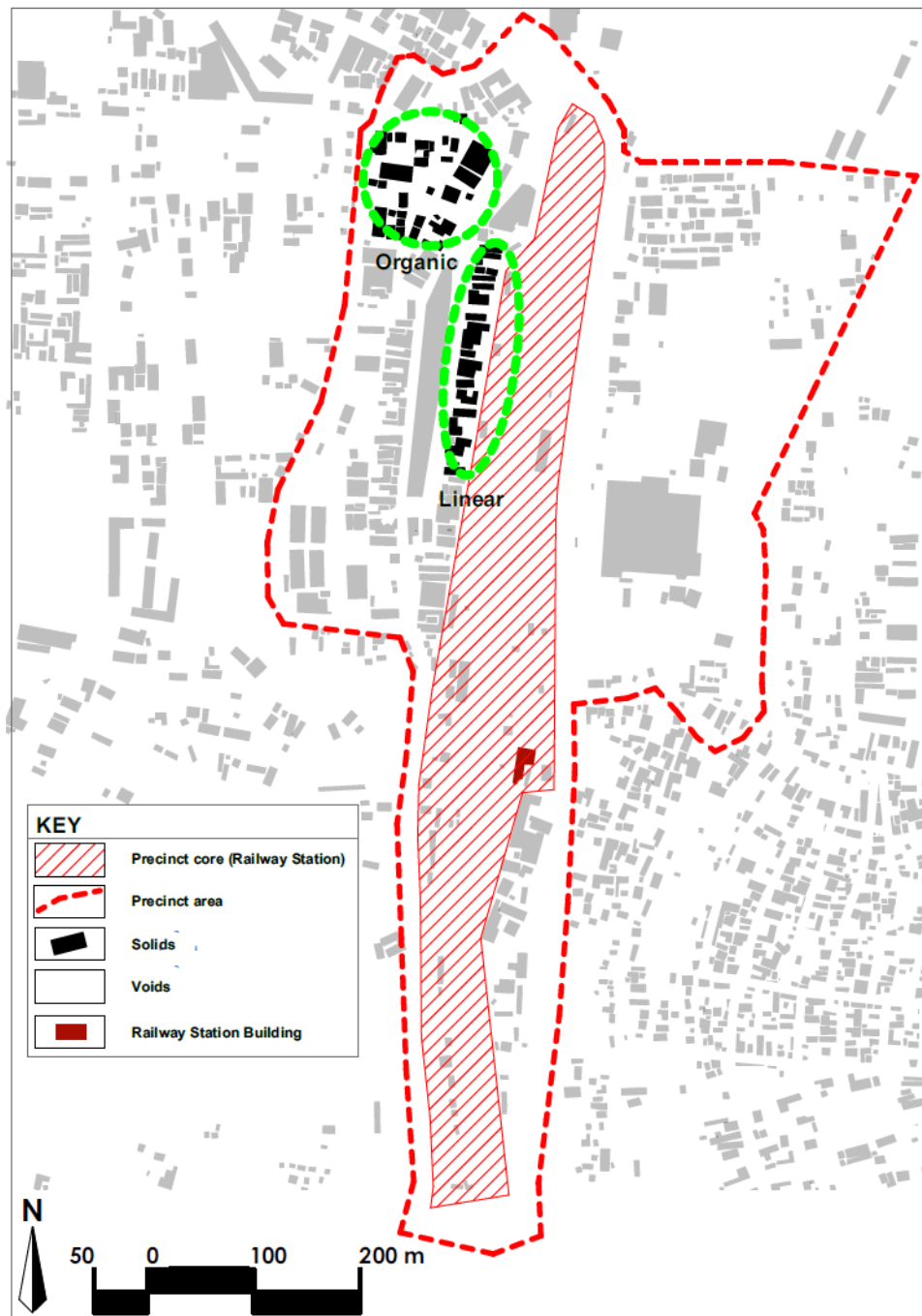


Figure 4.2: Typological Patterns of Solids and Voids in Limuru Town

4.2.1.2 Townscape Analysis of Naivasha Town

For Naivasha, the second town to be studied, as shown in Figure 4.3, the townscape was clearly defined by Moi Avenue, which was a primary path that acts as a datum. A key feature that was the edge of the town in the western direction was the Golf course and Lake Naivasha. There was a clear hierarchy of paths from the primary path of 30 meters, secondary paths of 18 -24 meters, and tertiary paths of 12 meters. Seven urban districts in the town were defined by the primary and secondary paths. There were six key nodes within the precinct area.

In Naivasha, nine heritage places were identified. Some of the heritage areas also serve as landmarks due to their unique physical character, form or size. There were no parks within the precinct area; however, the municipal park was immediately outside. The railway station opens directly into the larger precinct area; however, a weak connection to the precinct area was caused by the primary path, which was an international highway.

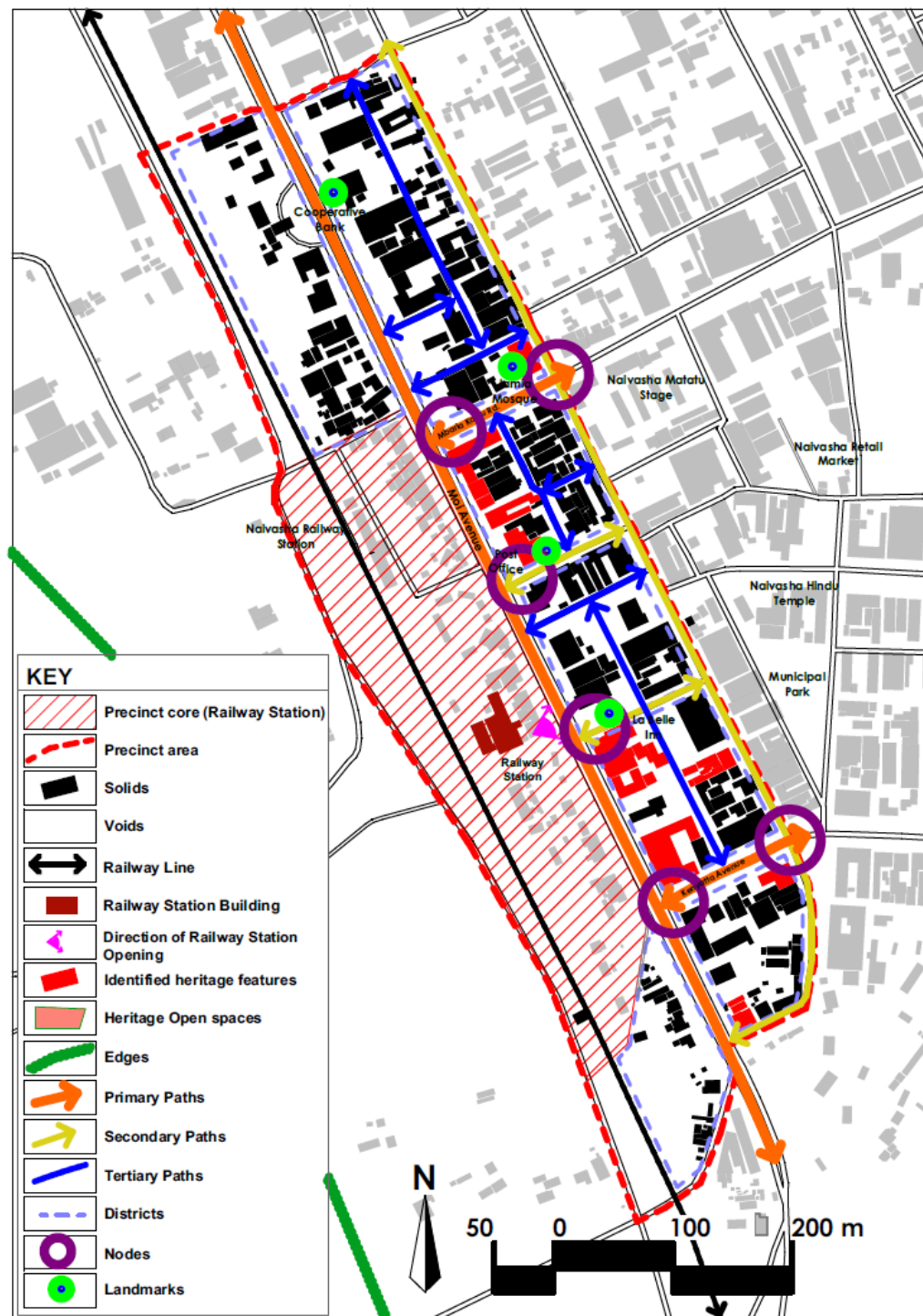


Figure 4.3: Main Features in Naivasha Town

Further, the townscape in the Naivasha railway station precinct area was predominantly laid out in a grid pattern. The identified typological pattern grid is illustrated in Figure 4.4.

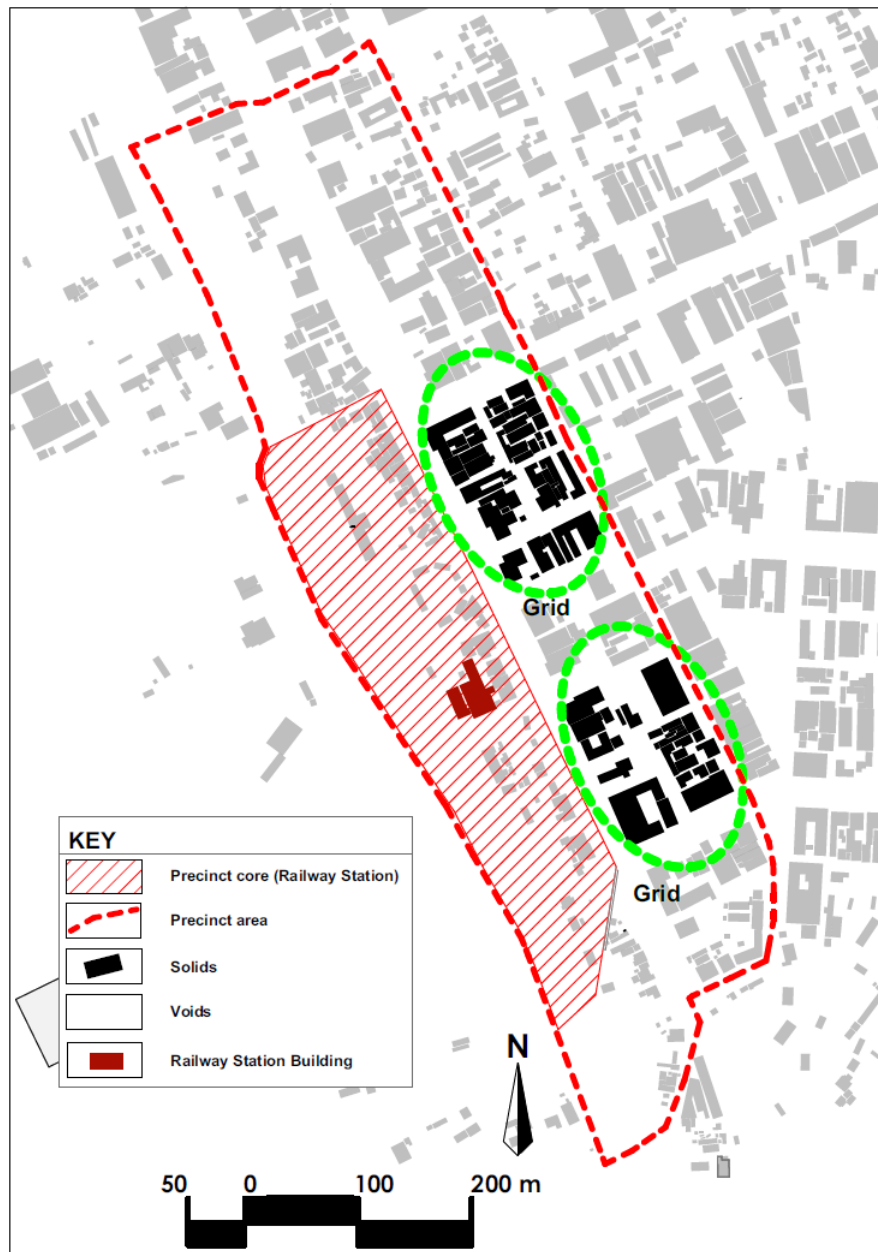


Figure 4.4: Typological Patterns of Solids and Voids in Naivasha Town

4.2.1.3 Townscape Analysis of Molo Town

In Molo, the third town to be studied, as shown in Figure 4.5 the townscape was clearly defined along 2 axes, which were primary paths that act as a datum. A key feature that was on the edge of the town in the northern direction was the Molo River. There was a clear hierarchy of paths from the primary path of 36 meters, secondary paths of 15 meters, and tertiary paths of 9-12 meters. Ten distinct urban districts in the town were

defined by the primary and secondary paths. There were six key nodes within the precinct area. Molo had ten heritage places identified. Some of the heritage areas, due to their unique physical character, form or size, also serve as landmarks. There was one pocket park within the precinct area. The railway station opens directly into the larger precinct area; however, a weak connection to the precinct area was caused by the primary path in front of the opening.

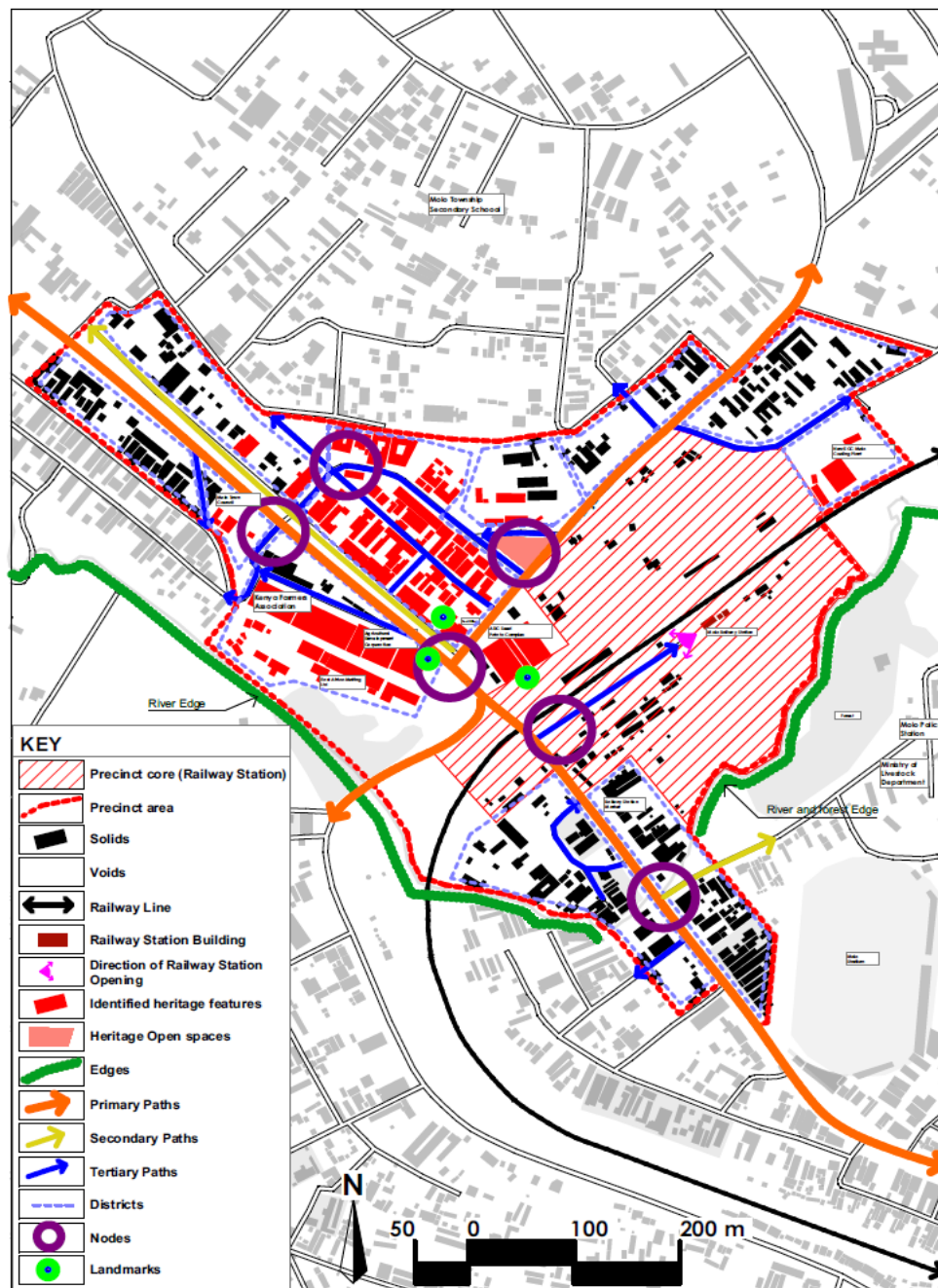


Figure 4.5: Main Features in Molo Town

The townscape in the Molo railway station precinct area was predominantly laid out in linear and grid patterns. The identified typological pattern grid is illustrated in Figure 4.6.

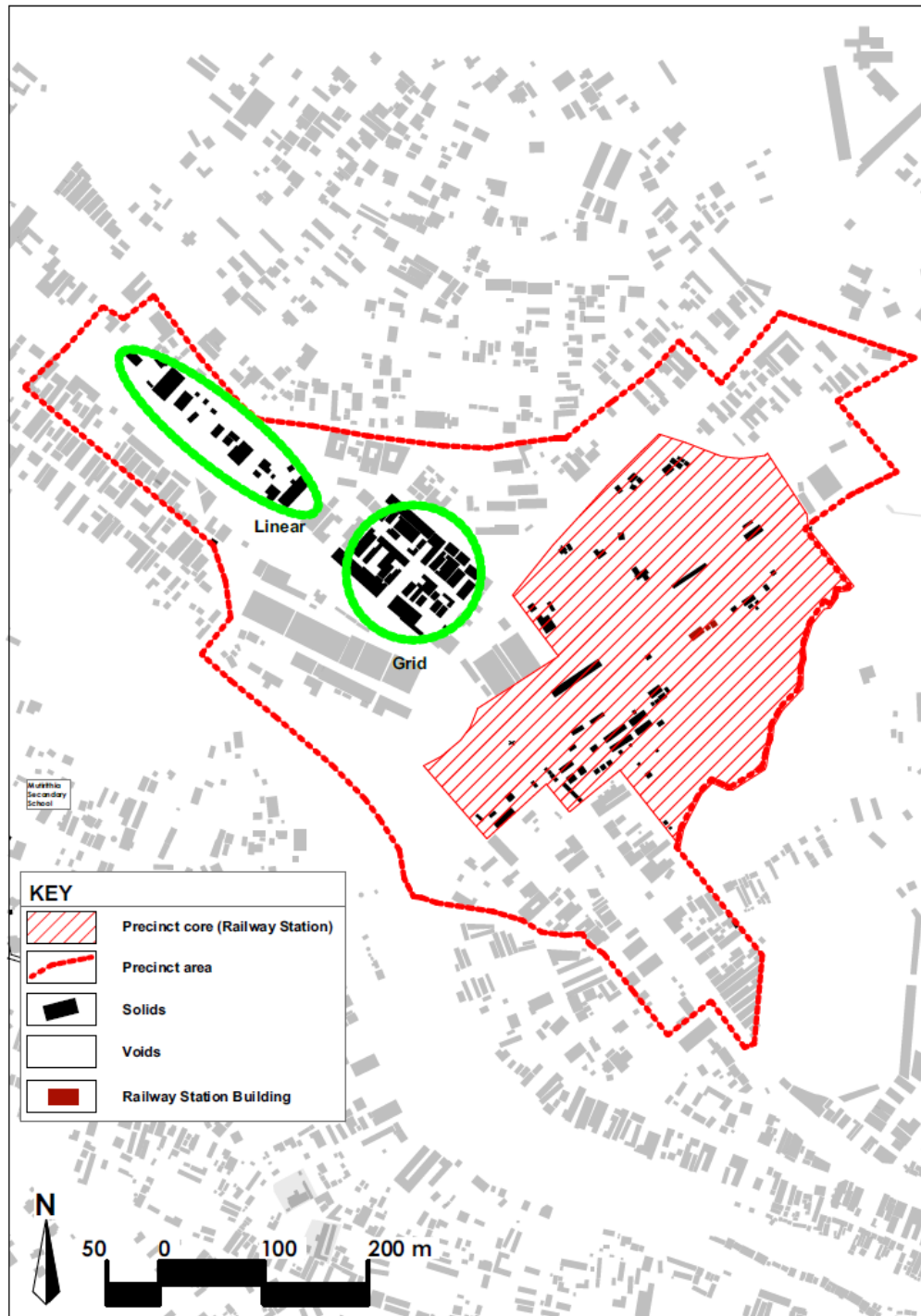


Figure 4.6: Typological Patterns of Solids and Voids in Molo Town

4.2.1.4 Comparison of the Three Townscapes

The townscape perspectives for Limuru, Naivasha and Molo, showing the precinct areas around the railway stations to enable three-dimensional townscape analysis, are presented in Figure 4.8, Figure 4.10, and Figure 4.12. The influence of the railway stations as the original urban nucleus of settlements and commercial areas was demonstrated in the evidence of idiosyncrasies of historic sectors adjacent to the core.

The townscapes scenes were mainly characterised by buildings and the spaces between them, streets, squares, vegetation and topography. Limuru and Molo townscapes exhibit a dynamic topography, causing organic townscape layouts, while Naivasha was a plane, allowing for a grid townscape layout.

The sense of enclosure was present in various instances within the townscapes, in the streets and spaces between buildings. With average heights of buildings between seven and ten meters and street widths of between 12 and 16 meters, the sense of enclosure in the towns was considerable. The primary roads were the main axes of the organisation of the townscape fabric.

The different functions and land use needs have dictated the varied types, sizes and forms of buildings and features. For example, large industrial warehouses and factories in Limuru and Naivasha, small compact buildings for trade, spread out places such as markets and tall commercial structures for commerce. This variety gives a desirable mix of townscape forms.

4.2.2 Townscape Heritage

Within the railway precincts of Limuru, Naivasha and Molo towns, places of heritage significance were identified by the respondents. This was after respondents were asked to identify three places of heritage significance in the towns. All the identified townscape heritage for each town was presented in lists. However, these lists were filtered further to only those that were identified by three or more respondents. Also, these identified places fell within the delimited precinct around the railway station.

4.2.2.1 Townscape Heritage in Limuru Town

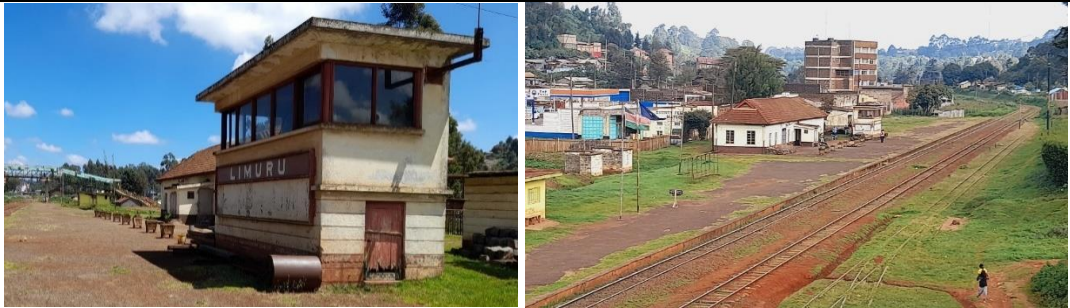
All the identified townscape heritage in Limuru town is presented in Table 4.1. A total of 46 places were identified, 23 of which were within the precinct, 16 outside the precinct and seven within the railway station area. Those identified by three or more respondents and fell within the precinct were nine, outside the precinct were four, while those within the core were five. However, for further analysis, these lists were filtered to only those that were identified by three or more respondents and fell within the precinct, as was the interest of the research. The photographs of the identified significant areas in Limuru are presented in Table 4.2.

Table 4.1: List of Identified Townscape Heritage in Limuru

Limuru Data			Location		
S. No	Important places around the railway station, considered important	Count	Within Precinct	Outside Precinct	Within Core
1	Post Office	36	✓		
2	Railway Houses / Quarters	21			✓
3	Railway Station	16			✓
4	Bata Factory	16		✓	
5	Bamburi Warehouse / Pipeline	12	✓		
6	Railways Goods Shed / Warehouse	11			✓
7	Market	10	✓		
8	Maziwa House (Dairy)	9	✓		
9	Farmers Bar (Areas) Choice / Misri	6	✓		
10	Kindaruma House	5	✓		
11	Police Post	4			✓
12	Buxton Tunnel	4		✓	
13	Jua Kali	4	✓		
14	Railways Nursery	3			✓
15	Njegi Plaza	3	✓		
	Hope Medical Clinic /Limuru General Store		✓		
16	Building	3	✓		
17	Wamarema Building/ Plaza	3		✓	
18	Water Point Railways	2			✓
19	Mabrooki Fields	2		✓	
20	Slaughter House	2		✓	
21	Kamondo Building	2	✓		
22	Manguo Swamp	2		✓	
23	Stage	2	✓		
24	Loreto Catholic	2		✓	
25	Animal Feeds Building Railways	1	✓		
26	Kirathimo	1	✓		
27	Gitugo	1	✓		
28	St Francis	1		✓	
29	Hope Medical Clinic Building	1	✓		
30	Jamaa Plaza	1	✓		
31	Pyrethrum Board Buildings	1	✓		
32	Ushirika House	1	✓		
33	Equity Bank Buildings	1	✓		
34	Woitongo House	1	✓		
35	Railways Footbridge	1	✓		
36	Railway Station Reserve	1	✓		

Limuru Data			Location		
S. No	Important places around the railway station, considered important	Count	Within Precinct	Outside Precinct	Within Core
37	Rimco Industry	1		✓	
38	Law Courts	1		✓	
39	Playfield around Bata	1		✓	
40	Posho Mill	1	✓		
41	Church (Railways)	1			✓
42	Administrative Offices	1		✓	
43	Kwa Nguruwe	1		✓	
44	Kwa Mbuzi	1		✓	
45	Karajii	1		✓	
46	Limuman Building	1		✓	
Total		46	23	16	7
Key: Studied heritage areas shaded in green			✓		
Excluded Places in grey					

Table 4.2: Photographs of Heritage Identified by Residents in Limuru

	
Limuru Railway Station	
	
Post Office	Bamburi Warehouse/ Tusker
	
Limuru Town Market	Limuru Dairy/Maziwa House.

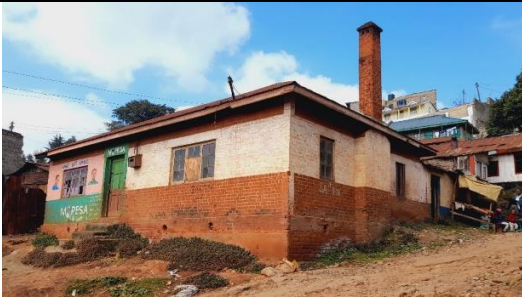
	
Animal Feeds Pyrethrum Board	Farmers Bar/ Farmers Choice/ Misri/ Farmers Corner
	
Kindaruma	Jua Kali
	
Njegi Plaza	Hope Medical Clinic /Limuru General Store Building

Table 4.3 provides a summary list of the statements on why heritage places were considered important in Limuru town. The corresponding heritage values were interpreted from the statements. Six heritage values associated with the heritage were identified in order of number of instances as: economic, age, historic, identity, function and rarity.

Table 4.3: Significant Places around Limuru Town Railway Station

Significant Places around the Railway Station				Reasons for Importance	Heritage Values
1.	Post Office			One of the oldest places in Limuru It was possibly established due to the railway It is as old as the colonial period	Age Historic
2.	Bamburi Warehouse/ Tusker			Employment Former pipeline warehouse in the 1980s	Economic
3.	Limuru Town Market			For employment. It attracted people to trade. Long ago, trade took place in an open-air market.	Economic Historic
4.	Limuru Dairy/Maziwa House. Animal Feeds Pyrethrum Board			Buy and process milk within Limuru town It was built by colonialists It is one of the old structures Pyrethrum was among the goods which were shipped to Europe from around Limuru.	Economic Historic Age
5.	Farmers Bar/ Choice/ Misri/ Corner	Farmers Farmers		Gives identity It has a place where colonials used to drink/bar Tea and Pyrethrum workers used to live around the area	Identity Historic Function
6.	Kindaruma			The old building is now a Rental House Good for business	Age Economic
7.	Jua Kali			Old settlement Employment	Age Economic
8.	Njegi Plaza			Place of Work It is iconic in Limuru town	Economic Identity
9.	Hope Medical Clinic Limuru General Store Building			One of the oldest buildings around One of the first storied buildings in Limuru	Age Rarity/ Oddness
Summary of Heritage Values				Economic - 6 Age - 5 Historic - 4 Identity -2 Function - 1 Rarity/oddness - 1	

Further, photographs of the townscape heritage were represented on a figure-ground map shown in Figure 4.7. The mapping shows the spatial distribution of the heritage within the precinct. It illustrates that the heritage was evenly distributed around the railway station. In addition, some of the heritage was made up of several buildings and hence inseparable, such as the Bamburi Warehouse, Limuru Juakali, Maziwa/Pyrethrum/Animal Feeds buildings and the Limuru Stores/ Hope Clinic buildings. The Post office was also strategically located close to the main station

building, perhaps due to the need to associate the transport and communication functions.

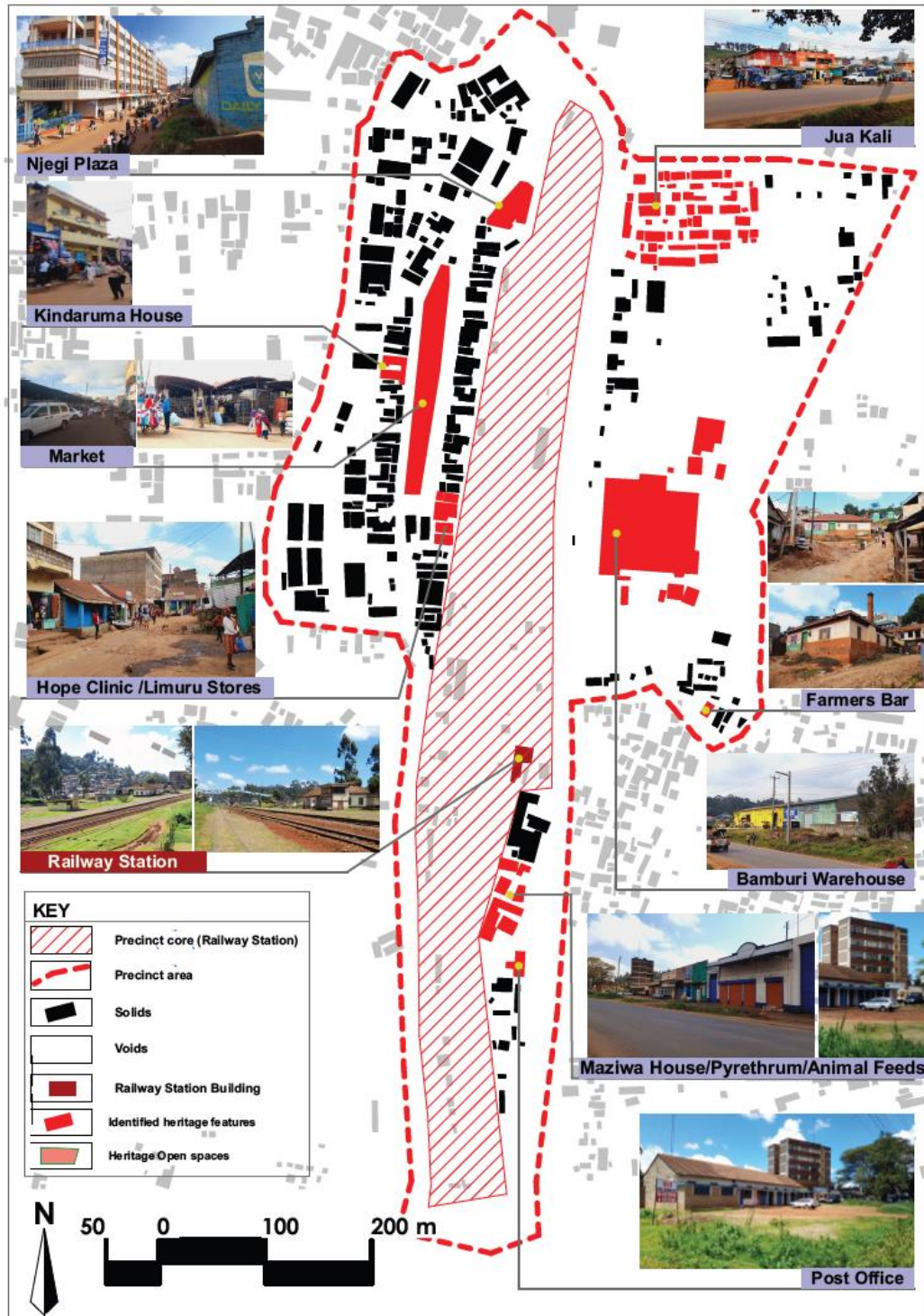


Figure 4.7: Heritage in Limuru Town

The townscape perspective in Figure 4.8 shows how the heritage was distributed and its relationship to the railway station core. The perspective demonstrates the relation of heritage to the railway station by distance and location. In this case, the distribution was even around the railway station area.



Figure 4.8: Townscape Perspective Model of Limuru

4.2.2.2 Townscape Heritage in Naivasha Town

All the identified townscape heritage in Naivasha town is presented in Table 4.4. A total of 93 places were identified, 43 of these were within the precinct, 45 outside the precinct and five within the railway station area. Those identified by three or more respondents and fell within the precinct were nine, outside the precinct were 15, while those within the core were five. The nine heritage places within the precinct underwent further analysis. The photographs of the identified significant areas in Naivasha are presented in Table 4.5.

Table 4.4: List of Identified Townscape Heritage in Naivasha

Naivasha Data			Location		
S. No	Important places around the railway station, considered important	Count	Within Precinct	Outside Precinct	Within Core
1	La Belle Inn	39	✓		
2	Lake Naivasha	32		✓	
	Group 1 (Salama /Bancie restaurant /Lakeview villa)				
3		22	✓		
4	Railway Station	21			✓
5	Post Office	18	✓		
6	Group 2 (Bawani Store Buildings /Family Bank)	18	✓		
7	Railway Quarters	15			✓
8	Lakeside Hotels	14		✓	
9	National Cereals and Produce Board (NCPB)	13		✓	
10	Flower Farms	12		✓	
11	Railway Club	12			✓
12	Mahaver Store Building	10	✓		
13	Golf Club	9		✓	
14	Kenya Farmers Association (KFA)	8	✓		
15	Wambuku	8	✓		
16	Railways Police Station	8			✓
17	Manera Primary	6		✓	
18	Bubble Club/Tusker Depot	6		✓	
19	Market	5		✓	
20	Buffalo Mall	5		✓	
21	Pan Food	4		✓	
22	Economic Housing Group (EHG)	4		✓	
23	Railway Warehouse	4			✓
24	County Council Houses	4		✓	
25	Kihoto	3		✓	
26	4 Season Building	3	✓		
27	Mugo & Kanyi	3		✓	
28	County Council Offices	3		✓	
29	Gitegenye Building	3	✓		
30	Hospital	2		✓	
31	Beach	2		✓	
32	Bridge	2		✓	
33	Stadium	2		✓	
34	Jamaa Supermarket	2	✓		
35	Top Lodge Hotel	2	✓		
36	Muthiga Building	2	✓		
37	A-Z Building	2	✓		
38	Swings Club	2	✓		
39	Old KFA Warehouse	2		✓	
40	Kilimo House	2	✓		
41	Zebra Hotel	2	✓		
42	Police Station	2		✓	
43	Viazi House	2	✓		
44	Wildlife	1		✓	
45	Geothermal	1		✓	
46	Park	1		✓	
47	Mosque	1		✓	
48	Hesbon Hotel	1	✓		

Naivasha Data			Location		
S. No	Important places around the railway station, considered important	Count	Within Precinct	Outside Precinct	Within Core
49	Naivas	1		✓	
50	Helsmere	1		✓	
51	Road	1	✓		
52	Stage	1		✓	
53	Mugoin Falling Waters	1	✓		
54	Total Petrol Station	1	✓		
55	Delemere House	1		✓	
56	Go Down Stores	1		✓	
57	Rift Valley Breweries	1		✓	
58	Rilo Park	1	✓		
59	Lakeside Hotel	1		✓	
60	Chiefs Office	1		✓	
61	Silence Lounge	1	✓		
62	Koerera Building	1	✓		
63	Mirangi Building	1	✓		
64	Sama House	1	✓		
65	Hindu Temple	1		✓	
66	Naivasha Prisons	1		✓	
67	KCC Deleremere	1		✓	
68	Airstrip	1		✓	
69	Kenvas Building	1	✓		
70	Poultry Centre Building	1	✓		
71	Pen Park	1	✓		
72	Law Courts	1		✓	
73	Suprime Bakers Building	1	✓		
74	Top Vet Supplies Building	1	✓		
75	Ravers Demonstration Church	1		✓	
76	Unitas	1	✓		
77	Penibra	1	✓		
78	Audic Point Building	1		✓	
80	Kings & Queen Building	1	✓		
81	Panorama Park Hotel	1	✓		
82	Kiragita	1		✓	
83	Karioki Chotara Building	1	✓		
84	Duati Building	1	✓		
85	Post Bank Building	1	✓		
86	Scopio Club Building	1	✓		
87	Swints Building	1	✓		
88	Olekipai Building	1	✓		
89	Mwicigi Autospares	1	✓		
90	Banda Public Beach	1		✓	
91	Dove Complex	1	✓		
92	Forest	1		✓	
93	Stores	1		✓	
Total		93	43	45	5
Key:	Studied heritage areas shaded in green		✓		
	Excluded Places				

Table 4.5: Photographs of Heritage Identified by Residents in Naivasha

	
Naivasha Railway Station	
	
La Bell Inn Restaurant	
	
Ivory Salama Building / Lake View Villa	
Post Office	
	
Family Bank/ Bawani Store Ltd Building	
Mahaver Store Building	

	
Kenya Farmers Association (KFA)	Wambuku Hotel
	
Four Seasons Building	Gitegenye Building

A summary list of the statements on why each of the heritage places was considered important in Naivasha town is presented in Table 4.6. The corresponding heritage values were interpreted from the statements. Six heritage values associated with the heritage were identified in order of the number of instances as: age, economic, historic, function, aesthetic, and identity.

Table 4.6: Significant Places around Naivasha Town Railway Station

	Significant Places around the Railway Station	Reasons for Importance	Heritage Values
1.	La Bell Inn Restaurant	Hosts guests, tourists, Historic Built in the 1920s The hotel was used by white people only It was used by British people working on the railway.	Economic Age Historic
2.	Ivory Salama Building / Lake View Villa	Good to see along the Road Built in 1949 It was an old restaurant for white people Hosts guests in Naivasha Historic significance It is one of the oldest buildings, which was the face of Naivasha	Aesthetic Age Historic Economic Function Identity

Significant Places around the Railway Station		Reasons for Importance	Heritage Values
3.	Post Office	Logistics It is one of the oldest buildings It has historic significance	Function Age Historic
4.	Bawani Store Ltd Building/ Family Bank	Money management It is one of the oldest buildings, built in 1957 It is one of the structures that started as the face of Naivasha It was constructed during the colonial period. The architecture is similar and simplified	Economic Age Identity Aesthetic
5.	Mahaver Store Building	One of the oldest buildings in Naivasha	Age
6.	Kenya Farmers Association (KFA)	Helped with business growth A place used by white people to trade equipment, seedlings, and seeds	Economic Historic
7.	Wambuku Hotel	It is an important tourist destination Guest house History, meeting point	Economic Function Historic
8.	Four Seasons Building	It is one of the oldest buildings Important for guests It is affordable	Age Economic Aesthetic
9.	Gitegenye Building	Hotel, Bar and Rooms- Had a bird's sculpture Lodging area Used by the Indians to trade Built about 1936 The owner of the building fought for independence	Function Historic Age
Summary of Heritage Values		Age - 7 Economic – 6 Historic - 6 Function – 4 Aesthetic - 3 Identity -2	

The photographs of the townscape heritage were represented on a figure-ground map shown in Figure 4.9. The mapping shows the spatial distribution of the heritage within the precinct, illustrating that the heritage was distributed parallel to the railway station area. Additionally, some of the heritage was made up of several buildings and hence inseparable, such as the La Belle Inn, Salama/Lakeview buildings and the Mahaver Stores. There were also similarities in the typology of heritage, which were single-storey with a pitched roof, seemingly built around the same period. The closest heritage to the railway station building was the La Belle Inn Hotel, which could have served in the early years to accommodate travellers from other places using the train services. In the case of Naivasha railway station, the Post office was also in the vicinity.

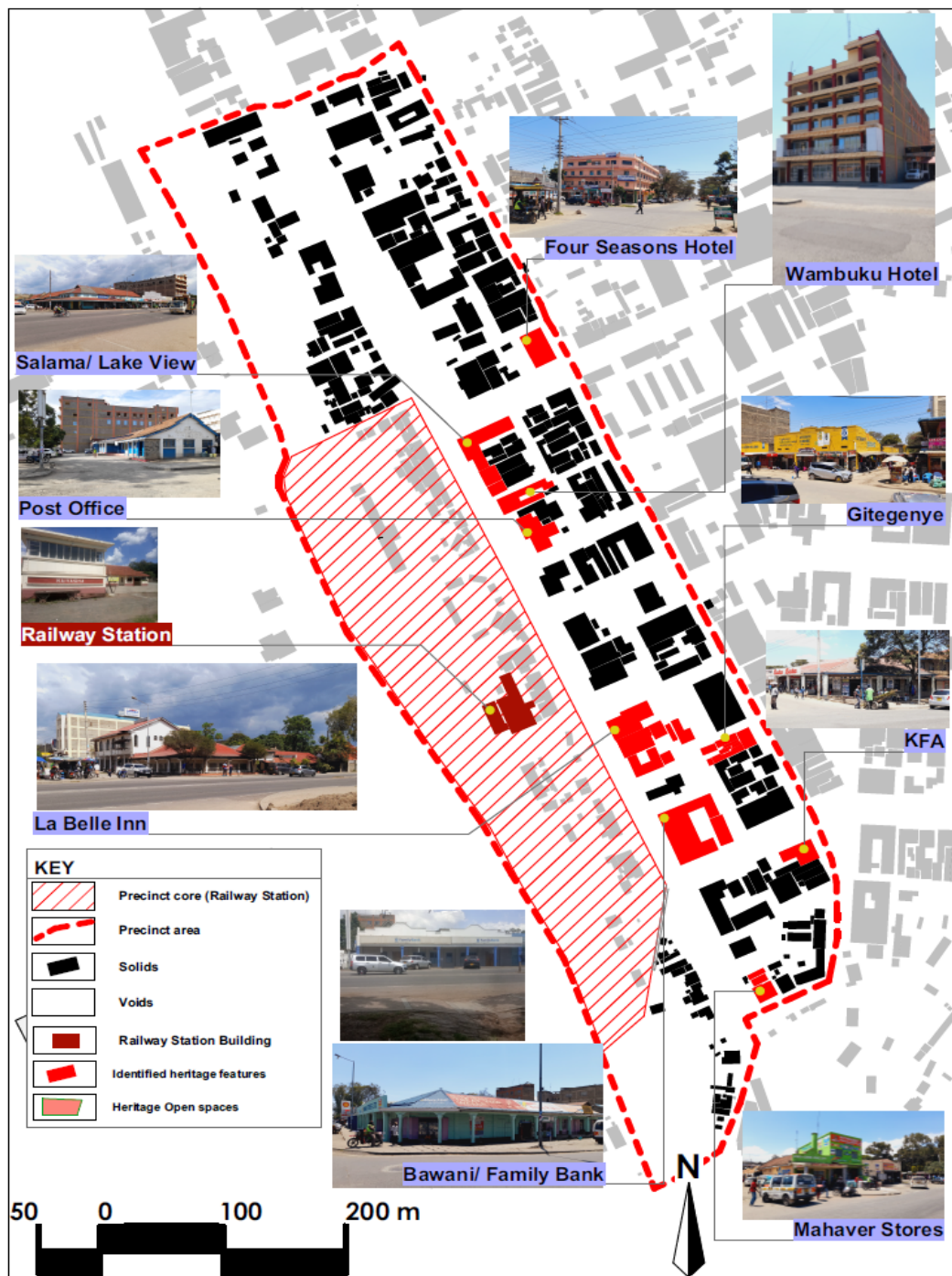


Figure 4.9: Heritage in Naivasha Town

The townscape perspective in Figure 4.10 shows how the heritage was distributed and its relationship to the railway station core. The perspective demonstrates that heritage was distributed parallel to the railway station area, even though separated by a major road.

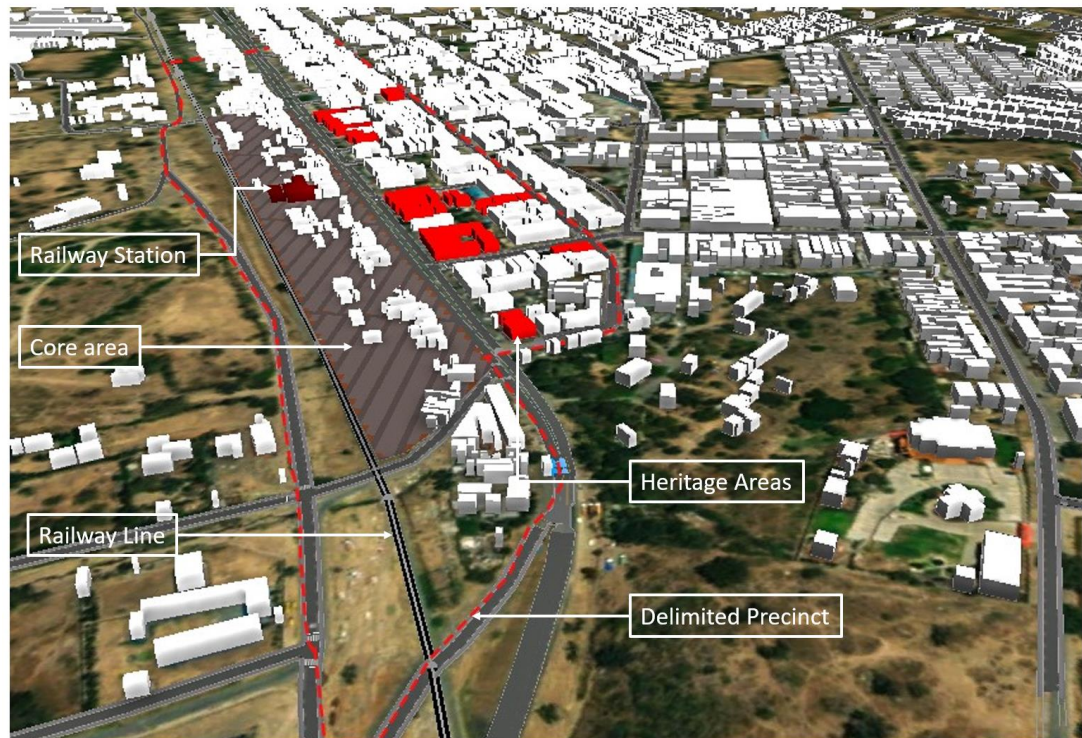


Figure 4.10: Townscape Perspective Model of Naivasha

4.2.2.3 Townscape Heritage in Molo Town

All the identified townscape heritage in Molo town is presented in Table 4.7. A total of 69 places were identified, 11 of which were within the precinct, 55 outside the precinct and three within the railway station area. Those identified by three or more respondents and fell within the precinct were ten, outside the precinct were 12, while those within the core were three. The ten heritage places within the precinct underwent further analysis. The photographs of the identified significant areas in Molo are presented in Table 4.8.

Table 4.7: List of Identified Townscape Heritage in Molo

Molo Data			Location		
S. No	Important places around the railway station, considered important	Count	Within Precinct	Outside Precinct	Within Core
1	Agricultural Development Corporation (ADC)	36	✓		
2	Kenyan Malting Ltd (KML) /Kenya Breweries Limited (KBL)	26	✓		
3	Kenya Co-Operative Creameries (KCC)	25	✓		
4	Posta Area (Old Town Area)	22	✓		
5	Post Office	12	✓		
6	Maziwa House	12		✓	
7	(Corner Mix / ADC Potato Complex / Molo Stores)	10	✓		
8	Railway Houses	8			✓
9	Kaloleni	8		✓	
10	Molo Township School	8	✓		
11	Kenya Farmers Association (KFA)	7	✓	✓	
12	Gatembo House	6			
13	Post Bank Building	6		✓	
14	Maua / Pyrethrum Board	6		✓	
15	Molo Police	5		✓	
16	New Location	4		✓	
17	Family Bank	4	✓		
18	Kenyatta	3		✓	
19	Municipal Council Offices	3	✓		
20	Market	3		✓	
21	Mugumo School	3		✓	
22	Keep Left	3		✓	
23	Molo Hospital	3		✓	
24	Railway Station	3			✓
25	Agricultural Finance Corporation (AFC)	3			✓
26	Kimotho Mbembe	2		✓	
27	Maishani	2		✓	
28	Milimani	2		✓	
29	Car Stage	2		✓	
30	20 Acres	2		✓	
31	Molo Primary	2	✓		
32	Kibunja	2		✓	
33	Uchumi Buildings	2		✓	
34	Kenya Research Centre	2		✓	
35	Gicharati Building	2		✓	
36	Molo Polytechnic	2		✓	
37	PAG Church	1		✓	
38	Kanyuni / Transport House	1		✓	
39	West End	1		✓	
40	Mitindo	1		✓	
41	Peace	1		✓	
42	Old Stage	1		✓	
43	Generis Hotel	1	✓		
44	Shell	1		✓	
45	Tayari	1		✓	
46	Tombo	1		✓	
47	Gathoni	1		✓	
48	Turi	1		✓	
49	Mobil	1			

Molo Data			Location		
S. No	Important places around the railway station, considered important	Count	Within Precinct	Outside Precinct	Within Core
50	Borehole (Between Rubis & Total)	1	✓		
51	National Social Security Fund (NSSF)	1	✓		
52	Animal Storage Unit	1	✓		
53	Saw Mills	1		✓	
54	Cosmopolitan Sacco	1		✓	
55	Molo Uniform Centre	1	✓		
56	Highway Bar	1	✓		
57	Go Down Stores	1	✓		
58	Muthuri Mwega Building	1		✓	
	Kenya Grain Growers Cooperative Union				
59	(KGGCU) Godown	1	✓		
60	Mwamba Hardware	1		✓	
61	Molo 220	1		✓	
62	Coca-Cola Depot	1	✓		
63	Moto	1		✓	
64	Shirikwa Maji Moto	1		✓	
65	Kamuge Building	1		✓	
66	Hollywood	1		✓	
67	Millenium Bar	1		✓	
68	NBK Molo Branch	1	✓		
69	Molo G4S	1		✓	
		69	11	55	3
Key: Studied heritage areas shaded in green			✓		
Excluded places					

Table 4.8: Photographs of Heritage Identified by Residents in Molo

 	
Molo Railway Station	
	
ADC	EABL/KML



KCC



Posta Area - NBK



Posta Area- Uhuru Bar



Posta Area - Highway Bar



Posta Area - Coca-Cola Depot



Posta Area - Millennium Bar



Post Office



Cornermix Godown

	
Molo Township School	Kenya Farmers Association (KFA)
	
Family Bank	County Council Offices

Table 4.9 provides a summary list of the statements on why heritage places were considered important in Molo town. The corresponding heritage values were interpreted from the statements. Seven heritage values associated with the heritage were identified in order of the number of instances as: economic, function, historic, age, identity, rarity, and uniqueness.

Table 4.9: Significant Places around Molo Town Railway Station

Significant Places around the Railway Station			Reasons for Importance	Heritage Values
1.	Agricultural Corporation (ADC)	Development	Helps farmers get the best seedlings Cold storage of potatoes Seed generation Agricultural Resource Centre for farmers Provide employment Increased farming of potatoes	Economic Function
2.	Kenya Breweries/ Ltd/ (EABL/KML)	Kenya Malting	Manufacture of alcohol and distribution of beer It creates Job opportunities Function, Beer depot, Malting barley To preserve the heritage of the quality brewing industry. The first industry in Molo Town Economic growth Attracted more people to Molo Enhanced production of barley within the area Support for Barley farmers	Economic Rarity/ Oddness Function
3.	Kenya Cooperative (KCC)	Creameries	Milk storage and processing Farmers sell milk produce there Source of income for local dairy farmers. Through the company, milk was available in the areas	Function Economic
4.	Posta Area a. National Bank of Kenya (NBK)		Employment of young people	Economic

Significant Places around the Railway Station			Reasons for Importance	Heritage Values
b.	Uhuru Bar/Building		Used to be called 'Rendezvous' It was built in 1954 by Indians It was used as a bar and still is Identity and history Entertainment / Guest house	Historic Age Identity Function
c.	Highway Bar		Bar in the Posta area	
d.	Coca-Cola Depot		Used to be a depot - now abandoned.	
e.	Millenium Bar		Entertainment area Part of the township	
5.	Post Office		Logistics services are not active currently It's a landmark and historic building Creates job opportunities Has been there since as early as the 1960s	Economic Uniqueness Identity Historic Age Function
6.	Comermix Godown/ Warehouse/ Molo Stores	ADC	Store for the Unilever company/Selling of goods Provide employment Through the shop, wholesale items were easily available Used by children, i.e. sons and daughters of white / Asian settlers. Used for storing seeds and produce after harvest.	Economic Identity Historic
	Molo Township School		Has good historic value Education facility Built by Indians Among the first schools in Molo Old School – catering for white settlers and Asian businessmen	Historic Function Age Rarity/Oddness
8.	Kenya Farmers Association (KFA)		It was used to distribute animal feeds and farm products Used by white settlers and Asian businessmen before the 1960s Cater for farmers - planting farming tools	Function Historic Age Economic
9.	Family Bank		Banking and Finance Employment of young people Town/business growth Increased development of the Town	Economic
10.	County Council Offices		Management of county activities and services	Function
Summary of Heritage Values			Economic – 8 Identity - 3 Function – 8 Rarity/oddness – 2 Historic – 6 Uniqueness - 1 Age – 5	

The photographs of the townscape heritage in Molo were represented on a figure-ground map shown in Figure 4.11. The mapping shows the spatial distribution of the heritage within the precinct, illustrating that the heritage was concentrated in one zone to the north west of the railway station. This could have been due to early planning of the agricultural town where the railway served the warehouses, and a town developed around the establishment. The concentration of heritage in the form of the warehouses and industrial buildings, such as the Corner Mix/Molo Stores, Kenya Malting Limited/ Kenya Breweries Limited, and the Kenya Cooperative Creameries, was an illustration of the importance of the railway services to the agricultural and economic functions of the town. Additionally, Molo town presents a heritage area made up of several buildings and hence can be viewed as one inseparable heritage zone. In the case of Molo, just like in Limuru and Naivasha, the Post office was also near the railway station building.



Figure 4.11: Heritage in Molo Town

The townscape perspective in Figure 4.12 shows how the heritage was distributed and its relationship to the railway station core. The perspective shows how the townscape heritage was located in the north-west direction of the railway station, perhaps

indicating the zone where the town was originally established and the activities supported by railway services.



Figure 4.12: Townscape Perspective Model of Molo

4.2.2.4 Summary of Associated Heritage Values

Townscape heritage in Limuru, Naivasha, and Molo was identified due to varied reasons as outlined in Table 4.3, Table 4.6 and Table 4.9 that ranged from their values in historicity, economic benefits, Identity, rarity, aesthetics, uniqueness, functionality, and age. There were also similarities in the kind of heritage identified in the three towns, such as the post office, Kenya Farmers Association (KFA) offices, and warehouses.

The heritage values for each of the three towns are summarised in Table 4.10 and illustrated in Table 4.13. Economic, age, and historic values were highly cited as reasons for the significance of important areas for the three towns. In addition, the value of the function was cited as a high value in Molo Town. Therefore, the key values identified by respondents in all three towns in order of significance were 1. economic,

2. age, 3. historic, and 4. Function, and 5. Identity. The economic and functional values were expressive of the fact that the predominant uses of the townscape heritage were commercial and logistical, and offered support services to farmers from surrounding agricultural areas. The heritage areas have also existed for a long time, and can be associated with, hence the age, historic, and identity values.

Table 4.10: Compared Frequencies of Expressed Heritage Values

	Aesthetic	Age	Economic	Function	Historic	Identity	Rarity/ Oddness	Uniqueness
Limuru	0	5	6	1	4	2	1	0
Naivasha	3	7	6	4	6	2	0	0
Molo	0	5	8	8	6	3	2	1
Total	3	17	20	13	16	7	3	1

Later, these heritage values were compared to the ones resulting from factor analysis of attitudinal statement scores in interviews by the respondents in 4.3.3.

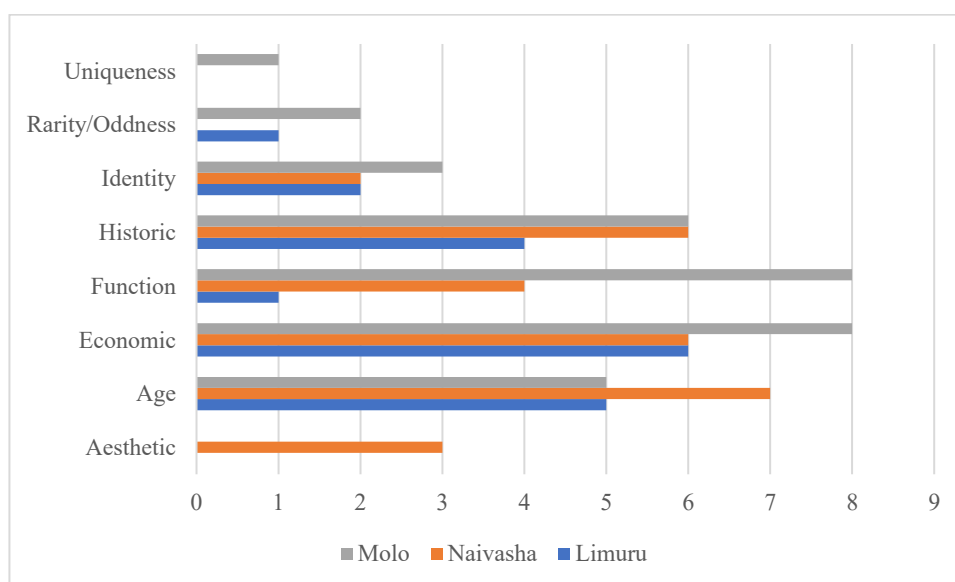


Figure 4.13: Compared Frequencies of Expressed Heritage Values

4.2.3 Townscape Heritage Footprint

In the analysis of the townscape heritage footprint, the railway station was regarded as a heritage area in itself, as observed from responses on significant places of towns.

Table 4.11, Figure 4.7, Figure 4.9, and Figure 4.11 show the delimited area, core and precinct sizes of the three towns.

4.2.3.1 Core and Precinct Sizes

For Limuru, the area of the delimited precinct and the core occupies an area of 31.56 ha, where the core was 8.27 ha or 26.2% of the delimited area, while the remaining area of the precinct was 23.29 ha or 73.8%. In Naivasha, the area of the delimited precinct and the core occupies an area of 21.09 ha, where the core was 6.34 ha or 30.1% of the delimited area, while the remaining area of the precinct was 14.75 ha or 69.9%. In Molo town, the area of the delimited precinct and the core occupies an area of 26.24 ha, where the core was 8.79 ha or 33.5% of the delimited area, while the remaining area of the precinct was 17.45 ha or 66.5%. The data on core and precinct sizes are shown in Table 4.11.

Table 4.11: Core and Precinct Sizes of Towns

Town	Zone	Area	% of the delimited area
Limuru	1. Area of the delimited precinct and the core	31.56 ha	100%
	2. Area of the core (railway station area)	8.27 ha	26.2%
	3. Total area (ta) of the precinct	23.29 ha	73.8%
Naivasha	1. Area of the delimited precinct and the core	21.09 ha	100%
	2. Area of the core (railway station area)	6.34 ha	30.1%
	3. Total area (ta) of the precinct	14.75 ha	69.9%
Molo	1. Area of the delimited precinct and the core	26.24 ha	100%
	2. Area of the core (railway station area)	8.79 ha	33.5%
	3. Total area (ta) of the precinct	17.45 ha	66.5%

Table 4.12, Table 4.13, and Table 4.14 present the calculated areas in hectares of the various zones, solids and voids. The maps in Figure 4.7, Figure 4.9 and Figure 4.11 complement the calculation of the heritage footprint ratio in the delimited precincts of Limuru, Naivasha and Molo towns.

4.2.3.2 Heritage Footprint for Limuru Town

In Limuru town, all solids in the precinct area occupied an area of 5.02 ha or 21.6% of the precinct area, while the voids covered 18.27 ha or 78.4% of the precinct area. The area covered by townscape heritage solids occupied 2.39 ha or 10.3%, while there were no townscape heritage voids. The total heritage area of solids and voids of identified

places of heritage significance was therefore 2.39 ha or 10.3% of the precinct area. The heritage footprint ratio for Limuru town railway station precinct was therefore 1:10 or 10.3% as presented in Table 4.12.

Table 4.12: Townscape Heritage Footprint for Limuru

Town	Calculation	Area	% of precinct
Limuru	1. Area of all solids in the precinct	5.02 ha	21.6%
	2. Area of all voids in the precinct area	18.27 ha	78.4%
	3. Area covered by the solids of identified places of heritage significance	2.39 ha	10.3%
	4. Area covered by the voids of identified heritage open spaces in the precinct area	0.00 ha	0%
	5. Total heritage area (solids and voids of identified places of heritage significance) in the precinct area (hf).	2.39 ha	10.3%
	6. The heritage footprint ratio, $hf_r = hf: ta$	2.4:23.3 = 1:10 or 10.3%	

Figure 4.14 provides a visual illustration of the heritage footprint ratio within the precinct area in Limuru town, which was at 10.3%. First, the townscape heritage footprint was evenly distributed around the railway station and along primary and secondary paths. The railway station, in this case as a node, was the primary organising townscape element for the heritage footprint. In some instances, the heritage was isolated even with the continued development of the town, and hence was hidden among newer developments. In addition, some townscape heritage exists in clusters due to them performing similar or related functions.

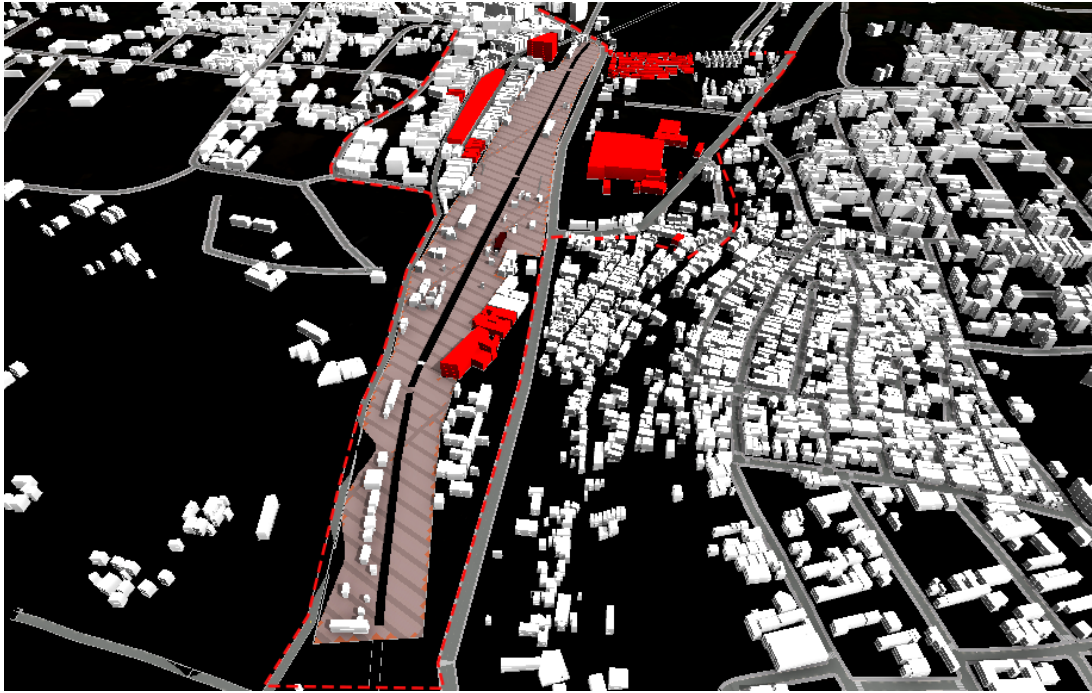


Figure 4.14: Visual Illustration of Heritage Footprint in Limuru

4.2.3.3 Heritage Footprint for Naivasha Town

In Naivasha town, all solids in the precinct area occupied an area of 4.7 ha or 31.9% of the precinct area, while the voids covered 10.5 ha or 68.1% of the precinct area. The area covered by townscape heritage solids occupied 1.24 ha or 8.4%, while there were no townscape heritage voids. The total heritage area of solids and voids of identified places of heritage significance was therefore 1.24 ha or 8.4% of the precinct area. The heritage footprint ratio for Naivasha town railway station precinct was therefore 1:12 or 8.4%. The heritage footprint ratio is presented in Table 4.13

Table 4.13: Townscape Heritage Footprint for Naivasha

Town	Calculation	Area	% of precinct
1.	Area of all solids in the precinct	4.7 ha	31.9%
2.	Area of all voids in the precinct area	10.05 ha	68.1%
3.	Area covered by the solids of identified places of heritage significance	1.24 ha	8.4%
4.	Area covered by the voids of identified heritage open spaces in the precinct area	0.00 ha	0.0%
5.	Total heritage area (solids and voids of identified places of heritage significance) in the precinct area (hf).	1.24 ha	8.4%
6.	The heritage footprint ratio, $hf_r = hf : ta$	1.24:14.75 or 1:12 or 8.4%	

Figure 4.15 provides a visual illustration of the heritage footprint within the precinct area in Naivasha town, which was at 8.4%. The townscape heritage footprint was evenly distributed and arranged along the railway station area, and along primary and secondary paths parallel to the station area. The heritage was among the early places developed due to the services the railway station provided. The railway station, linear in its layout, was the primary organising townscape element for the heritage footprint. Some heritage exists in clusters in a linear form, having influenced each other in form and arrangement along the railway line and primary path.

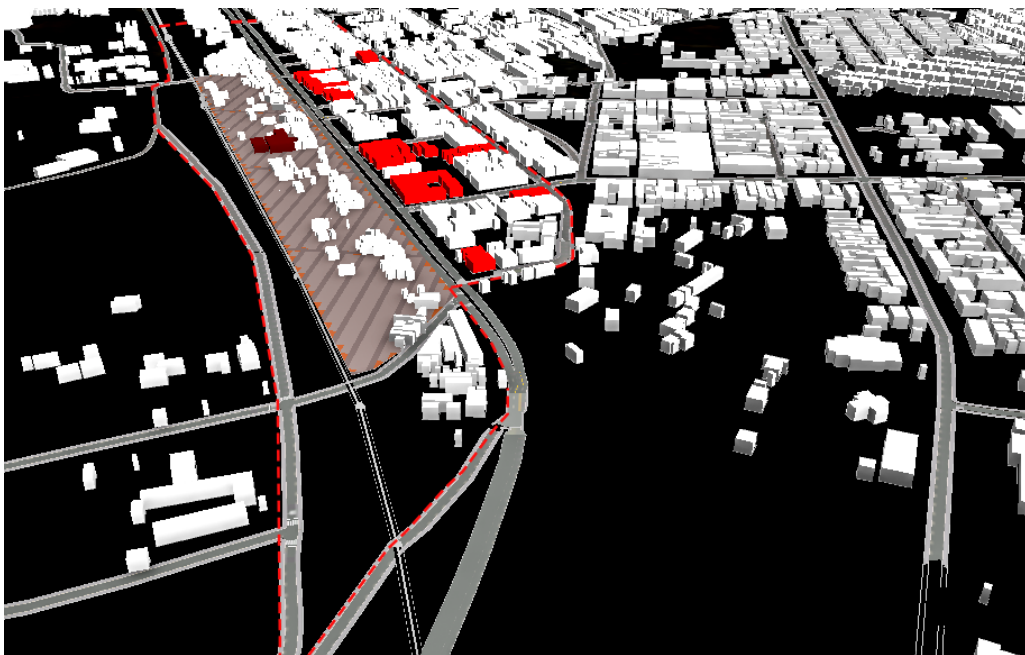


Figure 4.15: Visual Illustration of Heritage Footprint in Naivasha

4.2.3.4 Heritage Footprint for Molo Town

In Molo town, all solids in the precinct area occupied an area of 4.82 ha or 27.6% of the precinct area, while the voids covered 12.63 ha or 72.4% of the precinct area. The area covered by townscape heritage solids occupied 3.30 ha or 18.9%, while the area of townscape heritage voids occupied 0.09 ha or 0.5% of the precinct area. The total heritage area of solids and voids of identified places of heritage significance was therefore 3.39 ha or 19.4% of the precinct area. The heritage footprint ratio for the Molo town railway station precinct was therefore 1:5 or 19.4%, as shown in Table 4.14.

Table 4.14: Townscape Heritage Footprint for Molo

	Calculation	Area	% of precinct
1.	Area of all solids in the precinct	4.82 ha	27.6%
2.	Area of all voids in the precinct area	12.63 ha	72.4%
3.	Area covered by the solids of identified places of heritage significance	3.30 ha	18.9%
4.	Area covered by the voids of identified heritage open spaces in the precinct area	0.09 ha	0.5%
5.	Total heritage area (solids and voids of identified places of heritage significance) in the precinct area (hf).	3.39 ha	19.4%
6.	The heritage footprint ratio, $hf_r = hf : ta$	3.39:17.45 or 1:5 or 19.4%	

Figure 4.16 provides a visual illustration of the heritage footprint within the precinct area in Molo town, which was at 19.4%. First, the townscape heritage footprint was clustered near the railway station, to the north west and served by a primary road. The railway station as a node was the focus for the heritage footprint. The compactness and intactness of the heritage footprint in Molo town could stem from the continued usage of the heritage. The threat of new development to the clustered heritage footprint was minimal, as it was happening beyond the heritage cluster zone and the precinct area.

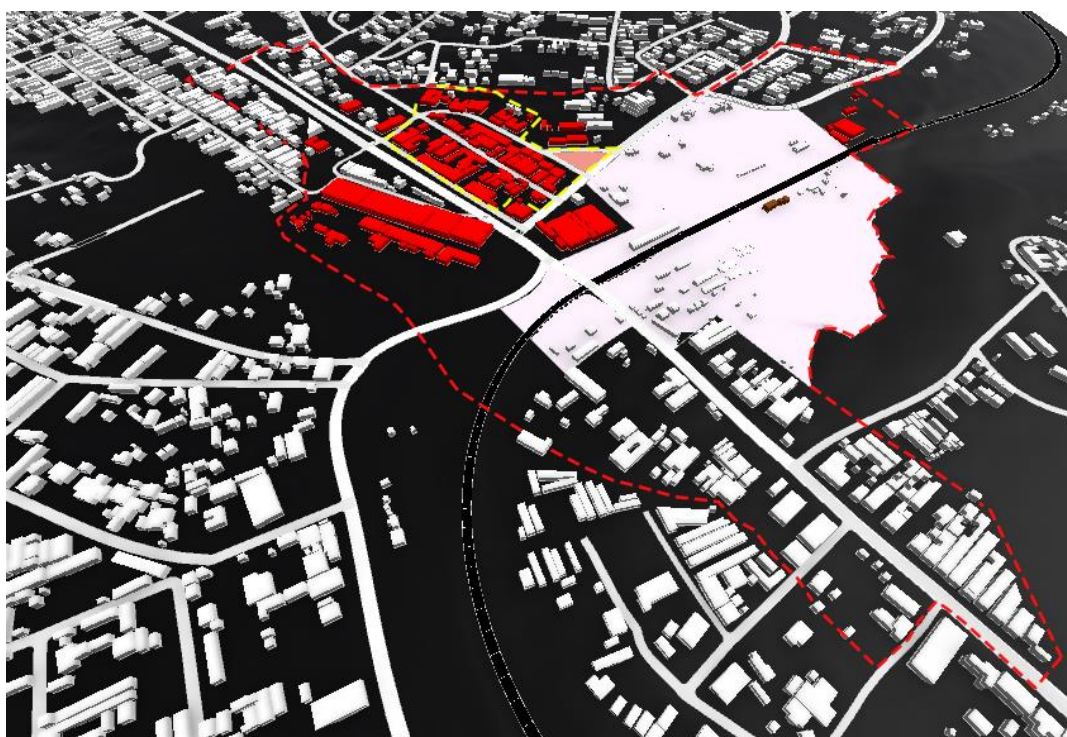


Figure 4.16: Visual Illustration of Heritage Footprint in Molo

4.2.3.5 Comparison of Heritage footprints among the Towns

The presence of this heritage footprint in the three towns was a pointer to the significance, people's association and awareness of the townscape heritage. In comparison, Limuru and Naivasha's heritage footprint was less than that of Molo due to differences in the threat of development. The townscape in Limuru and Naivasha could also be changing faster than that of Molo, and therefore high rate of heritage loss. On the other hand, the higher heritage footprint ratio in Molo could be due to continued usefulness in the heritage, together with affordable land in the town to accommodate new development.

4.2.4 Status of Townscape Heritage

The heritage inventory, physical, conservation and townscape status of the identified heritage in Limuru, Naivasha, and Molo towns are presented in tables and figures hereafter. The identified heritage inventory, characteristics of the heritage physical footprint, type of damage observed, threats, effects of change, conservation action, and their townscape characteristics are presented.

4.2.4.1 Towns' Heritage Inventory

The foremost aspect of the status of the heritage is the heritage inventory, where type, ownership, accessibility, use, occupancy and characteristics of the heritage footprint are addressed. Table 4.15 shows the identified townscape heritage inventory within the railway station precincts of Limuru, Naivasha and Molo. Further, the summary of the inventory for the three towns is presented in Table 4.16.

4.2.4.1.1 Type of Townscape Heritage

Figure 4.17 shows the type of townscape heritage for the three towns. In Limuru, eight of the identified heritage places were standalone buildings, and one was a zoned precinct, in the form of a group of buildings. In Naivasha town, nine of the identified heritage places were buildings. In Molo town, six of the identified heritage places were buildings, and four were within a zoned precinct, in the form of a group of buildings. In summary, for the three towns, the buildings represented 82%, while the zoned

precincts with buildings represented 18% of the identified heritage places, as shown in Table 4.16. Buildings were therefore the predominant type of townscape heritage in the three towns. Other heritage types, such as monuments and open spaces, were not present.

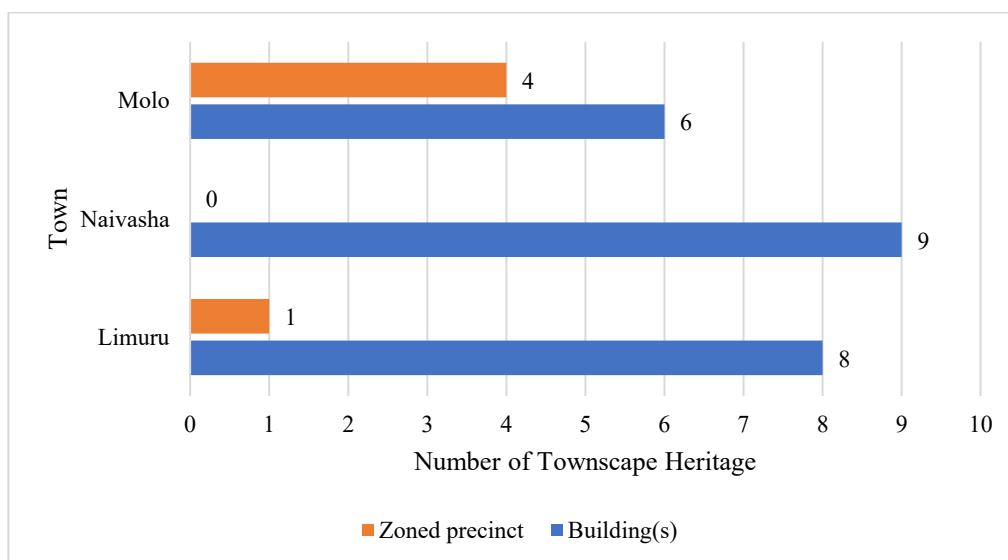


Figure 4.17: Type of Townscape Heritage

The dominance of buildings as a type of heritage could be due to the towns not evolving yet to accommodate other types of heritage. The zoned precincts in Molo town can be attributed to the concentration of activities related to the railway services in one central location.

4.2.4.1.2 Ownership and Accessibility

Figure 4.18 illustrates ownership of the identified townscape heritage. For Limuru, six of the identified heritage places were privately owned, two were owned by corporations, while one was publicly owned. In Naivasha town, seven of the identified heritage places were privately owned, and one was owned by a corporation. In Molo town, one of the identified heritage places was privately owned, eight were owned by corporations, while one was publicly owned. In summary, for the three towns, the privately owned places represent 50%, while corporations own 43%, and publicly

owned places were 7% of the identified heritage places, as demonstrated in Figure 4.18. Therefore, the ownership of the townscape heritage was mainly either privately owned or owned by corporations. Further, in all cases, all the heritage places were accessible.

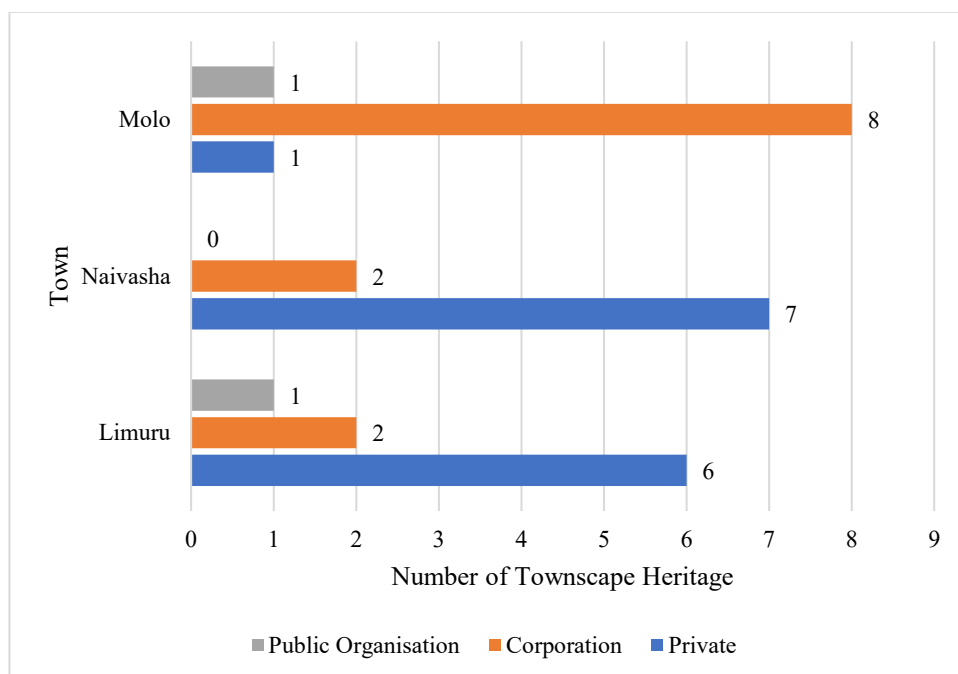


Figure 4.18: Ownership of Heritage

The higher number of heritages owned by corporations in Molo was due to them being set up to provide agricultural services such as warehousing, distribution, milling, and finance to the agriculturally rich region. On the other hand, the predominantly privately owned heritage in Limuru and Naivasha was an indicator of higher private investment for commerce and trade.

4.2.4.1.3 Use Status of the Townscape Heritage

Figure 4.19 presents the use status of the townscape heritage. In Limuru, seven of the identified heritage places retained their original use, and two were under adaptive reuse. In Naivasha town, eight of the identified heritage places retained their original use, and one was under adaptive reuse. In Molo town, nine of the identified heritage places retained their original use, and one was under adaptive reuse. In summary, for

the three towns, the identified heritage places that retain their original use represent 86%, while those under adaptive reuse were 14%, as presented in Figure 4.19. Consequently, a great number of the townscape heritage maintains its original use.

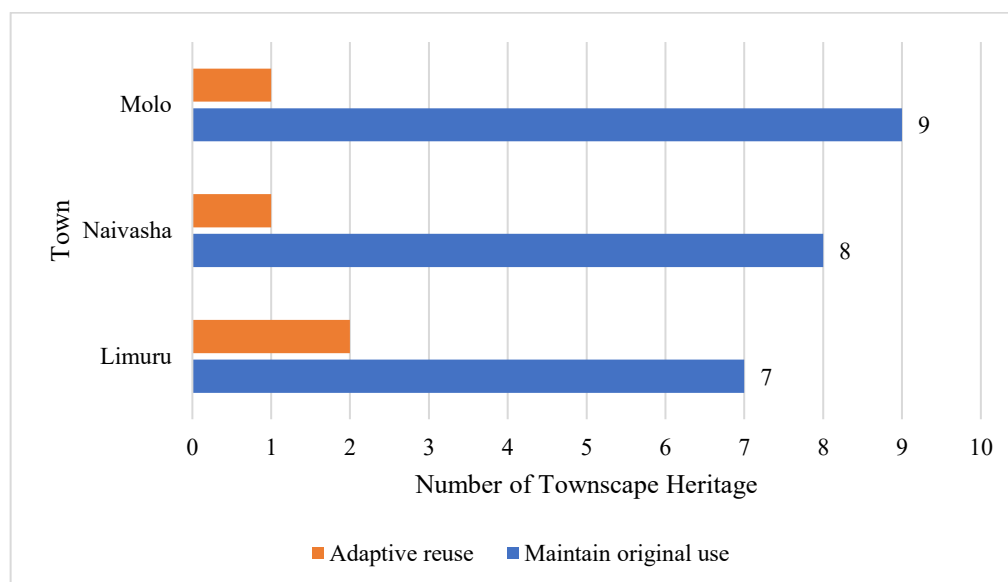


Figure 4.19: Use Status of the Heritage Places

The high level of maintaining the original use stems from the continuity of the original function and services, such as logistics and communication for the post offices. Adaptive reuse was adopted to utilise heritage places that stopped working for their original purpose, yet there was a need to accommodate other current functions. The example of adaptive reuse was the Indian settlement within the Posta area in Molo town, which became a hub for mixed uses of residential and commercial.

4.2.4.1.4 Land Use of the Heritage Places

On land use as revealed in Figure 4.20 for all the towns combined, industrial land use was the most common at 57%, followed by industrial at 21%, public purpose at 14%, educational at 4% and mixed-use at 4% as shown in Figure 4.20. Molo town has more land uses than the other two towns, Limuru and Naivasha. Commercial land use was also predominant in all three towns for the identified places of heritage.

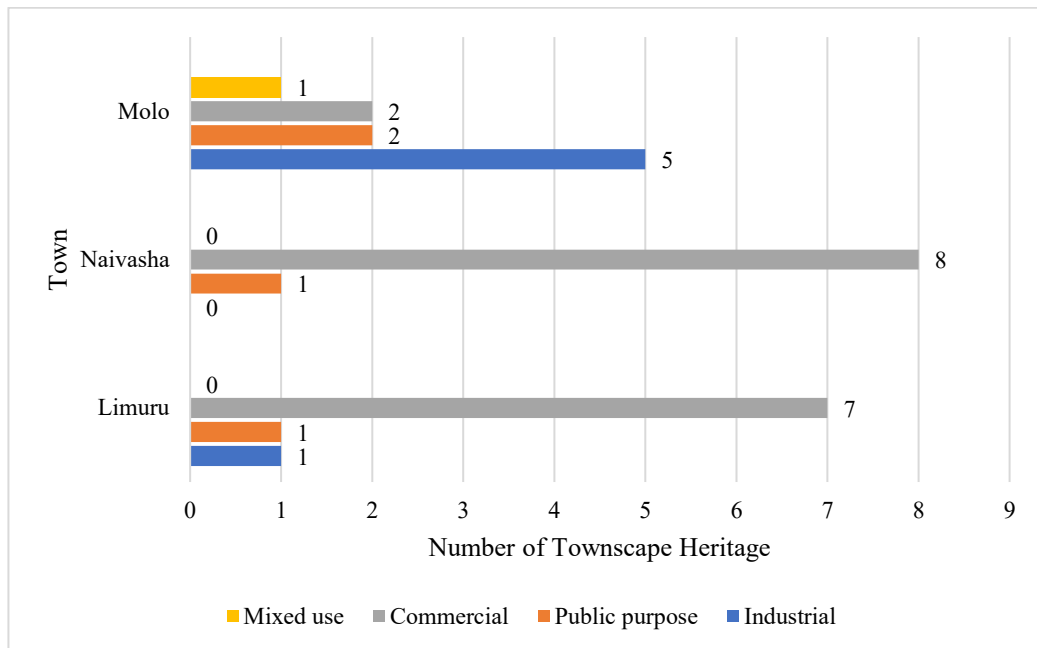


Figure 4.20: Land Use of the Heritage Places

Commercial and industrial land uses were high for the three towns, based on their history. Due to the railway going through agriculturally rich areas in the Kikuyu escarpment and the rift valley, it facilitated the transportation of goods and people. Commercial establishments were set up to enable trade. Industries were also set up due to the availability of agricultural produce, such as tea in Limuru, and wheat and barley in areas around Molo town.

4.2.4.1.5 Level of Occupancy

Figure 4.21 displays the levels of occupancy in the three towns. For Limuru, all nine were fully occupied. In Naivasha town, one of the identified heritage places was semi-occupied, while eight were fully occupied. In Molo town, four of the identified heritage places were semi-occupied, while six were fully occupied. In summary, for the three towns, the unoccupied places represent 3.5%, while semi-occupied were 18%, and the fully occupied were 78.5% of the identified townscape heritage. Accordingly, much of the townscape heritage was occupied.

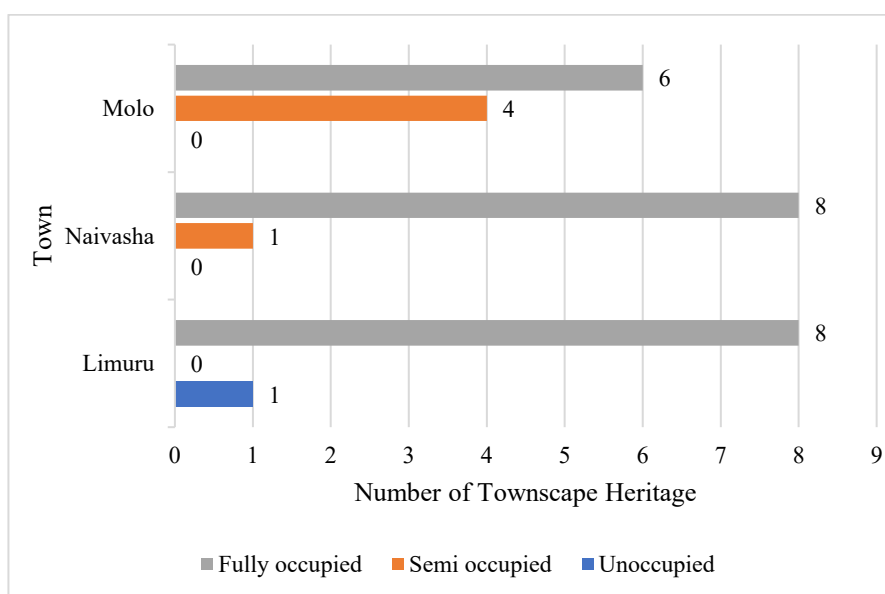


Figure 4.21: Level of Occupancy

The level of occupancy in the three towns was high due to the continued relevance of the functions of the heritage places. On the other hand, Molo town had a high incidence of semi-occupancy due to a decline in activities in older parts, such as the buildings in the Posta area.

Table 4.15: Combined Heritage Inventory of the Three Towns

Name of Heritage	Type	Ownership	Accessibility	Original Use	Change of Use	Land Use Type	Level of Occupancy
A. Limuru							
1. Post office	Building	Corporation	Accessible	Post office	No Liquor/	Public purpose	Fully occupied
2. Bamburi warehouse/ Tusker							
3. Limuru Town Market	Building	Private	Accessible	Pipeline warehouse	cement depot	Industrial	Fully occupied
4. Limuru Dairy/Maziwa House.	Building	Public organisation	Accessible	Market	No	Commercial	Fully occupied
Animal Feeds							
Pyrethrum board	Building	Corporation	Accessible	Agricultural	No	Commercial	Fully occupied
5. Farmers bar/ Farmers choice/ Misri/ Farmers corner	Building	Private	Accessible	Bar	Business centre	Commercial	Fully occupied
6. Kindaruma	Building	Private	Accessible	Business centre	No	Commercial	Fully occupied
7. Jua Kali	Zoned precinct	Private	Accessible	Commercial kiosks	No	Commercial	Fully occupied
8. Njegi Plaza	Building	Private	Accessible	Commercial Building	No	Commercial	Fully occupied
9. Hope Medical Clinic							
Limuru General Store Building	Building	Private	Accessible	Commercial	No	Commercial	Fully occupied
B. Naivasha							
1 La Bell Inn Restaurant	Building	Private	Accessible	Hotel	No	Commercial	Fully occupied
2 Ivory Salama Building / Lake View Villa	Building	Private	Accessible	Commercial	Mixed uses	Commercial	Fully occupied
3 Post Office						Public	
4 Family Bank/ Bawani Store Ltd building	Building	Corporation	Accessible	Communication and logistics	No	purpose	Semi occupied
5 Mahaver store building	Building	Private	Accessible	Commercial building	No	Commercial	Fully occupied
6 Kenya Farmers Association (KFA)	Building	Private	Accessible	Commercial building	No	Commercial	Fully occupied
7 Wambuku hotel	Building	Corporation	Accessible	Agricultural	No	Commercial	Fully occupied
8 Four Seasons Building	Building	Private	Accessible	Hotel	No	Commercial	Fully occupied
9 Gitegenye building	Building	Private	Accessible	Commercial Building	No	Commercial	Fully occupied

Name of Heritage	Type	Ownership	Accessibility	Original Use	Change of Use	Land Use Type	Level of Occupancy
C Molo							
1 Agricultural Development Corporation (ADC)	Building	Corporation	Accessible	Seed and potato complex	No	Industrial	Semi occupied
2 Kenya Breweries/ Kenya Malting Ltd/ (EABL/KML)	Building	Corporation	Accessible	Malting of barley	No	Industrial	Fully occupied
3 Kenya Cooperative Creameries (KCC)	Zoned precinct	Corporation	Accessible	purchase, sale, and processing of milk	No	Industrial	Fully occupied
4 Posta Area	Zoned precinct	Community	Accessible	Indian settlements	Mixed uses	Mixed-use Public	Fully occupied
5 Post Office	Building	Corporation	Accessible	Parcel/mail delivery	No	purpose	Semi occupied
6 Cornermix Godown/ ADC Warehouse/ Molo Stores	Building	Corporation	Accessible	Storage of agricultural goods	No	Industrial	Semi occupied
7 Molo Township School	Zoned precinct	Private	Accessible	School	No	Educational	Semi occupied
8 Kenya Farmers Association (KFA)	Building	Corporation	Accessible	Sale and distribution	No	Commercial	Fully occupied
9 Family Bank	Building	Corporation	Accessible	Banking and Finance	No	Commercial	Fully occupied
10 County Council Offices	Zoned precinct	Public Organisation	Accessible	Public service	No	Public purpose	Fully occupied
N= 28							

Table 4.16: Summary of Heritage Inventory of the Three Towns

Town	Type of Heritage			Ownership of heritage			Status of Use			Land Use Type				Level of Occupancy		
	Number	Building(s)	Zoned precinct	Private	Corporation	Public Organisation	Maintain the original use	Adaptive reuse	Educational	Industrial	Public purpose	Commercial	Mixed-use	Unoccupied	Semi occupied	Fully occupied
Limuru	9	8	1	6	2	1	7	2	0	1	1	7	0	1	0	8
Naivasha	9	9	0	7	2	0	8	1	0	0	1	8	0	0	1	8
Molo	10	6	4	1	8	1	9	1	1	4	2	2	1	0	4	6
Total	28	23	5	14	12	2	24	4	1	6	4	16	1	1	5	22
Percentile	100	82	18	50	43	7	86	14	4	21	14	57	4	3.5	18	78.5

Total Number surveyed = 28

4.2.4.1.6 Characteristics of the physical footprint

Table 4.17 presents the characteristics of the physical footprint in the form of means. In Limuru, the ground floor area for the townscape heritage averages 0.27 ha. The length of the street fronting the heritage places averages 77 meters, the mean width of the street was 16 meters, and the mean height of the townscape heritage was 10 meters. For Naivasha, the ground floor area for the townscape heritage averages 0.13 ha. The length of the street fronting the heritage places averages 34 meters, the mean width of the street was 21 meters, and the mean height of the townscape heritage was 8 meters. In Molo, the ground floor area for the townscape heritage averages 0.33 ha. The length of the street fronting the heritage places averages 131 meters, the mean width of the street was 16 meters, and the mean height of the townscape heritage was 7 meters.

Table 4.17: Characteristics of the Physical Footprint of the Three Towns

	Name of Heritage	Ground floor Area (ha)	Length of street (meters)	Width of the Street (meters)	Height in (meters)
A	Limuru				
1	Post office	0.03	36	20	3
2	Bamburi warehouse/ Tusker	0.80	36	13	12
3	Limuru Town Market	0.52	457	18	5
4	Limuru Dairy/Maziwa House /Animal Feeds/Pyrethrum board	0.24	55	32	21
5	Farmers bar/ Farmers choice/ Misri/ Farmers corner	0.01	14	12	4
6	Kindaruma	0.04	9	18	10
7	Jua Kali	0.57	36	12	5
8	Njegi Plaza	0.10	21	6	22
9	Hope Medical Clinic Limuru				
	General Store Building	0.08	32	12	7
	Mean	0.27	77	16	10
B	Naivasha				
1	La Bell Inn Restaurant	0.30	57	28	5
2	Ivory Salama Building / Lake View Villa	0.29	59	24	5
3	Post Office	0.05	32	18	6
4	Family Bank/ Bawani Store Ltd building	0.18	48	28	5
5	Mahaver store building	0.05	31	28	6
6	Kenya Farmers Association (KFA)	0.09	29	28	7
7	Wambuku hotel	0.07	13	18	22
8	Four Seasons Building	0.07	12	9	12
9	Gitegenye building	0.14	28	9	5
	Mean	0.13	34	21	8
C	Molo				
1	Agricultural Development Corporation (ADC)	0.40	170	36	8
2	Kenya Breweries/ Kenya Malting Ltd/ (EABL/KML)	0.70	122	15	10
3	Kenya Cooperative Creameries (KCC)	0.07	94	9	10
4	Posta Area	1.70	657	15	6
5	Post Office	0.04	18	15	5
6	Cornermix Godown/ ADC Warehouse/ Molo Stores	0.13	130	15	8
7	Molo Township School	0.09	26	15	6
8	Kenya Farmers Association (KFA)	0.03	17	15	6
9	Family Bank	0.09	19	12	10
10	County Council Offices	0.05	56	12	5
	Mean	0.33	131	16	7

The average size of heritage footprint in Molo was higher since the heritage was contributed to by the large size of warehouses, industries and whole zones. Limuru town had the second-largest average size of heritage footprint since they were a mix of large warehouses, a market and commercial buildings that were small in size. In contrast, the average footprint size in Naivasha was small since many were commercial, occupying small parcels of land. The larger the size of the individual footprint, the size of the street and the height, the more visually accessible the heritage would be at the townscape scale, since appreciation happens from the street.

4.2.4.2 Physical Status of Townscape Heritage

The status of the townscape heritage has been addressed in the form of threats to heritage, the type of damage observed, and the effects of change. Data was collected and recorded by research assistants as either '0' or '1', where 0 represented absence while 1 represented presence of the physical factor under observation. The detailed descriptive statistics are presented in Table 4.21.

4.2.4.2.1 Threats to Heritage

Five threats to heritage were under investigation: neglect, air pollution, new development, obsolescence and theft. Neglect meant the absence of actions to preserve the integrity of places against deterioration that impacts aesthetics. Air pollution was observed by traces of deposits and sooty walls. New development referred to any physical development out of character and came into being after an existing heritage. Obsolescence meant that the place was outdated and therefore out of use. Lastly, Theft implied the unlawful removal of parts of heritage to gain from them.

In Table 4.18 and Figure 4.22, the threats to the townscape heritage are presented. Additionally, Figure 4.22 shows the presence of threats to townscape heritage. In Limuru, neglect was observed in three heritage places, threats of air pollution were observed in one place, while the negative effect of new development was observed in four places. Obsolescence and theft were not reported in any of the heritage places.

For Naivasha, neglect was observed in two heritage places. The threats of air pollution, the negative effects of new development, obsolescence and theft were not reported in any of the identified places.

In Molo, neglect was observed in four heritage places, threats of air pollution were observed in one place, while the negative effect of new development was observed in two places. Obsolescence and theft were not reported in any of the identified places. The two major threats identified, therefore, were neglect at 32.1% and new development at 21.4%. Theft and obsolescence were not recorded in any instance due to the continued use of the identified townscape heritage places.

Table 4.18: Threats to Heritage in the Three Towns

	Town	Threats				
		Neglect	Air pollution	New development abutting	Obsolescence	Theft
1.	Limuru	3	1	4	0	0
2.	Naivasha	2	0	0	0	0
3.	Molo	4	1	2	0	0
Total Observed		9	2	6	0	0
Percentile		32.1	7.1	21.4	0	0

N= 28

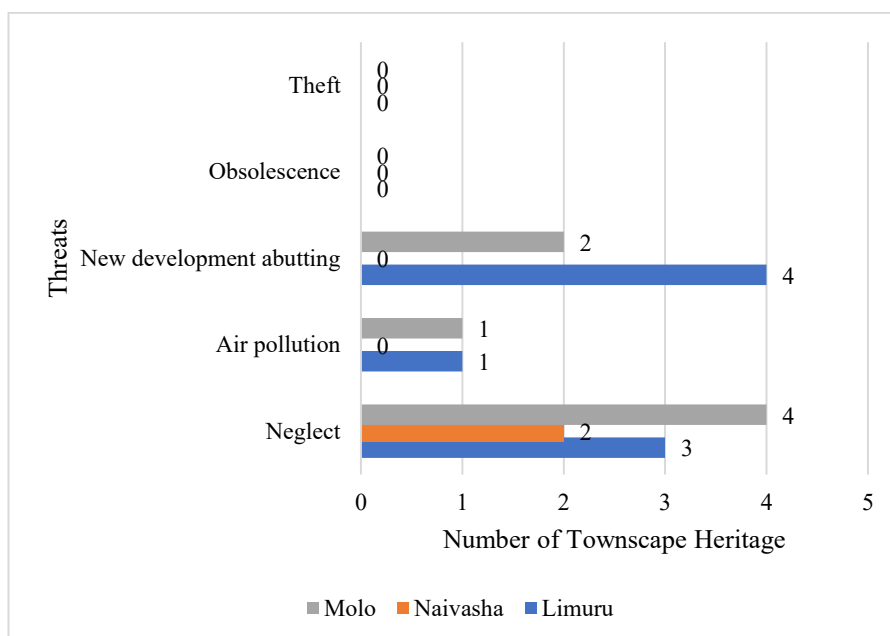


Figure 4.22: Threats to Heritage

High instances of neglect and new development in the three towns were indicators of the absence of urban management regulations compelling owners to implement conservation action to protect urban heritage. An example of neglect is shown in Figure 4.23 of the Farmer's Bar in Limuru, where the building seems to have been deteriorating for a long time without any intervention. Another example is in Figure 4.24 where new development was abutting the Post Office in Molo, posing as a threat to its continued existence. Also, obsolescence not being reported meant that the heritage places in the urban environment were still relevant to the needs of the towns' functions.

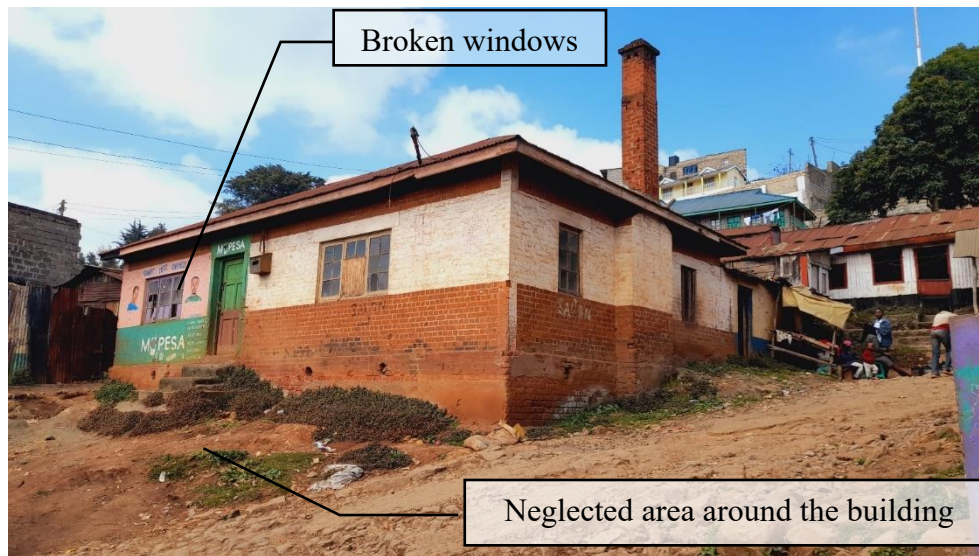


Figure 4.23: Neglected Farmers Bar in Limuru



Figure 4.24: Uncontextual Development Abutting Post Office in Molo

4.2.4.2.2 Type of Damage

Four types of damage to heritage were examined: decay, disintegration due to weather, vandalism, and defacement. Decay was observed through the rotting of parts of the heritage due to neglect. Disintegration due to weather meant the process of breakdown of parts due to the action of the elements of weather, such as precipitation, humidity,

sunshine, or wind. Vandalism referred to deliberate destruction and damage by humans. Finally, defacement was observed through the destruction of the appearance of the heritage by the addition of undesirable marks other than those originally intended. In addition, damage to the heritage fabric was also a threat to its integrity and existence.

Figure 4.25 and Figure 4.26 demonstrate the type of damage observed on townscape heritage in the three towns. In Limuru, decay was observed in seven heritage places, disintegration due to weather was observed in six places, vandalism was not observed, and defacement was observed in three places. In Naivasha, decay was observed in seven heritage places, disintegration due to weather was observed in seven places, vandalism was not observed, and defacement was observed in six places. Finally, in Molo, decay was observed in eight heritage places, disintegration due to weather was observed in nine places, vandalism was observed in one place and defacement was observed in two places.

Overall, the three main types of damage observed in order of magnitude across the towns were: decay and disintegration due to weather at 78.6% each and defacement at 39.3%. Vandalism occurrences were negligible, only observed in one instance. Figure 4.25 of the old buildings in the Posta area shows disintegration due to the effect of weather, where the roofs were tearing away and wood was rotting. Figure 4.26 illustrates defacement by painting on Uhuru Bar, Molo Town, therefore compromising its original outlook, which was covered in natural stone and unobscured.



Figure 4.25: Disintegration by Weather in Posta Area, Molo Town



Figure 4.26: Defacement by Painting on Uhuru Bar, Molo Town

Table 4.19: Type of Damage in the Three Towns

Town	The type of damage observed.			
	Decay	Disintegration due to weather	Vandalism	Defacement
1. Limuru	7	6	0	3
2. Naivasha	7	7	0	6
3. Molo	8	9	1	2
Total Observed	22	22	1	11
Percentile	78.6	78.6	3.6	39.3

N= 28

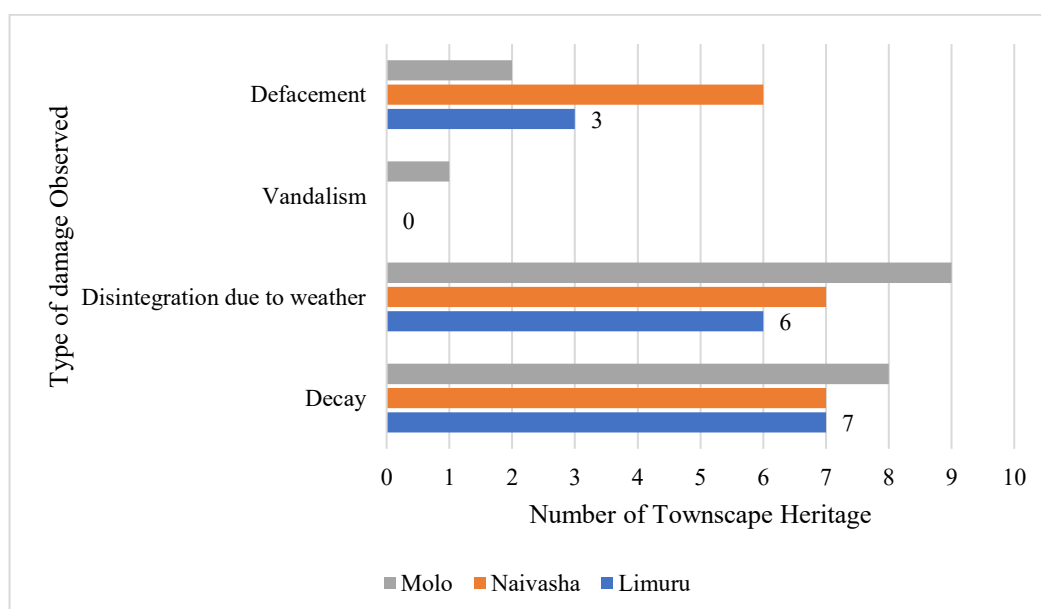


Figure 4.27: Type of Damage

Damage in the form of decay and disintegration due to weather was evident due to a lack of mitigating response in the three towns. Defacement came about due to inappropriate action on built heritage, such as painting exterior walls for advertisements.

4.2.4.2.3 Effects of Urban Change

Four effects of urban change were studied: decline in usage, abandonment, deterioration and brownfields. Decline in usage implied a decrease in the extent of usage below the capacity of a place with some unused spaces. Abandonment involved

a place being unattended in any way. Deterioration meant progressive wearing down of physical condition, especially with no maintenance. Brownfields were observed through undesirable, derelict visual conditions resulting from abandoned or underused places.

Table 4.20 and Figure 4.28 show the effects of change that include, decline in usage, abandonment, deterioration and brownfields. For Limuru town, the decline in usage was observed in two identified heritage places; abandonment was not observed; deterioration was observed in seven places, while brownfields were observed in two places. In Naivasha town, the decline in usage was observed in two identified heritage places; abandonment was not observed; deterioration was observed in seven places, while brownfields were not observed. For Molo town, the decline in usage was observed in four identified heritage places; abandonment was not observed; deterioration was observed in eight places, while brownfields were observed in four places. Overall, for the three towns, the main effect of change can thus be deduced as deterioration, as observed in 78.6% of cases, and a slight decline in usage and brownfields in 28.6% and 21.4% of cases, respectively.

Molo town was the most affected by urban change, with higher instances of observable effects at 16. Limuru was the second highest with 11 instances of observable effects of change, while Naivasha had nine.

Table 4.20: Effects of Urban Change in the Three Towns

Town		Effects of Change				Total Count
		Decline in Usage	Abandonment	Deterioration	Brownfields	
1.	Limuru	2	0	7	2	11
2.	Naivasha	2	0	7	0	9
3.	Molo	4	0	8	4	16
	Total	8	0	22	6	
	Observed Percentile	28.6	0	78.6	21.4	

N= 28

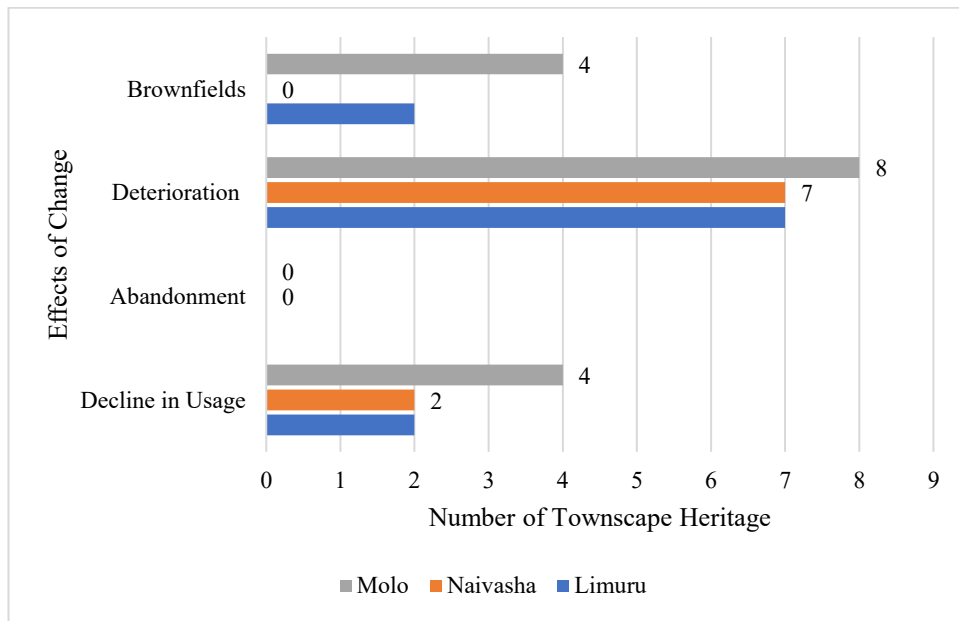


Figure 4.28: Effects of Urban Change

The high instances of deterioration and decline in usage were due to economic changes in the urban functions. The railway also ceased to be a major influence on urban development and growth. Brownfields observed in Molo and Limuru were due to the decline in usage of the heritage places. None of the heritage was abandoned, meaning that they were still relevant to the functional needs of the towns.

Table 4.21: Combined Physical Status of Townscape Heritage in all the Towns

		Threats to Heritage				Type of Damage				Effects of Urban Change				
		Lack of Maintenance	Air pollution	New development	Obsolescence	Theft	Decay	Disintegration	Vandalism	Defacement	Decline in Usage	Abandonment	Deterioration	Brownfields
Name of Heritage														
A		Limuru												
1	Post office	0	0	0	0	0	1	1	0	1	0	0	1	0
2	Bamburi warehouse/ Tusker	0	0	0	0	0	0	0	0	1	1	0	0	0
3	Limuru Town Market	0	0	1	0	0	1	1	0	0	0	0	1	0
4	Limuru Dairy/Maziwa House. Animal Feeds Pyrethrum board	1	0	0	0	0	1	1	0	0	0	0	1	0
5	Farmers bar/ Farmers choice/ Misri/ Farmers corner	1	1	1	0	0	1	1	0	1	0	0	1	1
6	Kindaruma	0	0	1	0	0	1	1	0	0	0	0	1	0
7	Jua Kali	1	0	1	0	0	1	1	0	0	0	0	1	1
8	Njegi Plaza	0	0	0	0	0	0	0	0	0	0	0	0	0
9	Hope Medical Clinic	0	0	0	0	0	1	1	0	0	0	0	1	0
	Limuru General Store Building Observed	3	1	4	0	0	7	6	0	3	2	0	7	2
B.		Naivasha												
1	La Bell Inn Restaurant	0	0	0	0	0	1	1	0	0	0	0	1	0
2	Ivory Salama Building / Lake View Villa	0	0	0	0	0	1	1	0	1	0	0	1	0
3	Post Office	0	0	0	0	0	1	1	0	0	1	0	1	0
4	Family Bank/Bawani Store Ltd building	0	0	0	0	0	1	1	0	1	0	0	1	0
5	Mahaver store building	1	0	0	0	0	1	1	0	1	0	0	1	0
6	Kenya Farmers Association (KFA)	1	0	0	0	0	1	1	0	1	1	0	1	0
7	Wambuku hotel	0	0	0	0	0	0	0	0	1	0	0	0	0
8	Four Seasons Building	0	0	0	0	0	0	0	0	1	0	0	0	0
9	Gitegenye building											0	1	0
	Observed	2	0	0	0	0	7	7	0	6	2	0	7	0

		Threats to Heritage				Type of Damage				Effects of Urban Change				
Name of Heritage		Lack of Maintenance	Air pollution	New development	Obsolescence	Theft	Decay	Disintegration	Vandalism	Defacement	Decline in Usage	Abandonment	Deterioration	Brownfields
C.					Molo									
1	Agricultural Development Corporation (ADC)	0	0	0	0	0	1	1	0	0	1	0	1	0
2	Kenya Breweries/ Kenya Malting Ltd/ (EABL/KML)	1	0	0	0	0	1	1	0	1	0	0	1	1
3	Kenya Cooperative Creameries (KCC)	0	0	0	0	0	0	1	0	0	0	0	0	0
4	Posta Area	1	1	1	0	0	1	1	1	1	1	0	1	1
5	Post Office	0	0	0	0	0	1	1	0	0	1	0	1	0
6	Cornermix Godown/ ADC Warehouse/ Molo Stores	1	0	0	0	0	1	1	0	0	0	0	1	1
7	Molo Township School	0	0	1	0	0	1	1	0	1	0	0	1	0
8	Kenya Farmers Association (KFA)	0	0	0	0	0	1	1	0	0	1	0	1	1
9	Family Bank	0	0	0	0	0	1	1	0	0	0	0	0	0
10	County Council Offices	1	0	0	0	0	0	0	0	0	0	0	1	0
	Observed	4	1	2	0	0	8	9	1	3	4	0	8	4
	0 = Absent													
	1 = Present													

4.2.4.3 Conservation Status

Six conservation actions were investigated: adaptive reuse, retention of original use, regular maintenance, repair, reconstruction, and demolition. Adaptive reuse meant the reuse of an existing heritage place for a different purpose from that for which it was originally built. Retention of original use referred to continuing the use of an existing heritage place for which it was originally built. The status of all townscape heritage uses, whether original use or adaptive reuse, is presented in Table 4.15. Regular maintenance implied routine, non-destructive interventions to reduce decay or disintegration through actions such as cleaning and repainting. Repair meant an action applied to a building to recover its functionality and appearance. Reconstruction was the act of rebuilding anew in imitation of the old on the same site. Lastly, demolition referred to the action of removing existing materials or parts of the building.

The data was gathered through observation and recorded by research assistants as either '0' or '1', where 0 denoted the lack of the physical factor being seen and 1 denoted its presence. In Table 4.22 and Figure 4.34 the types of conservation action in the three towns are presented. For Limuru, the most undertaken way of conservation was the retention of original use, as observed in seven of the heritage places. Regular maintenance was observed in four instances. Figure 4.29 of the Limuru Dairy, Maziwa House, Animal Feeds and Pyrethrum Board buildings was an example of heritage whose original use was retained. Adaptive reuse was also recorded in two places: the Bamburi warehouse and the Farmers Bar. The Bamburi warehouse, which was originally used as a warehouse shown in Figure 4.30 for pipes, and changed to a depot for beer and cement. While the Farmers' Bar changed to a commercial centre with a mix of uses. Repair was observed in three places. The other conservation actions, including reconstruction and demolition, were not observed.



Figure 4.29: Maziwa House, Animal Feeds and Pyrethrum Board buildings



Figure 4.30: Bamburi Warehouse, Change in Use

In Naivasha, the most commonly practised way of conservation was the retention of original use as observed in eight heritage places. Additionally, regular maintenance was observed in seven instances. Adaptive reuse was also recorded in one place, the Ivory Salama Building/Lakeview Villa, shown in Figure 4.31. It had changed from its purely commercial activities to mixed-use that included residential. Repair was observed in four places; reconstruction was observed in one instance, while demolition was not observed.



Figure 4.31: Ivory Salama Building, Change in Use

Finally, for Molo town, the retention of original use was the most undertaken way of conservation, as observed in ten instances. An example of retention of original use is presented in Figure 4.32 of the Kenya Breweries/ Kenya Malting Ltd buildings. While regular maintenance was observed in eight instances. Adaptive reuse was also recorded in one place; the Posta area, where the Indian settlement had changed use to accommodate residential, commercial and cottage industry in the example presented in Figure 4.33. Repair was observed in two places. Reconstruction was observed in two instances in the Posta area and the Molo Township School. Demolition was observed once in the Posta area.



Figure 4.32: Kenya Breweries/ Kenya Malting Ltd, Retention of Use



Figure 4.33: Posta Area, Example of Change in Use

Therefore, as shown in Table 4.22, the conservation actions carried out the most were retention of original use at 89.3%, regular maintenance at 67.9%, repair at 28.6 and adaptive reuse at 14.3%.

Table 4.22: Conservation Action in all the Towns

Name of Heritage		Conservation Action				
		Adaptive Reuse	Retention of Original Use	Regular Maintenance Repair	Reconstruction	Demolition
A		Limuru				
1	Post office	0	1	1	1	0
2	Bamburi warehouse/ Tusker	1	0	1	1	0
3	Limuru Town Market	0	1	1	0	0
4	Limuru Dairy/Maziwa House. Animal Feeds					
	Pyrethrum board	0	1	0	0	0
5	Farmers bar/ Misri/ Farmers corner	1	0	0	0	0
6	Kindaruma	0	1	1	1	0
7	Jua Kali	0	1	0	0	0
8	Njegi Plaza	0	1	0	0	0
9	Hope Medical Clinic					
	Limuru General Store Building	0	1	0	0	0
	Observed	2	7	4	3	0
B		Naivasha				
1	La Bell Inn Restaurant	0	1	1	1	0
2	Ivory Salama Building / Lake View Villa	1	0	1	1	0
3	Post Office	0	1	0	0	0
4	Family Bank/Bawani Store Ltd building	0	1	1	1	0
5	Mahaver store building	0	1	1	1	0
6	Kenya Farmers Association (KFA)	0	1	0	0	0
7	Wambuku hotel	0	1	1	0	1
8	Four Seasons Building	0	1	1	0	0
9	Gitegenye building	0	1	1	0	0
	Observed	1	8	7	4	1
C.		Molo				
1	Agricultural Development Corporation (ADC)	0	1	1	0	0
2	Kenya Breweries/ Kenya Malting Ltd/ (EABL/KML)	0	1	0	0	0
3	Kenya Cooperative Creameries (KCC)	0	1	1	1	0
4	Posta Area	1	1	1	1	1
5	Post Office	0	1	1	0	0
6	Cornermix Godown/ ADC Warehouse/ Molo Stores	0	1	0	0	0
7	Molo Township School	0	1	1	0	1
8	Kenya Farmers Association (KFA)	0	1	1	0	0
9	Family Bank	0	1	1	0	0
10	County Council Offices	0	1	1	0	0
	Observed	1	10	8	2	2
	Total	4	25	19	8	3
	Total Percentile	14.3	89.3	67.9	28.6	10.7
	0 = Absent, 1 = Present					3.6

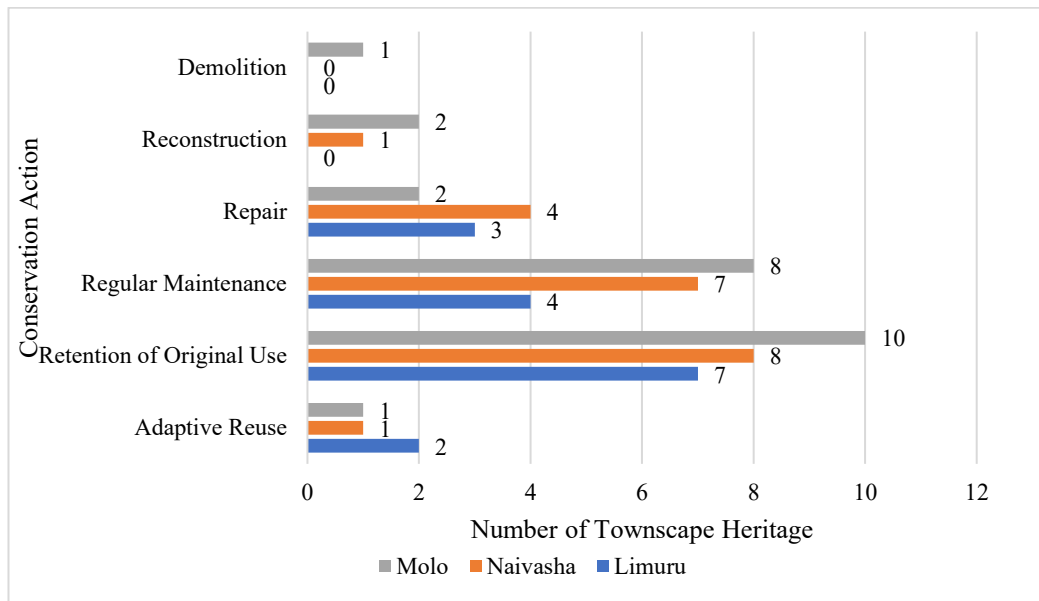


Figure 4.34: Conservation Action

There was a high level of retention of original uses since they continued to be relevant. Regular maintenance was the second-highest action carried out due to continued economic usage, therefore offering owners the motivation to manage the quality of places. Repair was the third highest action to manage wear and tear. Further adaptive reuse in the three towns was adopted to accommodate other uses, so that they ended up as mixed-use and to take up spaces whose original functions had ceased. This happened in the example of Molo town, where the Indian settlement areas were occupied by indigenous people for residency and commercial use.

4.2.4.4 Townscape Status

The conditions of townscape characteristics, as well as other townscape elements, were observed. This was to investigate the physical townscape status from a human scale.

i. Townscape Characteristics

Five townscape characteristics were investigated: signage positioning, visual access, pedestrian friendliness, street environment condition, and street planting condition. Signage positioning meant the appropriateness of its location on the property. Visual access meant the quality of being seen from the street without obstructions. Pedestrian

friendliness pointed to the quality of street surfaces and sizes favourable for pedestrians. Street environment condition referred to the level of cleanliness, free from dirt. Lastly, street planting conditions implied the condition of vegetation in the form of trees, shrubs and groundcovers.

Research assistants were required to rate each characteristic based on the context of each townscape heritage. Five-point Likert scale rating of townscape characteristics was used, where 1 represented 'very poor', 5 represented 'very good' and 0 represented the absence of the element. Table 4.23 and Figure 4.35 present townscape characteristics around the identified heritage places.

In Limuru, the mean score for signage positioning was 2.4 or poor, visual access from the street was 3.2 or fair, while pedestrian friendliness and the street environmental condition were scored as poor at 2.2 and 2, respectively. Street planting condition was rated as very poor at 0.9.

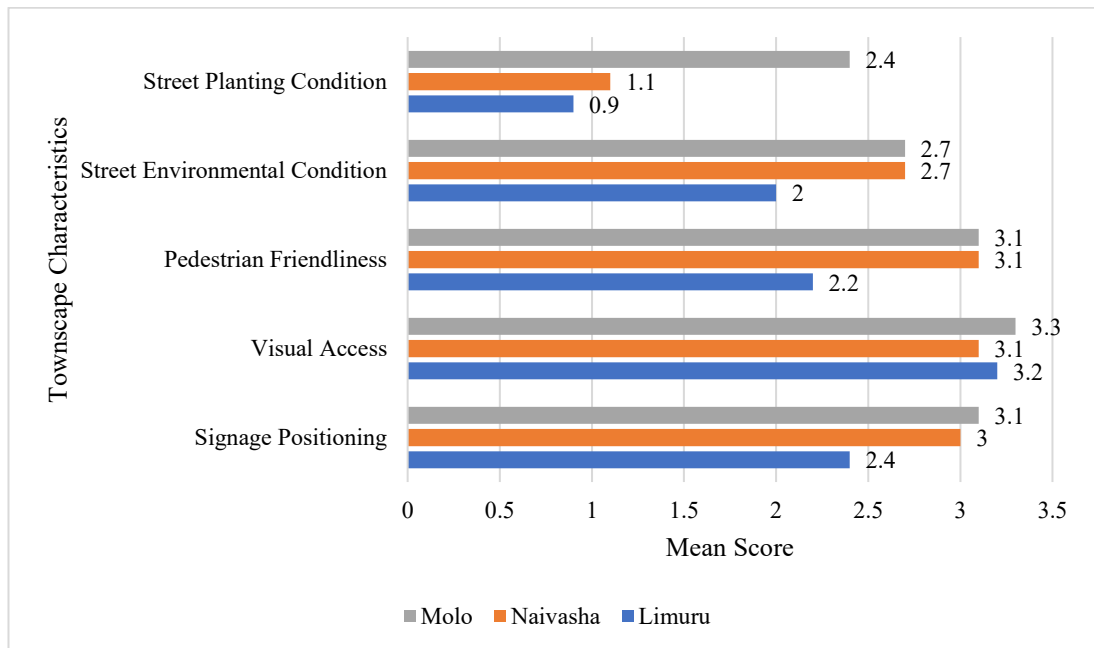
For Naivasha, the mean score for signage positioning was 3 or fair, visual access from the street was 3.1 or fair, and pedestrian friendliness at 3.1 or fair. The street environmental condition was scored as fair at 2.7. Street planting condition was rated as very poor at 1.1.

In Molo, the mean score for signage positioning was 3.1 or fair, visual access from the street was 3.3 or fair, and pedestrian friendliness at 3.1 or fair. The street environmental condition was scored as fair at 2.7. Street planting condition was rated as poor at 2.4. Therefore, the rating of townscape characteristics in the form of physical elements ranges from very poor to fair, which was generally a below-average rating.

Table 4.23: Townscape Characteristics

Name of Heritage		Signage Positioning	Visual Access	Pedestrian Friendliness	Street Environmental Condition	Street Planting Condition
A.			Limuru			
1	Post office	3	4	3	2	2
2	Bamburi warehouse/ Tusker	4	4	3	1	1
3	Limuru Town Market	2	3	2	2	0
4	Limuru Dairy/Maziwa House.					
	Animal Feeds					
	Pyrethrum board	2	3	2	3	3
5	Farmers bar/ Farmers choice/ Misri/ Farmers comer	1	2	2	2	2
6	Kindaruma	3	4	2	2	0
7	Jua Kali	0	3	3	2	0
8	Njegi Plaza	5	2	1	3	0
9	Hope Medical Clinic					
	Limuru General Store Building	2	4	2	1	0
	Mean	2.4	3.2	2.2	2	0.9
B.			Naivasha			
1	La Bell Inn Restaurant	4	3	4	3	3
2	Ivory Salama Building / Lake View Villa	3	4	3	3	2
3	Post Office	3	4	4	3	2
4	Family Bank/ Bawani Store Ltd building	4	4	4	3	0
5	Mahaver store building	3	3	3	3	0
6	Kenya Farmers Association (KFA)	0	1	1	1	1
7	Wambuku hotel	4	4	4	3	2
8	Four Seasons Building	2	2	2	2	0
9	Gitegenye building	4	3	3	3	0
	Mean	3	3.1	3.1	2.7	1.1
C.			Molo			
1	Agricultural Development Corporation (ADC)	3	4	2	2	2
2	Kenya Breweries/ Kenya Malting Ltd/ (EABL/KML)	4	4	3	2	2
3	Kenya Cooperative Creameries (KCC)	3	3	4	4	3
4	Posta Area	2	3	3	3	2
5	Post Office	4	4	4	3	3
6	Cortermix Godown/ ADC Warehouse/ Molo Stores	4	4	3	2	1
7	Molo Township School	2	3	2	2	2
8	Kenya Farmers Association (KFA)	2	2	3	2	2
9	Family Bank	4	3	4	3	3
10	County Council Offices	3	3	3	4	4
	Mean	3.1	3.3	3.1	2.7	2.4

Key: 0 = None, 1 = Very poor, 2 = Poor, 3= Fair, 4 = Good, 5 = Very good



Key: 0 = None, 1 = Very poor, 2 = Poor, 3= Fair, 4 = Good, 5 = Very good

Figure 4.35: Townscape Characteristics

The below-average rating for the townscape characteristics in the three towns meant that little effort was there to enhance townscape conditions. Therefore, there was a need to improve the townscape characteristics for users. Figure 4.36 shows an example of good Visual access of the KFA building in Naivasha, where it could be seen with no form of obscurity. Additionally, Figure 4.37 shows an example of poor environmental conditions around the Limuru market with uncollected waste and a poor road surface.



Figure 4.36: Good Visual Access of the KFA Building in Naivasha



Figure 4.37: Poor Environmental Condition around the Limuru Market

ii. Other Townscape Elements

Four townscape elements were examined: Parking, street frontage, street light and type of fence. Parking was recorded as present if there were designated spaces for leaving vehicles. Street frontage meant heritage directly fronted by a street. Street lights were observed through the presence of fixtures for the provision of light at night. The type of fence meant a form of barrier around the heritage to hinder direct access. Through observation, the data was collected, and research assistants recorded it as either '0' or

'1', where 0 indicated the absence of the townscape element and 1 indicated its existence.

Figure 4.38 represents other townscape elements that included parking, street frontage, street lighting and the type of fences as observed in the three towns. In Limuru, out of the nine heritage areas identified, street parking was available for six. All of the nine fronted a street, as well as having street lights. Five of the places were open with no fences, two had live fences, one with a barbed wire fence and one with a steel grill. The example in Figure 4.38 shows the presence of street parking and a steel grill fence for the Limuru market.



Figure 4.38: Limuru Market with Street Parking and Grill Fence

In Naivasha, out of the nine heritage areas identified, street parking was available for eight; eight of them fronted a street, while six had street lights. Seven of the places were open with no fences, while two had live fences Figure 4.39, Labelle Inn as an example of a townscape heritage set in a good quality townscape environment. In this example, street lights, walkways and parking were present and had unobscured visual access.



Figure 4.39: Labelle Inn with Quality Townscape Environment

In Molo, out of the ten heritage areas identified, street parking was available for seven; nine of them fronted a street, while six had street lights. Four of the places were open with no fences, two had masonry walls, one had a live fence and one with a steel grill. Street parking was available for 75.0%, 92.3% of them also front a street, while 75.0% have street lights. In addition, 57% of the townscape heritage places were open with no fences. Figure 4.40 shows the Molo Sub-county offices with a live fence hindering visual access.



Figure 4.40: Molo Sub-County Offices with Live Fence Hindering Visual Access

Table 4.24: Presence of Other Townscape Elements in the Towns

	Name of Heritage	Parking	Street Frontage	Street lights	Type of fence
A		Limuru			
1	Post office	1	1	1	Live fence
2	Bamburi warehouse/ Tusker	1	1	1	Barbed wire
3	Limuru Town Market	1	1	1	Open
4	Limuru Dairy/Maziwa House. Animal Feeds Pyrethrum board	1	1	1	Live fence
5	Farmers bar/ Farmers choice/ Misri/ Farmers corner	1	1	1	Open
6	Kindaruma	0	1	1	Open
7	Jua Kali	0	1	1	Open
8	Njegi Plaza	0	1	1	Steel grill
	Hope Medical Clinic Limuru General Store Building	1	1	1	Open
	Observed	6	9	9	
B		Naivasha			
1	La Bell Inn Restaurant	1	1	1	Masonry wall
2	Ivory Salama Building / Lake View Villa	1	1	1	Masonry wall
3	Post Office	1	1	1	Open
4	Family Bank/ Bawani Store Ltd building	1	1	1	Open
5	Mahaver store building	1	1	1	Open
6	Kenya Farmers Association (KFA)	0	0	0	Open
7	Wambuku hotel	1	1	1	Open
8	Four Seasons Building	1	1	0	Open
9	Gitegenye building	1	1	0	Open
	Observed	8	8	6	
C		Molo			
1	Agricultural Development Corporation (ADC)	0	1	0	Chain link
2	Kenya Breweries/ Kenya Malting Ltd/ (EABL/KML)	1	1	1	Masonry wall
3	Kenya Cooperative Creameries (KCC)	1	1	1	Live fence
4	Posta Area	0	1	1	Open
5	Post Office	1	1	0	Open
6	Cornermix Godown/ ADC Warehouse/ Molo Stores	1	1	1	Open
7	Molo Township School	1	1	0	Steel grill
8	Kenya Farmers Association (KFA)	1	1	1	Open
9	Family Bank	1	1	1	Masonry wall
10	County Council Offices	0	0	0	Masonry wall
	Observed	7	9	6	
	Total	21	26	21	
	Percentile	75.0	92.3	75.0	

Key: 0 = Absent, 1 = Present

The presence of parking in more areas complements the functions of heritage places in accessibility and amenity. The high number of townscape heritage fronting the street with open and partially open fences, such as the steel grill, meant that the heritage provided visual access from the street. High presence of street lights implied that

places can be accessed at night with improved safety and visibility. However, improving these conditions would improve usability, accessibility, and visual appreciation at all times.

4.3 Objective Two: Townscape Heritage Values

The second objective was to identify the heritage values in selected towns along the Kenya Railway. Exploratory factor analysis for all three towns was carried out on respondents' seven-point Likert scale scores of 71 heritage value attitudinal statements, where 1 represented 'strongly disagree' while 7 represented 'strongly agree'. The next step was to check the data distribution using normality before continuing with further inferential analyses on the 71 attitudinal statements. Exploratory factor analysis was used to analyse interrelationships among variables and explain them in the form of their underlying factors. The underlying factors, here referred to as heritage values, were identified and interpreted.

4.3.1 Nature of Respondents

The required sample size was 355 respondents obtained by multiplying the 71 variables by five to fulfil the 1:5 ratio required for factor analysis. 360 respondents from Limuru, Naivasha and Molo towns were interviewed to identify underlying heritage values for the townscapes. The number of respondents per town was based on representative population ratios of the towns. 70 respondents for Limuru, 160 for Naivasha, and 130 for Molo. To understand the nature of respondents, data presented below includes: length of stay in the town, age, gender, level of education and nature of occupation.

4.3.1.1 Length of Stay in the Town

The data from all three towns as shown in below indicates that the respondents who had lived in the town below 5 years were 11.7%; 6 – 10 years, 18.1%; 11 – 25 years, 35.3 %; 26 – 40 years, 26.1%; 41 – 55 years, 7.2 %; and those with over 55 years of stay, 1.7%. This data indicates a normal spread of respondents concerning their length of stay and relative familiarity with the town.

Table 4.25: Length of Stay in the Town

	Length of stay	Frequency	Percentile	Valid Percent	Cumulative Percent
Valid	Below 5 years	42	11.7	11.7	11.7
	6 - 10 years	65	18.1	18.1	29.7
	11 - 25 years	127	35.3	35.3	65.0
	26 - 40 years	94	26.1	26.1	91.1
	41 - 55 years	26	7.2	7.2	98.3
	over 55 years	6	1.7	1.7	100.0
	Total	360	100.0	100.0	

4.3.1.2 Age of Respondents

For the three towns combined, the data on the age of respondents is as follows: below 18 years, 1.1%; 18 – 28 years, 31.9%; 29-39 years, 31.9%; 40 – 50 years, 21.9%; 51-60 years, 9.7% and above 61 years, 3.3%. This data is presented in Table 4.26 below.

Table 4.26: Age of Respondents

	Age	Frequency	Percentile	Valid Percent	Cumulative Percent
Valid	Below 18years	4	1.1	1.1	1.1
	18 - 28 years	115	31.9	31.9	33.1
	29 - 39 years	115	31.9	31.9	65.0
	40 - 50 years	79	21.9	21.9	86.9
	51 - 61 years	35	9.7	9.7	96.7
	Above 61 years	12	3.3	3.3	100.0
	Total	360	100.0	100.0	

4.3.1.3 Gender of Respondents

Of the 360 respondents, 26.9% were female, while 73.1% were male, as shown in Table 3 below. The number of male respondents was higher than that of females.

Table 4.27: Gender of Respondents

	Gender	Frequency	Percentile	Valid Percent	Cumulative Percent
Valid	Female	97	26.9	26.9	26.9
	Male	263	73.1	73.1	100.0
	Total	360	100.0	100.0	

4.3.1.4 Level of Education of Respondents

4.2% of the respondents indicated that they had no formal education; 20.3% had primary level education; 48.3% had a Secondary level of education; 19.4% had a

college education; and 7.8% had a university level education. Consequently, the majority of those interviewed had middle-level education as presented in Table 4.28..

Table 4.28: Level of Education of Respondents

Level of Education		Frequency	Percentile	Valid Percent	Cumulative Percent
Valid	None	15	4.2	4.2	4.2
	Primary	73	20.3	20.3	24.4
	Secondary	174	48.3	48.3	72.8
	College	70	19.4	19.4	92.2
	University	28	7.8	7.8	100.0
Total		360	100.0	100.0	

4.3.1.5 Nature of Occupation of Residents

As shown in Table 4.29 below, students constituted 4.4% of respondents; unemployed were 12.2%; self-employed were 54.7%; employed were 28.1% and those retired were 0.6%. The majority, therefore, were either self-employed or employed.

Table 4.29: Nature of Occupation of Respondents

Nature of Occupation		Frequency	Percentile	Valid Percent	Cumulative Percent
Valid	Student	16	4.4	4.4	4.4
	Unemployed	44	12.2	12.2	16.7
	Self-employed	197	54.7	54.7	71.4
	Employed	101	28.1	28.1	99.4
	Retired	2	.6	.6	100.0
Total		360	100.0	100.0	

4.3.2 Normality

Tests of normality were carried out by examining the results of the Kurtosis, Skewness, Kolmogorov-Smirnov (K-S), and Shapiro-Wilk (S-W) statistics. The null hypothesis associated with the test of normality is that the data are normally distributed.

Hair Jr, Hult, Ringle, & Sarstedt (2022) provide an interpretation of skewness and Kurtosis values as follows: A skewness value of between -1 and +1 is ideal, -2 to +2 is usually good, and a value outside of -2 or +2 indicates significant nonnormality. On the other hand, a distribution is deemed excessively peaked if the kurtosis is larger than +2, and too flat if it is less than -2. Therefore, a distribution is deemed normal when its skewness and kurtosis are near zero. Skewness values in all the 71 variables,

as presented in Table 4.30 were within -2 and +2, and considered as good. On the other hand, the Kurtosis values fell within the -2 and +2 range, except for 9 out of the 71 variables that fell between +2.25 and +4.52. The nine were heritage value statements 3, 4, 23, 24, 32, 50, 58, 65, and 66 as highlighted in the normality table. The distribution of the data set can therefore be considered to be approximately normal.

Table 4.30: Skewness and Kurtosis Tests of Normality for Attitudinal Statements

		St. 1	St. 2	St. 3	St. 4	St. 5	St. 6	St. 7	St. 8	St. 9	St. 10	St. 11	St. 12	St. 13	St. 14	St. 15
N	Valid	360	360	360	360	360	360	360	360	360	360	360	360	360	360	358
	Missing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Skewness		-0.993	-0.332	-2.178	-1.860	-1.475	-0.880	-0.991	-1.498	-0.425	-0.899	-1.579	-0.825	-0.703	-0.416	-0.883
Std. Error of Skewness		0.129	0.129	0.129	0.129	0.129	0.129	0.129	0.129	0.129	0.129	0.129	0.129	0.129	0.129	0.129
Kurtosis		0.026	-1.439	4.734	3.790	1.113	-0.509	-0.345	1.776	-1.225	-0.463	2.040	-0.708	-0.832	-0.823	-0.685
Std. Error of Kurtosis		0.256	0.256	0.256	0.256	0.256	0.256	0.256	0.256	0.256	0.256	0.256	0.256	0.256	0.256	0.257

		St. 16	St. 17	St. 18	St. 19	St. 20	St. 21	St. 22	St. 23	St. 24	St. 25	St. 26	St. 27	St. 28	St. 29
N	Valid	360	360	360	360	360	360	360	360	360	360	360	360	360	360
	Missing	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Skewness		-1.009	-1.164	0.059	-0.832	-0.365	-0.874	-1.432	-1.621	-1.727	-1.281	-0.918	-0.696	-0.815	-0.924
Std. Error of Skewness		0.129	0.129	0.129	0.129	0.129	0.129	0.129	0.129	0.129	0.129	0.129	0.129	0.129	0.129
Kurtosis		0.019	0.463	-1.398	-0.535	-1.104	-0.575	1.458	2.249	3.449	0.924	-0.366	-0.838	-0.601	-0.369
Std. Error of Kurtosis		0.256	0.256	0.256	0.256	0.256	0.256	0.256	0.256	0.256	0.256	0.256	0.256	0.256	0.256

		St. 30	St. 31	St. 32	St. 33	St. 34	St. 35	St. 36	St. 37	St. 38	St. 39	St. 40	St. 41	St. 42	St. 43
N	Valid	360	360	360	360	360	360	360	360	360	360	360	360	360	360
	Missing	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Skewness		-1.406	-1.497	-1.992	-1.099	-0.797	-0.873	-0.836	-0.979	-0.795	-1.113	-1.329	-1.587	-1.019	-1.166
Std. Error of Skewness		0.129	0.129	0.129	0.129	0.129	0.129	0.129	0.129	0.129	0.129	0.129	0.129	0.129	0.129
Kurtosis		1.195	1.263	4.517	0.190	-0.799	-0.242	-0.223	-0.021	-0.655	0.526	1.216	2.712	0.089	0.293
Std. Error of Kurtosis		0.256	0.256	0.256	0.256	0.256	0.256	0.256	0.256	0.256	0.256	0.256	0.256	0.256	0.256

		St. 44	St. 45	St. 46	St. 47	St. 48	St. 49	St. 50	St. 51	St. 52	St. 53	St. 54	St. 55	St. 56	St. 57
N	Valid	360	360	360	360	360	360	360	360	359	359	360	360	360	360
	Missing	0	0	0	0	0	0	0	0	1	1	0	0	0	0
Skewness		-0.907	-1.267	-1.260	-1.616	-0.094	-1.093	-1.841	-1.346	-0.475	-1.092	-0.452	-0.772	-1.439	-1.379
Std. Error of Skewness		0.129	0.129	0.129	0.129	0.129	0.129	0.129	0.129	0.129	0.129	0.129	0.129	0.129	0.129
Kurtosis		0.062	0.490	1.125	1.566	-1.370	-0.028	3.530	1.371	-0.890	0.165	-1.144	-0.510	1.772	1.610
Std. Error of Kurtosis		0.256	0.256	0.256	0.256	0.256	0.256	0.256	0.256	0.257	0.257	0.256	0.256	0.256	0.256

		St. 58	St. 59	St. 60	St. 61	St. 62	St. 63	St. 64	St. 65	St. 66	St. 67	St. 68	St. 69	St. 70	St. 71
N	Valid	359	360	359	360	360	360	360	360	359	360	360	360	360	359
	Missing	1	0	1	0	0	0	0	0	1	0	0	0	0	1
Skewness		-1.867	-0.669	-1.543	-1.124	-1.554	-1.264	-1.188	-1.985	-1.984	-0.461	-1.330	-0.659	-1.219	-0.415
Std. Error of Skewness		0.129	0.129	0.129	0.129	0.129	0.129	0.129	0.129	0.129	0.129	0.129	0.129	0.129	0.129
Kurtosis		3.983	-0.903	2.478	0.200	2.189	1.106	0.270	4.319	4.003	-0.995	0.896	-0.581	0.480	-1.250
Std. Error of Kurtosis		0.257	0.256	0.257	0.256	0.256	0.256	0.256	0.256	0.257	0.256	0.256	0.256	0.256	0.257

St. = Statement

In the Kolmogorov-Smirnov and Shapiro-Wilk tests, when $P > 0.05$, the null hypothesis is accepted and data are considered to be normally distributed (Mishra, Pandey, Singh, Gupta, Sahu, & Keshri, 2019). The Sig. values from the Kolmogorov-Smirnov and Shapiro-Wilk tests were all at .000 ($P > 0.05$) as shown in Table 4.31 suggesting a violation of the assumption of normality. This is common in larger samples ($n > 50$) according to Pallant (2020). The significant K-S and S-W values meant rejecting the null hypothesis. However, further consideration is recommended by examining the histograms, Q-Q plots, and box plots to get further insights into judging normality (Pallant, 2020; Tabachnick & Fidell, 2013). Kim (2013) supports this notion by noting that K-S and S-W may be unreliable for large samples ($n > 300$). A visual analysis of the histograms, Q-Q plots and box plots showed that the distribution of the data was approximately normal, as was the case in the skewness and Kurtosis.

Table 4.31: K-S and S-W Tests of Normality for Attitudinal Statements

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Statement 1	0.318	352	0.000	0.825	352	0.000
Statement 2	0.259	352	0.000	0.851	352	0.000
Statement 3	0.401	352	0.000	0.653	352	0.000
Statement 4	0.380	352	0.000	0.715	352	0.000
Statement 5	0.358	352	0.000	0.739	352	0.000
Statement 6	0.313	352	0.000	0.824	352	0.000
Statement 7	0.301	352	0.000	0.806	352	0.000
Statement 8	0.334	352	0.000	0.779	352	0.000
Statement 9	0.246	352	0.000	0.874	352	0.000
Statement 10	0.308	352	0.000	0.822	352	0.000
Statement 11	0.350	352	0.000	0.752	352	0.000
Statement 12	0.293	352	0.000	0.824	352	0.000
Statement 13	0.274	352	0.000	0.851	352	0.000
Statement 14	0.183	352	0.000	0.918	352	0.000
Statement 15	0.326	352	0.000	0.794	352	0.000
Statement 16	0.286	352	0.000	0.837	352	0.000
Statement 17	0.320	352	0.000	0.810	352	0.000
Statement 18	0.175	352	0.000	0.897	352	0.000
Statement 19	0.289	352	0.000	0.842	352	0.000
Statement 20	0.222	352	0.000	0.895	352	0.000
Statement 21	0.313	352	0.000	0.818	352	0.000
Statement 22	0.338	352	0.000	0.776	352	0.000
Statement 23	0.349	352	0.000	0.759	352	0.000
Statement 24	0.331	352	0.000	0.765	352	0.000
Statement 25	0.323	352	0.000	0.801	352	0.000
Statement 26	0.287	352	0.000	0.835	352	0.000
Statement 27	0.270	352	0.000	0.845	352	0.000
Statement 28	0.294	352	0.000	0.832	352	0.000

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Statement 29	0.299	352	0.000	0.825	352	0.000
Statement 30	0.355	352	0.000	0.771	352	0.000
Statement 31	0.333	352	0.000	0.741	352	0.000
Statement 32	0.349	352	0.000	0.712	352	0.000
Statement 33	0.294	352	0.000	0.822	352	0.000
Statement 34	0.296	352	0.000	0.819	352	0.000
Statement 35	0.279	352	0.000	0.858	352	0.000
Statement 36	0.290	352	0.000	0.861	352	0.000
Statement 37	0.277	352	0.000	0.846	352	0.000
Statement 38	0.274	352	0.000	0.843	352	0.000
Statement 39	0.263	352	0.000	0.841	352	0.000
Statement 40	0.293	352	0.000	0.809	352	0.000
Statement 41	0.342	352	0.000	0.778	352	0.000
Statement 42	0.306	352	0.000	0.830	352	0.000
Statement 43	0.330	352	0.000	0.793	352	0.000
Statement 44	0.277	352	0.000	0.864	352	0.000
Statement 45	0.335	352	0.000	0.778	352	0.000
Statement 46	0.323	352	0.000	0.817	352	0.000
Statement 47	0.366	352	0.000	0.707	352	0.000
Statement 48	0.193	352	0.000	0.899	352	0.000
Statement 49	0.326	352	0.000	0.795	352	0.000
Statement 50	0.349	352	0.000	0.733	352	0.000
Statement 51	0.310	352	0.000	0.806	352	0.000
Statement 52	0.234	352	0.000	0.892	352	0.000
Statement 53	0.309	352	0.000	0.813	352	0.000
Statement 54	0.233	352	0.000	0.881	352	0.000
Statement 55	0.255	352	0.000	0.868	352	0.000
Statement 56	0.319	352	0.000	0.796	352	0.000
Statement 57	0.316	352	0.000	0.806	352	0.000
Statement 58	0.290	352	0.000	0.742	352	0.000
Statement 59	0.273	352	0.000	0.854	352	0.000
Statement 60	0.350	352	0.000	0.777	352	0.000
Statement 61	0.328	352	0.000	0.805	352	0.000
Statement 62	0.332	352	0.000	0.777	352	0.000
Statement 63	0.323	352	0.000	0.812	352	0.000
Statement 64	0.333	352	0.000	0.783	352	0.000
Statement 65	0.344	352	0.000	0.718	352	0.000
Statement 66	0.345	352	0.000	0.710	352	0.000
Statement 67	0.201	352	0.000	0.902	352	0.000
Statement 68	0.347	352	0.000	0.778	352	0.000
Statement 69	0.243	352	0.000	0.882	352	0.000
Statement 70	0.330	352	0.000	0.796	352	0.000
Statement 71	0.248	352	0.000	0.873	352	0.000

a. Lilliefors Significance Correction

4.3.3 Identifying Heritage Values

To identify the underlying heritage values in Limuru, Naivasha and Molo towns, an interview schedule with 71 attitudinal statements on a seven-point Likert scale was used. To extract variables that explain similar components, the Exploratory Factor Analysis (EFA) method and Promax rotation were used. By enabling the correlation

of the underlying factors, EFA with Promax rotation was utilised to simplify the complex data and produce a scenario that was both realistic and comprehensible. The factor loading criteria were set at a minimum of 0.3. The communality, which is an indication of the amount of variance on each dimension, was assessed and found that all communalities presented in Appendix VIII were above 0.5. Therefore, no variable was eliminated based on communality.

First, to determine that the data were adequate for factor analysis, the anti-image matrix was checked to evaluate the adequacy of the correlation matrix. In the anti-image correlation matrix, the first diagonal line gives the Kaiser's Measurement of Sampling Accuracy (MSA) for the individual variables. Each of the variables was retained based on its sampling adequacy, where all the included variables had an MSA of above 0.5.

Further, to verify that the data set was suitable for factor analysis, the initial Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) value recorded was 0.915, as shown in Table 4.32. This value was above the minimum required of 0.6 as stated by Pallant (2020). The Bartlett's Test of Sphericity value was significant at $\chi^2(n = 360) = 12276.687$ ($p < 0.001$). This met the required significant value, which should be .05 or smaller (Pallant, 2020). Therefore, given the KMO and Bartlett's test of Sphericity values obtained, factor analysis was appropriate. The Chi-Square test was significant ($p < .05$).

Table 4.32: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.915
Bartlett's Test of Sphericity	Approx. Chi-Square	12276.687
	df	2485
	Sig.	.000

4.3.3.1 Hypothesis Testing

The null and research hypotheses associated with the factor analysis conducted are as stated below.

Null Hypothesis (H_o): There are no latent underlying factor structures associated with residents' attitudes towards heritage in historic townscapes along the Kenya Railway, and all variables load equally ($m = 0$), and the correlation matrix is an identity matrix.

Alternate Hypothesis (H_a): There are latent underlying factor structures associated with residents' attitudes towards heritage in historic townscapes along the Kenya Railway ($m \neq 0$), and the correlation matrix is not an identity matrix.

Since the Chi-Square test was significant ($p < .05$), and the matrix of population correlations is different from the identity matrix, then the null hypothesis (H_o) is rejected, providing support for the alternate hypothesis (H_a).

In addition, a reliability test for the 71 items on heritage value statements produced a Cronbach's alpha value of 0.952, as shown in Table 4.33 which was excellent according to Taber (2018), proving internal consistency among the sets of items in the instrument.

Table 4.33: Reliability Test for Heritage Value Statements

Main Item	Reliability Statistics		
	Cronbach's Alpha	N of Items	Remark
Heritage Value Statements	.952	71	Excellent

The correlation matrix provides the correlation coefficient between each variable and each of the other variables in the analysis. Variables with correlation coefficients below 0.3 were eliminated, and the factor analysis was rerun. On this account, two variables, Heritage Value Statements 14 and 40, were eliminated. In the correlation matrix presented in Appendix VII, the correlation coefficients of 0.3 and above were 69 and therefore sufficient, rendering the data appropriate. The reproduced correlation matrix showed that there were 356 (14%) nonredundant residuals with absolute values greater than 0.05, and therefore presented a model that was a good fit. The initial factor solution from the analysis yielded 17 factors for the scale, which accounted for 63.281% per cent of the variation in the data.

In the subsequent analysis, 20 variables failed to load on any dimension significantly and were removed, leaving 49 items for further analysis. EFA was rerun, excluding

the 22 items, and the results of the final analysis yielded 13 13-item component structure. The KMO and Bartlett's test of Sphericity was 0.906. The 13 dimensions explained a total of 63.060% of the variance among the items in the study. The Bartlett's Test of sphericity was significant ($p < .05$), and all communalities were over the required value of 0.500.

4.3.3.2 Total Variance

Table 4.34 shows that 13 components explaining 63.060% of variance were obtained as indicated in the rotation sums of the squared loadings column. The column explains the percentage of variance explained by each of the 13 components by eigenvalues. These components met Kaiser's criteria of having eigenvalues greater than 1. The rest of the components have eigenvalues less than 1 and were therefore excluded from further analysis.

Table 4.34: Total Variance of Components Explained

Component	Total Variance Explained						
	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings ^a
			Cumulative %			Cumulative %	Total
	Total	% of Variance		Total	% of Variance		
1	12.468	25.445	25.445	12.468	25.445	25.445	9.392
2	3.391	6.920	32.364	3.391	6.920	32.364	8.339
3	2.031	4.145	36.510	2.031	4.145	36.510	4.218
4	1.757	3.586	40.096	1.757	3.586	40.096	6.685
5	1.558	3.180	43.276	1.558	3.180	43.276	5.580
6	1.434	2.927	46.203	1.434	2.927	46.203	4.228
7	1.389	2.835	49.038	1.389	2.835	49.038	4.679
8	1.297	2.647	51.685	1.297	2.647	51.685	4.898
9	1.236	2.522	54.207	1.236	2.522	54.207	4.467
10	1.175	2.398	56.606	1.175	2.398	56.606	1.770
11	1.102	2.248	58.854	1.102	2.248	58.854	1.585
12	1.051	2.145	60.999	1.051	2.145	60.999	1.289
13	1.010	2.061	63.060	1.010	2.061	63.060	1.264

Extraction Method: Principal Component Analysis.

a. When components are correlated, the sums of squared loadings cannot be added to obtain a total variance.

The scree plot in Figure 4.41 also graphically presents the 13 components whose eigenvalues were more than 1. The scree plot provides a greater visual explanation of the variance in the data, and the positioning of the 13 components and was therefore retained for further investigation in the parallel analysis.

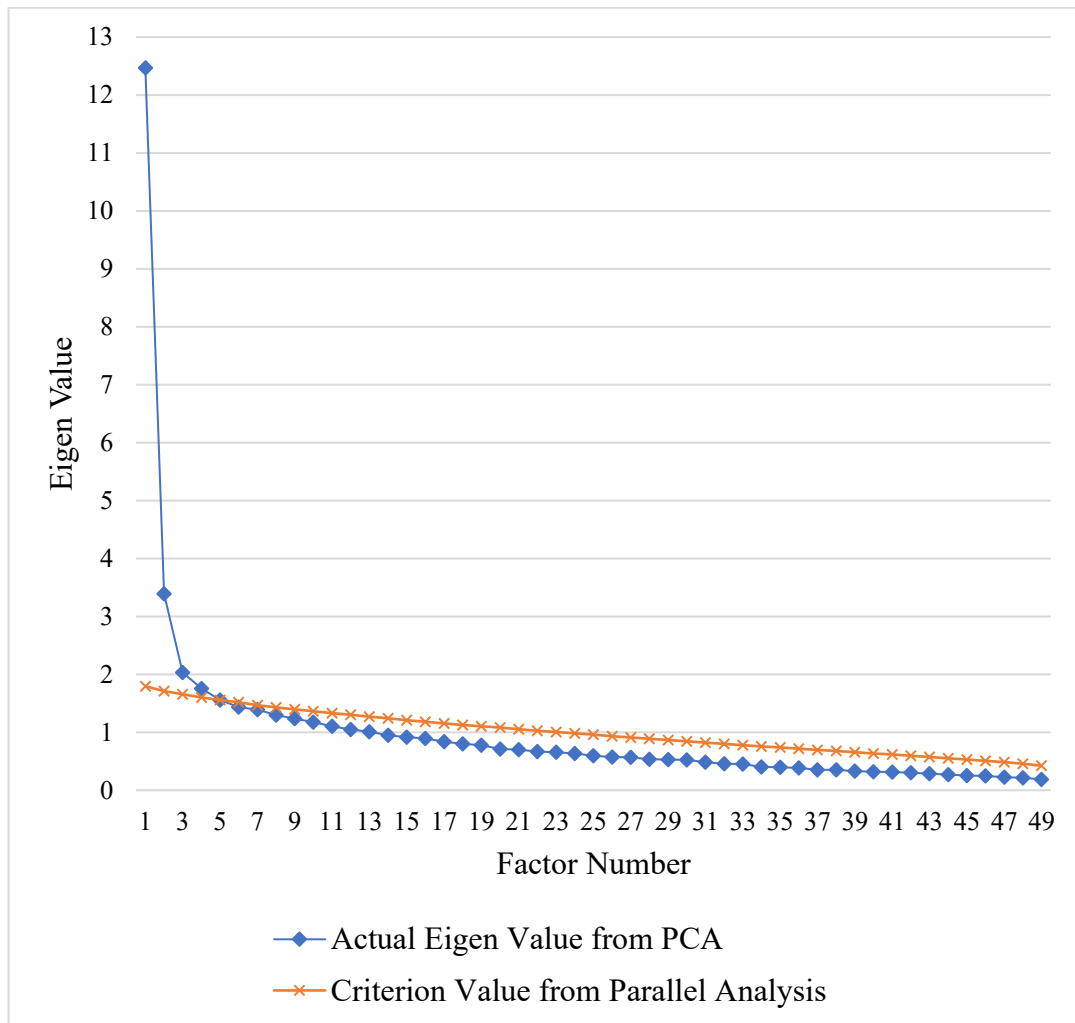


Figure 4.41: Component Scree Plot

A parallel analysis was conducted to establish the minimum number of components to keep from factor analysis. The parallel analysis involved comparing the size of the eigenvalues with those obtained from a randomly generated data set of the same size as seen in Table 4.35. Eigenvalues that exceeded the corresponding values from the random data set were retained. The parallel analysis yielded five components, which were reasonably loaded as plotted on the Scree plot in Figure 4.41. The five components, according to Table 4.34 explain 43.276% of the variance.

Table 4.35: Comparison: PCA Eigenvalues and Parallel Analysis' Criterion Values

	Actual Eigenvalue from PCA	Comparison	Criterion Value from Parallel Analysis	Decision
1	12.468	>	1.795217	Accept
2	3.391	>	1.712596	Accept
3	2.031	>	1.655883	Accept
4	1.757	>	1.600563	Accept
5	1.558	>	1.556757	Accept
6	1.434	<	1.516764	Reject
7	1.389	<	1.470103	Reject
8	1.297	<	1.432227	Reject
9	1.236	<	1.399456	Reject
10	1.175	<	1.363917	Reject
11	1.102	<	1.332913	Reject
12	1.051	<	1.303221	Reject
13	1.010	<	1.270433	Reject

Further, the rotated five-factor solution was reviewed to ascertain that three or more items were ideally loading on each of the components and that the loading values were 0.4 and above as recommended by Pallant (2020). Table 4.36: Pattern Matrix for Heritage Value Statements presents the pattern of loadings for easier interpretation. The pattern matrix shows the items' loadings on the five factors, with eight items loading above 0.4 on component 1, seven items loading on component 2, five items on component 3, four items on component 4 and four items on component 5. This solution was therefore optimal and further supports the decision to retain the five factors. Further analysis of the pattern matrix shows evidence of three more factors since each of the extra components had three to four factors loading with values above 0.4. These three components were taken up for the interpretation of the peculiarity.

Table 4.36: Pattern Matrix for Heritage Value Statements

Pattern Matrix ^a													
	Component												
	1	2	3	4	5	6	7	8	9	10	11	12	13
Statement 6	.876	-.151	.113	-.236	.034	-.051	-.029	-.043	.002	.250	.066	-.086	.052
Statement 47	.869	-.116	.045	.104	.007	-.045	.078	.018	-.159	-.127	-.013	.101	.146
Statement 45	.853	-.012	-.110	-.037	.192	-.151	.117	-.156	.001	-.039	-.100	.208	.038
Statement 5	.798	.057	.004	-.169	-.154	-.112	.015	-.016	.098	.161	.121	.035	.203
Statement 43	.739	.023	.093	-.046	-.144	-.011	.012	-.095	.257	-.097	-.029	.250	.007
Statement 31	.703	.103	-.090	.107	-.022	.000	-.037	.146	-.090	-.053	-.064	.065	-.088
Statement 13	.622	.166	.068	-.109	-.060	.145	.029	.005	-.174	.130	.110	-.111	.029
Statement 64	.411	-.013	.042	.365	-.163	.010	.041	.137	-.078	-.060	.042	.239	.067
Statement 33	.063	.883	.014	-.077	-.052	-.072	-.096	-.065	.029	-.035	.037	.126	-.027
Statement 28	-.072	.861	-.144	-.064	.031	.086	.084	-.043	.004	-.059	.078	.025	.080
Statement 39	-.166	.699	-.019	.057	.220	-.083	.084	-.118	.133	.131	-.196	.053	.031
Statement 29	.227	.615	-.054	-.088	.018	.163	-.105	.167	-.078	-.054	-.026	-.086	-.111
Statement 30	.357	.552	-.047	.023	.018	.010	-.074	.105	-.053	-.094	.001	-.014	-.068
Statement 27	-.062	.495	-.030	.108	-.125	.148	.408	-.083	-.135	-.048	-.032	-.116	.137
Statement 68	-.008	.443	.174	-.165	-.056	-.078	.059	.372	.089	-.129	.022	-.050	-.036
Statement 63	.027	-.125	.745	.235	.037	.018	.090	.038	-.149	-.054	.040	.072	-.019
Statement 59	.049	-.124	.640	-.179	.032	.042	.081	-.050	.405	-.175	.012	-.140	-.004
Statement 62	.005	.009	.600	.138	.052	-.020	.086	.010	.039	-.019	.294	-.018	.133
Statement 60	.024	.058	.541	.110	.105	-.050	-.004	.065	-.043	-.091	.325	.113	.138
Statement 52	.031	.140	.435	-.228	-.056	.134	.112	.286	-.087	.050	-.241	.237	.066
Statement 65	-.163	-.131	-.035	.807	-.120	.040	.135	.097	.126	-.019	.038	.049	.053
Statement 66	.082	-.070	.183	.764	.017	-.018	.005	-.082	-.138	.016	-.001	.147	.039
Statement 50	-.168	.066	.061	.608	.151	-.046	-.083	.113	.069	.319	-.051	.090	.001
Statement 58	-.076	.098	.380	.437	.012	-.101	-.133	-.041	.184	-.008	.129	-.167	.171
Statement 24	-.006	.045	.036	-.049	.880	.025	.014	-.015	-.076	.143	-.014	.127	.092
Statement 23	-.105	.045	.059	.055	.853	.087	.042	-.130	-.063	.064	-.029	.119	-.017
Statement 25	-.022	-.064	.378	-.133	.608	.026	-.055	.136	-.010	-.034	-.261	-.181	-.096
Statement 22	.233	-.088	-.184	-.043	.452	.299	-.056	.093	-.017	-.223	.056	-.012	.360
Statement 20	-.100	-.102	.049	-.122	.228	.824	-.156	.068	.149	-.058	.081	.271	.040
Statement 18	-.231	.068	-.049	.187	-.098	.567	.172	.048	-.030	.032	-.185	-.028	.261
Statement 21	.125	.185	-.089	-.024	-.036	.541	.099	.047	.109	-.024	.032	-.151	.002
Statement 19	.123	.184	.131	.056	.009	.529	-.098	-.160	.148	.039	.238	.062	-.112
Statement 67	.101	.065	.237	.017	-.066	-.049	.693	-.196	-.024	.057	-.082	.084	-.036
Statement 69	-.111	.018	-.091	-.183	.077	-.062	.601	.245	.179	.029	.052	.315	.211
Statement 36	.223	-.142	-.032	.159	.013	-.016	.589	.039	.089	-.154	.014	-.192	-.043
Statement 37	-.067	-.005	.200	.089	.275	.022	.494	-.085	.035	-.021	.146	-.247	-.084
Statement 48	-.179	-.194	.019	.004	-.085	.355	-.045	.785	-.099	.210	.221	.108	-.074
Statement 51	.164	.013	.026	.075	.011	-.059	.026	.653	-.035	-.031	-.108	.028	-.089
Statement 32	-.052	.152	.029	.218	-.026	-.292	-.198	.560	.104	-.101	.125	-.049	.031
Statement 53	-.104	.036	.069	.054	-.079	.116	.039	-.034	.855	.018	.027	.011	-.094
Statement 54	.211	.008	-.069	.100	-.085	.202	.073	-.013	.637	.107	.047	.168	-.210
Statement 2	.070	-.105	-.157	.061	.105	-.014	-.019	.063	.023	.864	.100	-.041	.032
Statement 12	.285	.167	-.089	.074	.128	-.036	-.070	-.025	.080	.463	.021	-.074	.331
Statement 4	.046	-.022	.213	.026	-.102	.083	.007	.118	.051	.112	.755	-.064	.068
Statement 49	.353	-.144	-.031	.265	-.037	.066	.033	.178	.197	.198	-.403	-.093	-.036
Statement 55	.289	.032	-.014	.183	.096	.132	-.063	.035	.023	-.022	-.026	.673	.064
Statement 56	.094	.124	.029	.381	.171	.078	.005	-.027	.087	-.188	-.153	.407	-.105
Statement 3	.221	.030	.123	.099	.046	.052	.061	-.081	-.171	.090	.108	.084	.643
Statement 44	.084	.091	-.108	.014	.213	-.201	.324	.214	-.026	.158	.295	-.008	-.473

Extraction Method: Principal Component Analysis.

Rotation Method: Promax with Kaiser Normalisation.

a. Rotation converged in 13 iterations.

4.3.4 Interpretation of Components

The clustering of original factors in the form of heritage values provides the basis for giving the identity and interpretation of the components by their various themes. Table 3.7 shows the clusters of the factors explaining each of the five components. Further, Table 4.38 shows the cluster of heritage value statements for each of the five components.

Table 4.37: Heritage Values Factor Combination

Extracted Components	Variables (Original Factors)
Component 1	6, 47, 45, 5, 43, 31, 13, 64.
Component 2	33, 28, 39, 29, 30, 27, 68.
Component 3	63, 59, 62, 60, 52
Component 4	65, 66, 50, 58
Component 5	24, 23, 25, 22
	Other Variables
Component 6	20, 18, 21, 19
Component 7	67, 69, 36, 37
Component 8	48, 51, 32

Table 4.38: Component Extraction – Factor Clusters

No.	Variable	Components	Summary
Component 1:			
1.	Statement 6	The built heritage should be conserved for its artistic value.	Artistic value
2.	Statement 47	I would want important features to be protected from destruction.	Protection from destruction
3.	Statement 45	I would like to see the built heritage continue to exist.	Continuity of existence
4.	Statement 5	The town's heritage should be preserved.	Need for preservation
5.	Statement 43	The continued existence of heritage is important for the town.	Importance of heritage
6.	Statement 31	I would like to see the townscape heritage conserved for future generations.	Conservation for future generations
7.	Statement 13	The townscape heritage is considered to be aesthetic.	Heritage Aesthetics
8.	Statement 64	Old industrial functions should be retained.	Retention of industrial functions
Component 2:			
1.	Statement 33	The townscape heritage brings economic benefits.	Economic benefits
2.	Statement 28	The built heritage areas are productive places.	Productive heritage places
3.	Statement 39	The townscape heritage supports different needs in the town.	Support urban needs
4.	Statement 29	It is pleasant to move through the town where the historic features are.	Pleasant heritage experience
5.	Statement 30	I value the important features of the town.	Value for important places
6.	Statement 27	The streets in the town are well defined for wayfinding.	Well defined streets
7.	Statement 68.	Improvement of the original buildings has positive effects on the aesthetics of the townscape.	Improvement of the outlook of heritage areas
Component 3:			
1.	Statement 63	The heritage represents the history of Kenya.	Representative of National History
2.	Statement 59	The town exists due to the railway station.	Railway origins
3.	Statement 62	The town's important features can easily be connected to the past.	Connection to the past
4.	Statement 52	Some memorable events related to the railway took place in the town.	Memorable events
5.	Statement 60	This town is significant in the region's history.	Significance to the region's history
Component 4:			
1.	Statement 65	The town is a place where most people meet.	A social place for meeting
2.	Statement 66	The town's history should be passed down to future generations.	History to be passed to future generations

No.	Variable	Components	Summary
3.	Statement 50	Stories about the origin of the town should be documented.	Documentation of heritage
4.	Statement 5	Older people here have special memories of this town.	Memories of the past
Component 5:			
1.	Statement 24	The heritage represents the history of the town.	Representative of town history
2.	Statement 23	There is history to be learned from the existing townscape heritage.	Learnt history
3.	Statement 25	Townscape heritage is representative of the colonial past.	Representative of colonial heritage
4.	Statement 22	Townscape heritage is easily identifiable.	Heritage is identifiable
Other Components			
Component 6:			
1.	Statement 20	The railway created a unique culture among the residents of the town.	Created a unique culture
2.	Statement 18	There are adequate public spaces within the town.	Adequate public spaces
3.	Statement 21	The collection of buildings creates a beautiful scenery.	Beautiful scenery
4.	Statement 19	The heritage buildings have a unique architectural style.	Unique architectural style
Component 7:			
1.	Statement 67	The townscape heritage is well conserved.	Well conserved heritage
2.	Statement 69	Information is available about the townscape heritage.	Availability of Heritage information
3.	Statement 36	The town has good landmarks.	Good landmarks
4.	Statement 37	The town is illustrative of past events.	Illustration of past events
Component 8:			
1.	Statement 48	I have known about the heritage through oral literature.	Heritage oral literature
2.	Statement 51	The important historic features are easy to remember.	Good for memory
3.	Statement 32	Rehabilitation/renovations of the built environment should be done to enhance its usability.	Rehabilitation for usability

Table 4.39: Component Score Coefficient Matrix of Heritage Value Statements

	Component							
	1	2	3	4	5	6	7	8
Statement 2	-.006	-.008	-.001	-.006	-.003	.006	.006	-.003
Statement 3	-.001	.005	.009	.001	-.006	-.022	.028	-.005
Statement 4	.005	-.004	.001	.002	-.011	.015	-.002	.013
Statement 5	.127	.009	-.003	-.073	-.052	-.065	-.004	.007
Statement 6	.165	-.042	.068	-.080	.009	.006	-.030	-.022
Statement 12	.034	.055	-.028	.018	.039	-.042	-.043	.009
Statement 13	.127	.048	.048	-.014	-.036	.117	.007	-.019
Statement 18	-.042	.016	-.009	.066	-.079	.271	.102	.032
Statement 19	.040	.052	.056	.037	-.016	.262	-.065	-.139
Statement 20	-.016	-.046	.011	-.062	.056	.347	-.067	.000
Statement 21	.052	.042	-.048	.030	-.010	.273	.051	.018
Statement 22	.056	-.053	-.181	.014	.224	.083	-.025	.105
Statement 23	-.013	.006	-.014	.026	.322	.013	.008	-.060
Statement 24	-.007	.003	-.025	-.024	.335	-.036	-.001	.011
Statement 25	.027	-.013	.168	-.037	.226	.021	-.053	.093
Statement 27	-.015	.136	-.017	.057	-.068	.094	.205	-.033
Statement 28	-.026	.235	-.066	-.006	.012	.014	.035	-.017
Statement 29	.062	.172	.002	.009	.011	.098	-.062	.070
Statement 30	.079	.153	-.017	.043	.022	.015	-.053	.046
Statement 31	.146	.022	-.039	.068	.009	.030	-.027	.064
Statement 32	-.004	.045	-.051	.078	.051	-.189	-.107	.302
Statement 33	-.008	.251	.039	-.027	-.035	-.054	-.068	-.049
Statement 36	.065	-.056	-.092	.087	.045	.016	.292	.052
Statement 37	.012	-.004	.021	.056	.120	.035	.232	-.035
Statement 39	-.049	.202	.025	.015	.061	-.066	.023	-.045
Statement 43	.121	-.006	.037	-.035	-.053	-.023	-.017	-.047
Statement 44	.032	.022	-.078	.024	.112	-.068	.169	.063
Statement 45	.148	-.021	-.064	-.007	.087	-.073	.045	-.058
Statement 47	.162	-.045	-.015	.051	.016	-.003	.027	.021
Statement 48	-.036	-.056	.003	-.035	-.046	.150	.016	.347
Statement 49	.086	-.033	.026	.105	-.020	.059	.006	.109
Statement 50	-.032	.040	.029	.207	.042	-.029	-.055	.030
Statement 51	.038	.000	-.001	.018	.023	-.038	.022	.335
Statement 52	-.032	.043	.260	-.157	-.106	.053	.057	.131
Statement 53	-.018	.004	-.008	-.001	.004	-.018	-.009	.004
Statement 54	.040	-.007	-.044	.023	-.015	.057	.021	-.022
Statement 55	.005	-.005	-.005	.005	-.001	.003	-.027	-.016
Statement 56	.009	.028	-.004	.124	.057	.011	-.012	-.034
Statement 58	-.002	.047	.112	.163	.022	-.064	-.109	-.015
Statement 59	.017	-.032	.249	-.091	.008	-.001	-.003	-.006
Statement 60	-.014	.023	.176	.003	.027	-.055	-.029	.009
Statement 62	-.009	.014	.208	.018	.003	-.025	.011	-.014
Statement 63	.002	-.015	.324	.046	-.042	.039	.014	-.024
Statement 64	.066	-.006	-.007	.120	-.065	.005	.016	.047
Statement 65	-.018	-.030	-.084	.299	-.021	.013	.060	.039
Statement 66	.022	-.003	.052	.280	-.008	.018	-.019	-.079
Statement 67	-.007	.015	.115	-.030	-.079	.008	.343	-.104
Statement 68	-.006	.122	.065	-.070	-.011	-.064	.020	.200
Statement 69	-.083	-.024	-.096	-.144	.021	-.120	.328	.165

Extraction Method: Principal Component Analysis.

Rotation Method: Promax with Kaiser Normalisation.

Component Scores.

The following are the given identities of constructs and the interpretation of the extracted components in Table 3.7 and Table 4.38. The coefficients for the regression models presented under every theme are presented in Table 4.39.

4.3.4.1 Key Components

Component 1: Cultural Continuity

This component, made up of eight factors, accounts for 25.45% of the total variance shown in Table 4.34. The attitudinal statements isolated under this component represent the desire to continue experiencing the heritage and even pass it on to future generations. With continuity, residents will keep learning about the heritage due to them being held in high regard and also considered historic as well as aesthetic. The reasons for cultural continuity are embodied in the need to enhance the usability of the townscape heritage, continuity as a record, and to conserve heritage for future generations. The desired continuity was therefore a result of the aesthetics, rarity, uniqueness and cultural significance of the heritage in the towns. The statements emphasise the importance of townscape heritage to the towns' residents. This importance lies in the towns' distinct character, such as landmarks, public spaces and artistic value. Component 1 can therefore be identified as continuity. The factor model is expressed as:

$$\text{Cultural Continuity} = .17 \text{ Artistic value} + .16 \text{ Protection from destruction} + .15 \text{ Continuity of existence} + .13 \text{ Need for preservation} + .12 \text{ Importance of heritage} + .15 \text{ Conservation for future generations} + .13 \text{ Heritage Aesthetics} + .07 \text{ Retention of industrial functions}$$

Component 2: Functional -Economic

The second component extracted, made up of seven factors, represented 6.92% of the total variance of the factor analysis. This component has been given the interpretation of functionality and economics. The attitudinal statements dwell on issues of economic benefits, productivity and perceived worth of the townscape heritage. To reinforce the idea of functionality is the concept of development of the town that can be directly attributed to the origin of the towns and its evidence in the townscape heritage. Therefore, the desire for heritage conservation was encompassed in the functions and economic benefits that are drawn from the significant places. The factor model can be expressed as follows:

Functional-economic = .251 Economic benefits + .24 Productive heritage places + .20 Support urban needs + .17 Pleasant heritage experience + .15 Value for important places + .14 Well defined streets + .12 Improved of outlook of heritage areas

Component 3: Identity

The third component, represented by a cluster of five factors, can be interpreted as identity and accounts for 4.15% of the total variance. The statements here present the aspect of people's relationship with the townscape heritage as well as relationships among themselves in the townscape space. The statements highlight issues related to the way people associate themselves with their environment. The issues included awareness of past events, people's associations and accessibility of the townscape heritage. The third component, referred to as identity in this case, refers to the origin of the towns, which is directly related to the establishment of the railway station and the desire to have the current continuously linked to the past origins. The expression for the factor model is:

Identity = .32 Representative of National History + .25 Railway origins + .21 Connection to the past + .18 Memorable events + .26 Significance to regions history

Component 4: Placeness

The fourth component extracted, made up of four factors, represented 3.59% of the total variance of the factor analysis. The attitudinal statements under this component bring out the element of distinctiveness of the townscape heritage. The statements present this aspect through townscape attributes such as aesthetics, architectural style, and creativity that stand out and are incomparable to others. These notable characteristics of the townscape heritage bring about a sense of belonging, identity, and because of shared admiration. The familiarity and memory of the townscape heritage to people bring forth a sense of ownership and attachment to the place. The factor model is expressed as:

Placeness= .23 Asocial place for meeting + .28 History passed to future generations + .21 Documentation of heritage + .16 Memories of the past

Component 5: Historicity

Component five, extracted, was made up of four factors that account for 3.18% of the total variance. The interpreted theme from the five factors was historicity. Symbolism, origins, knowledge of history and representativeness of the townscape heritage to the railway and colonial past point to the notion of historicity. Further, the continued existence of the townscape heritage supports different needs in the towns, and they are also pleasant and significant places laden with historic information. The factor model can be expressed as follows:

$$\text{Historicity} = .34 \text{ Representative of town history} + .32 \text{ Learnt history} + .23 \text{ Representative of colonial heritage} + .22 \text{ Heritage is identifiable}$$

4.3.4.2 Other Components

Even though the EFA processes produced a factor solution of five, the resulting pattern matrix showed three other minor but considerable components, each with three to four factor loadings that required interpretation. The following are the given identities of constructs and the interpretation of the three other extracted components in Table 4.37 and Table 4.38.

Component 6: Rarity

Component 6, extracted, was made up of four factors that account for 2.93% of the total variance. The theme that was created by the heritage values statements points to the uniqueness created in the urban space and especially influenced by the railway stations. This uniqueness was embodied in the urban open spaces, the architectural heritage, and the knowledge of it. The uniqueness of the townscape heritage brings about the desire to preserve the built heritage and enhance the performance of the town as a commercial hub. It was identified through its distinctiveness, since each heritage place shares the aspect of uniqueness of character. All these combined to provide a rarity in the outlook of the townscape. The expression for the factor model is:

$$\text{Rarity} = .35 \text{ Created unique culture} + .27 \text{ Adequate public spaces} + .27 \text{ Beautiful scenery} + .26 \text{ Unique architectural style}$$

Component 7: Evidence

The seventh component extracted, made up of four factors, represented 2.84% of the total variance of the factor analysis. The themes of the four statements gravitate towards evidence. Evidence is available if the townscape heritage was well conserved, and information was available about the townscape heritage. Other ways evidence was expressed are in the landmarks and a townscape fabric illustrative of the past, and the quality of the physical environment to provide heritage messages. The following is an expression for the factor model:

$$\text{Evidence} = .34 \text{ Well conserved heritage} + .33 \text{ Availability of Heritage information} + .29 \text{ Good landmarks} + .23 \text{ Illustration of past events}$$

Component 8: Memory

The eighth component, represented by a cluster of three factors, was interpreted as memory and accounted for 2.65% of the total variance. The three statements present a theme related to memory and the need to have it preserved. For example, the Rehabilitation of heritage areas would enhance their usability and, in turn, sustain memory through the living heritage approach. The factor model can be expressed as follows:

$$\text{Memory} = .35 \text{ Heritage oral literature} + .24 \text{ Good for memory} + .30 \text{ Rehabilitation for usability}$$

4.4 Objective Three: Conservation Needs of Townscape Heritage

Respondents were asked to rate the state of the desired needs related to the townscape heritage conservation for Limuru, Naivasha, and Molo Towns. The rating was based on a seven-point Likert scale where 1 represented very poor, and 7 represented very good. Descriptive statistics on conservation needs for each of the towns are presented in Table 4.41, Table 4.42 and Table 4.43 which are broken down into four categories: physical environment, accessibility, economic, and social-cultural. The calculated means under each of the need factors indicate the residents' perspectives on the status of conservation and therefore present the level of needs against the Likert scale. In addition, general comments on the desirable state of townscapes were provided by

respondents and summarised as shown in Table 4.40 were reviewed to check for consistency.

Table 4.40: General Comments on the Desirable State of the Townscapes

Interview Ref. No.	Comments on the Desirable State of the Townscapes
L	Limuru
L037	Town Buildings should be improved. Parking should be available.
L038, L44, L45, L47, L60	There should be continuous improvement in the infrastructure and technological development around the town and the surroundings to enable the town to deal with development pressure.
L038	Set up a museum where people can learn about the town.
L059, L67	Townscape Heritage need to be preserved as a symbol of the history of the town since it gives a sense of belonging and pride.
L059, L65	Waste management is poor; it needs redevelopment. Streetlights along the residential areas to minimise insecurity Adopt better water harvesting techniques- rainwater harvesting in the market.
L068	The areas around the railway line are inaccessible during the rainy season due to poor drainage. Drainage should be enhanced to mitigate flooding around the railway area.
N	Naivasha
N006	Plant more trees around town Build memorial sites for the towns' important figures Provide more benches for relaxation Regularly clean public areas Provide proper drainage facilities up to the treatment facilities
N007	Provision of a park for the people Use the old infrastructure to create employment opportunities
N011	Adopt a futuristic city design.
N014	Reafforestation programs Creation of schools and churches Renovation of old structures Proper maintenance of the market.
N030	Renovate buildings for purposes of tourism purposes.
N040	Pave dusty roads near the railway Painting of the townscape heritage. Proper lighting and regular cleaning of the spaces close to the railway
N041	Renovation of roads and parking spaces
N048	Upgrade drainage and sewer systems
N109	The reuse of old structures to create employment for the rising influx of immigrants in the town.
N111	Borrow old architecture from the buildings, especially in the use of material. The old architecture was stronger and more durable.
N116	Old buildings taking up large spaces should be demolished to build new ones to create employment opportunities.
N142	Industrial areas should be renovated and improved to create more jobs. Water treatment in areas close to the railway. The water is too salty and dirty. More house construction near the railway.

Interview Ref. No.	Comments on the Desirable State of the Townscapes
N155	Cafe and park destinations to be set up close to the forested areas
N159	An increase in tertiary institutions to enhance the town's growth.
M	Molo
M007	Resources set aside to upgrade and maintain the state of the townscape.
M011	The post office can be rebranded and expanded for <i>Huduma</i> Centre services.
M022	Roads and streets to be expanded. Plant more trees.
M026	Improve on lighting. Creation of walkways. Creation of dumping sites for the town's waste.
M027	Mixed-use design around the heritage sites
M064	Establishment of a tertiary institution to enhance town growth and education
M082	Fines should be removed for those who pass through the railway station or relax along the railway line. Renovation of rail houses and offices.
M097	Establishment of industrial parks for job opportunities and training purposes.
M108	Investment in agriculture to improve agriculture in the town
M120	Design should be exploited to include areas of beautiful scenery.
M127	Establishment of vocational centres. The reuse of old structures to create youth rehabilitation centres.
M128	Better road signage to minimise road accidents.

4.4.1 Conservation Needs in Limuru Town

The data showed moderate to high standard deviation, ranging from 1.66 to 2.00, indicating variance in the rating of the conservation needs in Limuru town, pointing to a moderate to high degree of disagreement among respondents. Kurtosis and Skewness results were examined for normalcy as shown in Table 4.41. The results showed skewness values ranging between -0.49 and 0.50, regarded as ideal since they fell between -1 and +1. The kurtosis values ranged between -1.59 and -0.72, regarded as normally peaked since they fell within -2 and +2 values. Therefore, the distribution of the data was deemed as normal with skewness and kurtosis near zero.

For the physical environment of the town, the level of cleanliness presented a mean of 3.93, which was rated as fair; and the level of safety was at a mean of 4.20 and rated as fair. The condition of infrastructure was at a mean of 4.04, rated as fair. Consequently, the physical environment of the town therefore rated as fair overall.

Under accessibility, the condition of lighting has a mean of 4.16 or fair; The condition of walkways has a mean of 3.53, or fair; conditions of roads and parking were rated at 4 or fair. The accessibility condition of the town was, therefore, generally rated as fair.

The capacity to provide employment and the level of tourism under the economic conditions were rated on a mean of 3.63 and 3.31, respectively, which was regarded as fair and mildly poor, respectively, on the Likert scale. On the other hand, the level of usability and the level of railway functions were rated at a mean of 3.80 and 3.26, respectively, which were fair and mildly poor. Therefore, the economic conditions were rated between mildly poor and fair.

The state of heritage under social and cultural conditions was rated at 3.60, while the knowledge of it was rated at 4.13, which were rated as fair on the Likert scale. It thus means social and cultural conditions were generally rated as fair. The key townscape conservation needs in Limuru were thus pointed out as: level of cleanliness, condition of walkways, capacity to provide employment, level of tourism, level of railway functions, and state of the heritage. Figure 4.42 displays the physical setting of Limuru's townscape heritage from which conservation needs were determined.



Figure 4.42: Townscape Heritage Context of Limuru Town

Table 4.41: Conservation Needs of Limuru Townscape Heritage

Factors		N	Mean	Std. Dev.	CV %	Skewness		Kurtosis	
						Statistic	Std. Error	Statistic	Std. Error
1. Physical Environment	Level of Cleanliness	70	3.93	1.82	46.31	-0.25	0.29	-1.09	0.57
	Level of Safety	70	4.2	2.00	47.71	-0.49	0.29	-1.22	0.57
	Condition of Infrastructure	70	4.04	1.83	45.27	-0.09	0.29	-1.31	0.57
2. Accessibility	Condition of Lighting	70	4.16	2.00	47.84	-0.25	0.29	-1.39	0.57
	Condition of Walkways	70	3.53	1.95	55.35	0.13	0.29	-1.59	0.57
	Condition of Roads and Parking	70	4.06	1.94	47.78	-0.19	0.29	-1.45	0.57
	Capacity to Provide Employment	70	3.63	1.90	52.26	0.10	0.29	-1.34	0.57
3. Economic	Level of Tourism	70	3.31	1.85	55.77	0.43	0.29	-1.02	0.57
	Level of Usability	70	3.8	1.77	46.47	-0.04	0.29	-1.25	0.57
	Level of Railway Functions	70	3.26	1.73	53.19	0.50	0.29	-0.72	0.57
4. Social-Cultural	State of the Heritage	70	3.6	1.81	50.14	-0.05	0.29	-1.29	0.57
	Knowledge of Heritage	70	4.13	1.69	40.80	-0.06	0.29	-0.79	0.57
Valid N (listwise)		70							

Key: 1 = Very poor, 2 = poor, 3 = Mildly Poor, 4 = Fair, 5 = Mildly good, 6 = Good, 7 = Very Good

4.4.2 Conservation Needs in Naivasha Town

The data showed moderate to high standard deviation, ranging from 1.47 to 1.83, indicating variance in the rating of the conservation needs in Naivasha town, pointing to a moderate degree of disagreement among respondents. Kurtosis and Skewness results were examined for normalcy as shown in Table 4.42. The results showed skewness values ranging between 0.42 and -0.35, regarded as ideal since they fell between -1 and +1. The kurtosis values ranged between 0.31 and -1.36, regarded as normally peaked since they fell within -2 and +2 values. With skewness and kurtosis close to zero, the data distribution was considered normal.

For the physical environment of the town, the level of cleanliness presented a mean of 4.52, which was rated as mildly good; and the level of safety was at a mean of 5.03 and rated as mildly good. The condition of infrastructure was at a mean of 5.13, rated as mildly good. Consequently, the physical environment of the town therefore rated as mildly good overall.

Under accessibility, the condition of lighting has a mean of 4.68 or mildly good; The condition of walkways has a mean of 4.85, or mildly good; conditions of roads and parking were rated at 4.68 or mildly good. The accessibility condition of the town was, therefore, generally rated as mildly good.

The capacity to provide employment and the level of tourism under the economic conditions were rated on a mean of 4.43 and 5.58, respectively, which was regarded as fair and good, respectively, on the Likert scale. On the other hand, the level of usability and the level of railway functions were rated at a mean of 4.7 and 3.93, respectively, which was mildly good and fair. Therefore, the economic conditions were rated between fair and good.

The state of heritage under social and cultural conditions was rated at 4.42, while the knowledge of it was rated at 4.36, which were rated as fair on the Likert scale. It thus means social and cultural conditions were generally rated as fair.

The key townscape conservation needs in Naivasha, therefore, were: the capacity to provide employment; the level of railway functions; the state of the heritage; and knowledge of heritage. The physical context of the townscape heritage of Naivasha, from which conservation needs were determined, is presented in Figure 4.43: Townscape Heritage Context of Naivasha Town.



Figure 4.43: Townscape Heritage Context of Naivasha Town

Table 4.42: Conservation Needs of Naivasha Townscape Heritage

	Factors	N	Mean	Std. Dev	CV %	Skewness		Kurtosis	
						Statistic	Std. Error	Statistic	Std. Error
1. Physical Environment	Level of Cleanliness	159	4.52	1.63	36.06	-0.62	0.19	-0.42	0.38
	Level of Safety	160	5.03	1.42	28.25	-1.04	0.19	0.59	0.38
	Condition of Infrastructure	160	5.13	1.43	27.80	-1.04	0.19	0.51	0.38
2. Accessibility	Condition of Lighting	160	4.68	1.65	35.19	-0.72	0.19	-0.33	0.38
	Condition of Walkways	160	4.85	1.58	32.64	-0.89	0.19	-0.12	0.38
	Condition of Roads and Parking	160	4.68	1.63	34.85	-0.60	0.19	-0.49	0.38
3. Economic	Capacity to Provide Employment	160	4.43	1.90	42.93	-0.35	0.19	-1.14	0.38
	Level of Tourism	160	5.58	1.78	31.88	-1.25	0.19	0.31	0.38
	Level of Usability	160	4.7	1.48	31.55	-0.68	0.19	-0.42	0.38
	Level of Railway Functions	160	3.93	1.67	42.54	-0.29	0.19	-0.99	0.38
4. Social Cultural	State of the Heritage	160	4.42	1.54	34.84	-0.35	0.19	-0.51	0.38
	Knowledge of Heritage	159	4.36	1.61	36.88	-0.31	0.19	-0.66	0.38
	Valid N (listwise)	158							

Key: 1 = Very poor, 2 = poor, 3 = Mildly Poor, 4 = Fair, 5 = Mildly good, 6 = Good, 7 = Very Good

4.4.3 Conservation Needs in Molo Town

The standard deviation of the data was moderate to high, ranging from 1.42 to 1.90, indicating variance in the rating of the conservation needs in Molo town, pointing to a moderate to high degree of disagreement among respondents. Kurtosis and Skewness results were examined for normalcy as shown in Table 4.43. The results showed skewness values ranging between -0.29 and -1.04, regarded as ideal because they fell between -1 and +1. The kurtosis values ranged between -1.14 and 0.59, regarded as normally peaked since they fell within -2 and +2 values. As a result, the data distribution was considered normal, with skewness and kurtosis close to zero.

For the physical environment of the town seen in, the level of cleanliness presented a mean of 4.11, which was rated as fair; and the level of safety was at a mean of 4.18 and rated as fair. The condition of infrastructure was at a mean of 4.15, rated as fair. Consequently, the physical environment of the town therefore rated as fair overall.

Under accessibility, the condition of lighting has a mean of 3.69 or fair; The condition of walkways has a mean of 3.11, or mildly poor; conditions of roads and parking were rated at 3.22 or mildly poor. The accessibility condition of the town was therefore generally rated between mildly poor and fair.

The capacity to provide employment and the level of tourism under the economic conditions were rated on a mean of 3.47 and 2.86, respectively, which were both regarded as mildly poor on the Likert scale. On the other hand, the level of usability and the level of railway functions were rated at a mean of 4.21 and 4.08, which were fair. Therefore, the economic conditions were rated between mildly poor and fair.

The state of heritage under social and cultural conditions was rated at 3.88, while the knowledge of it was rated at 3.84, which were both rated as fair on the Likert scale. It thus means social and cultural conditions were generally rated as fair.

The key townscape conservation needs in Molo were thus pointed out as: condition of lighting; condition of walkways, condition of roads and parking, capacity to provide employment; level of tourism; state of the heritage and knowledge of heritage. This

was based on their low mean rating by respondents. The physical context of the townscape heritage of Molo, from which conservation needs were determined, is presented in Figure 4.44.



Figure 4.44: Townscape Heritage Context of Molo Town

Table 4.43: Conservation Needs of Molo Townscape Heritage

Factors		N	Mean	Std. Dev.	CV %	Skewness		Kurtosis	
						Statistic	Std. Error	Statistic	Std. Error
1. Physical Environment	Level of Cleanliness	130	4.11	1.80	43.72	-0.17	0.21	-1.15	0.42
	Level of Safety	130	4.18	1.60	38.33	-0.35	0.21	-0.64	0.42
	Condition of Infrastructure	130	4.15	1.62	39.06	-0.28	0.21	-0.87	0.42
2. Accessibility	Condition of Lighting	130	3.69	1.83	49.70	-0.09	0.21	-1.36	0.42
	Condition of Walkways	130	3.11	1.83	58.87	0.42	0.21	-1.16	0.42
	Condition of Roads and Parking	130	3.22	1.68	52.17	0.39	0.21	-0.92	0.42
3. Economic	Capacity to Provide Employment	130	3.47	1.58	45.42	0.29	0.21	-0.64	0.42
	Level of Tourism	130	2.86	1.65	57.55	0.98	0.21	0.31	0.42
	Level of Usability	130	4.21	1.47	34.82	-0.05	0.21	-0.79	0.42
	Level of Railway Functions	130	4.08	1.56	38.31	-0.08	0.21	-0.78	0.42

		N	Mean	Std. Dev.	CV %	Skewness		Kurtosis	
Factors						Statistic	Std. Error	Statistic	Std. Error
4. Social Cultural	State of the Heritage	130	3.88	1.68	43.38	-0.04	0.21	-0.95	0.42
	Knowledge of Heritage	129	3.84	1.75	45.68	-0.021	0.21	-0.76	0.42
	Valid N (listwise)	129							

Key: 1 = Very poor, 2 = poor, 3 = Mildly Poor, 4 = Fair, 5 = Mildly good, 6 = Good, 7 = Very Good

4.4.4 Comparison of Conservation Needs among the Towns

In the comparison of conservation needs among towns, the means and the coefficient of variation (CV) values were analysed as presented in Table 4.44. Limuru town had CV values ranging between 40.80% and 55.77%, thus presenting a moderate to high inconsistency in responses among respondents. CV values for Naivasha were between 27.80% and 42.93%, hence showing moderate consistency of answers among respondents. Molo CV values were between 34.82% and 58.87%, therefore presenting a moderate to high inconsistency in responses among respondents.

Table 4.44: Comparison of Conservation Needs among the Towns

Factors		Limuru				Naivasha				Molo			
		N	Mean	Std. Dev.	CV %	N	Mean	Std. Dev.	CV %	N	Mean	Std. Dev.	CV %
1. Physical Environment	Level of Cleanliness	70	3.93	1.82	46.31	159	4.52	1.63	36.06	130	4.11	1.80	43.72
	Level of Safety	70	4.20	2.00	47.71	160	5.03	1.42	28.25	130	4.18	1.60	38.33
	Condition of Infrastructure	70	4.04	1.83	45.27	160	5.13	1.43	27.80	130	4.15	1.62	39.06
2. Accessibility	Condition of Lighting	70	4.16	1.99	47.84	160	4.68	1.65	35.19	130	3.69	1.83	49.70
	Condition of Walkways	70	3.53	1.95	55.35	160	4.85	1.58	32.64	130	3.11	1.83	58.87
	Condition of Roads and Parking	70	4.06	1.94	47.78	160	4.68	1.63	34.85	130	3.22	1.68	52.17
3. Economic	Capacity to Provide Employment	70	3.63	1.90	52.26	160	4.43	1.90	42.93	130	3.47	1.58	45.42
	Level of Tourism	70	3.31	1.85	55.77	160	5.58	1.78	31.88	130	2.86	1.65	57.55
	Level of Usability	70	3.80	1.77	46.47	160	4.70	1.48	31.55	130	4.21	1.47	34.82
	Level of Railway Functions	70	3.26	1.73	53.19	160	3.93	1.67	42.54	130	4.08	1.56	38.31
4. Social-Cultural	State of the Heritage	70	3.60	1.81	50.14	160	4.42	1.5	34.84	130	3.88	1.68	43.38
	Knowledge of Heritage	70	4.13	1.69	40.80	159	4.36	1.61	36.88	129	3.84	1.75	45.68
	Valid N (listwise)	70				158				129			

N = Number of Cases

CV = Coefficient of Variation

Overall, Limuru town was rated as having the highest levels of conservation needs, with less agreement on what the desired state should have been. Similarly, Molo was also rated as having second second-highest levels of conservation needs, with less agreement on what the desired state was supposed to be. Naivasha was rated lowest on the levels of conservation needs, with moderate agreement on what the desired state should have been. The cross-cutting needs for the three towns were the condition of walkways, capacity to provide employment, level of tourism, level of railway functions, state of heritage and knowledge of heritage. These needs can be interpreted to be addressing the economic needs of the population as well as their desire for the sustainability of the townscape heritage.

4.4.5 The Desirable State of the Townscapes

Comments on the desirable state of the townscape given by residents were analysed using a word frequency cloud as presented in Figure 4.45. Responses to the open-ended question were analysed on WordClouds.Com (2025). The analysis revealed words that could be placed into four thematic categories of townscape conservation needs that have been outlined and discussed hereafter.

and add value. The six words were: ‘improve’, ‘renovation’, ‘maintenance’, ‘enhance’, ‘upgrade’, and ‘cleaning’. The second category of four words suggested building new townscape elements to address emerging needs. The four words were: ‘provision’, ‘establish’, ‘development’, and ‘design’.

iii. Townscape elements and their quality

The third theme was deciphered from 11 words pointing to the physical nature of the townscape elements. The words were: ‘heritage’, ‘drainage’, ‘architecture’, ‘roads’, ‘lighting’, ‘structures’, ‘infrastructure’, ‘parking’, ‘water’, ‘spaces’, and ‘houses’. The theme refers to the elements experienced in the townscapes as areas that require to be subjected to conservation action, and according to the third theme of action words.

iv. Enhancement of socio-economic factors

The fourth theme was explained by four words pointing to the people’s need for economic occupation. The words were: ‘employment’, ‘opportunities’, ‘jobs’, and ‘agriculture’. The theme reflects the idea that people seek economic prosperity from the towns they live and work in, even as heritage conservation objectives are advanced. Therefore, conserved townscape heritage must meet or support the socio-economic factors.

4.5 Discussion

The discussion hereafter reviews the results presented based on the objectives of the study and answers the research questions presented in the first chapter. The first objective was to examine the built environment characteristics of townscapes in selected towns along the Kenya Railway. The second objective aimed to identify the heritage values in selected towns along the Kenya Railway. The third was to determine the conservation needs of townscapes in selected towns along the Kenya Railway. Finally, the fourth objective, which aimed to formulate a planning framework for historic townscapes along the Kenya railway, was dealt with in Chapter Five.

4.5.1 Objective One: Characteristics of Railway Townscape Heritage

Under this Objective, four research questions were answered. The first question was concerned with revealing the figure-ground characteristics of railway towns. The second question was finding out what constituted the townscape heritage. The third question was concerned with calculating the townscape heritage footprint. Finally, the fourth question was concerned with uncovering the status of townscape heritage.

4.5.1.1 Figure-Ground Characteristics of Railway Precincts

The first research question was concerned with the figure-ground characteristics of railway precincts of towns along the Kenya Railway. Townscape analysis done in Limuru, Naivasha, and Molo towns showed evidence that their growth was influenced at the beginning by their respective railway stations and their associated activities. There was a direct link between the railway stations and the immediate urban fabric. The railway stations were the cause of their establishment and eventual growth. This evidence was exhibited by the aged buildings existing adjacent to the railway stations, and many continue to accommodate their original functions. As argued by Llano-Castresan et al. (2013) and Cuélla (2018), territory and railway form a combination that interacts inevitably. This link in the three towns exists. However, it is currently weak due to the decline in Kenya Railways operations.

The townscapes were dotted with identifiable, significant heritage places within the delimited precincts. These significant heritage places were also considered urban landmarks due to their inherent values. On the other hand, designated parks and open spaces were non-existent. This provision in the early townscape planning might have been overlooked in a context where the core was initially small and surrounded by vast unbuilt lands. The delimited precinct areas were sufficiently served by a hierarchy of paths and a network of nodal spaces that accommodate public activities. This offers ease of accessibility, wayfinding and exploration as well as accommodating public space activities. This supported the study by Yildirim & Celik (2023) that showed that connectivity and integration values have a strong effect on pedestrian densities at nodes.

The townscapes in the three towns studied sprawl within a rural landscape character, even though Naivasha presents a higher density compared to Limuru and Molo. This sprawling character was likely to change to dense and compact, albeit slowly, due to the threat of new taller developments. As opposed to the study done by Cuéllar, (2018) in Spain which reported that many of the railway towns were depopulated and disappeared partially or totally due to the decline of railway operations, the three Kenyan towns have continued to thrive and their continuity hinged on other economic activities such as agriculture, commerce and tourism as new elements of economic propulsion.

The patterns of solids and voids on the figure-ground maps of the three towns were either grid or linear, with a few instances of organic. The organisation of developments in early towns was basic, thus conforming to the grid and linear patterns. Overall, the precinct area townscape perspectives in Limuru, Naivasha and Molo present relatively short skylines of heights averaging between 7 and 10 meters, in a rural landscape context and relatively aged urban fabric dotted with townscape heritage.

4.5.1.2 The Townscape Heritage

In the second research question, the aim was to reveal what constituted the heritage in towns along the Kenya Railway. The survey in the three towns identified a combined inventory of 28 townscape heritage areas: nine for Limuru, nine for Naivasha and ten for Molo. The significance expressed by respondents caused the derivation of heritage values associated with the identified townscape heritage. The values given in the order of importance were economic, age, historic, function and identity. There were also notable similarities in the type of heritage across the three towns. This could have been due to the original need to replicate service facilities near the railway station for transport logistics, storage, service provision and communication when the towns enjoyed full operations of railway services. Examples of the replicated facilities included the post offices, Kenya Farmers Association (KFA) offices and warehouses.

The existence of townscape heritage in towns along the Kenya railway line, which was not acknowledged, exemplifies the notion of under-representation of the modern heritage of Africa on their national inventory lists (Uskokovic, 2006). Yet according

to the findings of this study and the assertion by Macdonald (2013), in many areas, twentieth-century structures dominate the urban landscape.

4.5.1.3 Townscape Heritage Footprint

The third research question under the first objective was: What is the heritage footprint of towns along the Kenya Railway? To start with, the railway stations themselves at the core of the townscape precincts were regarded as townscape heritage. This is supported by Cuélla (2018), who notes that railway towns that emerged in the 19th century onwards can be understood as part of the railway management system and cannot be separated. The railway stations for the towns averaged one-third of the delimited precinct area. The townscape as perceived from the figure-ground was only in the form of solids. Heritage in the form of voids was not represented except in an isolated case in Molo town. The heritage footprint (HF) ratio for Limuru was 10.3%, for Naivasha was 8.4%, and for Molo was 19.4%. The lower ratios in Limuru and Naivasha could be due to physical loss and, therefore, memory loss of potentially significant areas in the past. Figure 4.46 of the Naivasha townscape scene shows the potential danger of loss posed by the need for urban renewal.

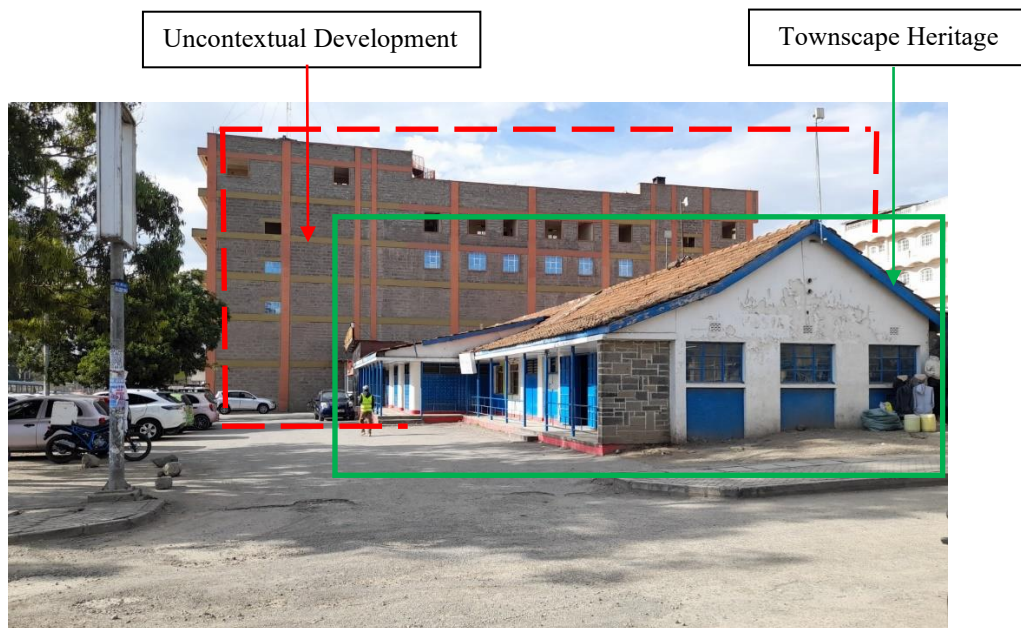


Figure 4.46: New Developments Abutting Townscape Heritage in Naivasha

Molo town has the highest heritage footprint ratio of 19.4%, and this could be attributable to the continuity of original uses that perpetuate the existence of heritage, and also clusters of heritage wholly considered as places of significance. Figure 4.47 shows the heritage cluster in Molo town, marked in yellow, known as the Posta area. The heritage footprint accounting method can therefore be used to track changes in loss or an increase in future surveys.

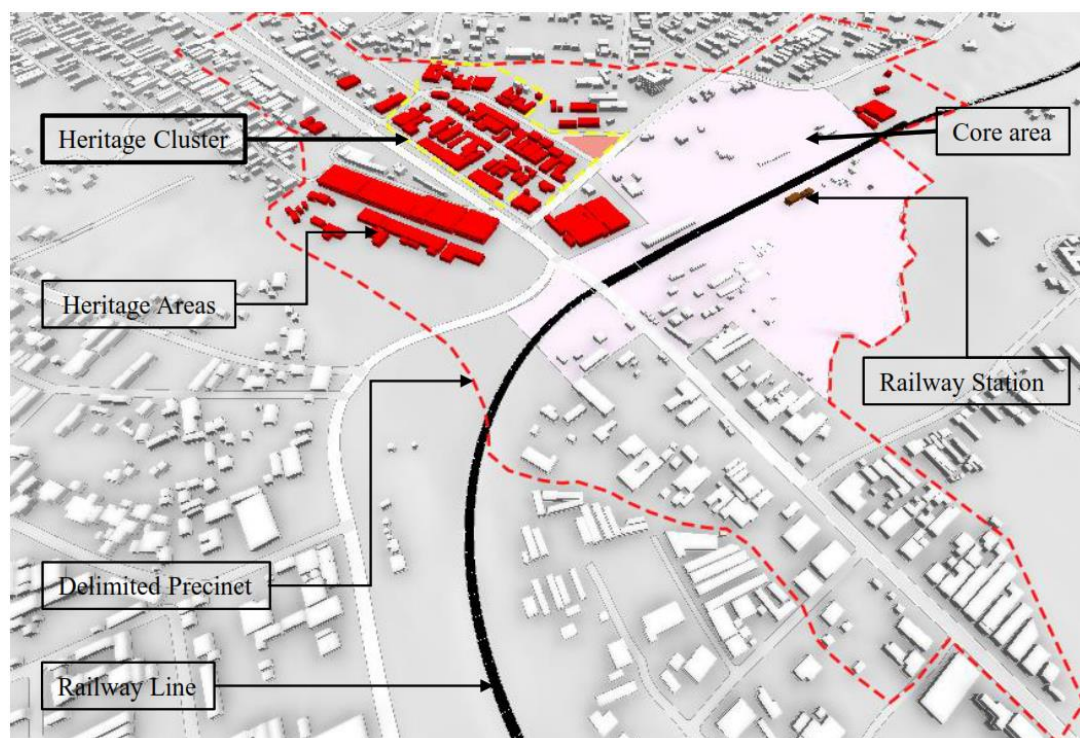


Figure 4.47: Heritage Cluster in Molo Town

The 2010 - 2013 longitudinal study in the historic city of Melaka, Malaysia, using value topography maps by Saida et al. (2016), showed a low heritage value footprint, which later increased after the implementation of a conservation management plan. Comparatively, the case in Limuru and Naivasha presented relatively low average heritage footprint coverage. This could have been the case due to the towns not having any conservation initiatives like those in Melaka. From the lesson presented for the City of Melaka, the three townscapes' redevelopment guided by a sound conservation management plan could lead to an increase in the heritage value footprint of areas.

The analysis of heritage footprints could therefore justify the need to carry out conservation and where to direct effort in the townscape. The identified heritage was part of the character of the townscape, where the railway station was the core in the precinct area, as conceptualised in Figure 4.48

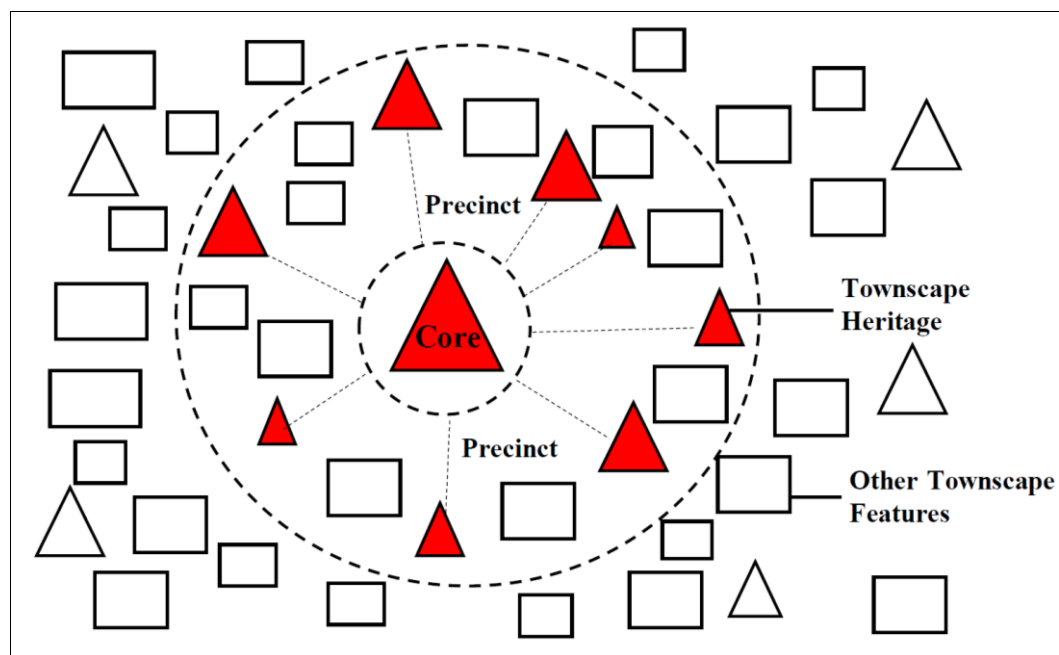


Figure 4.48: Relationship of Core and Townscape Heritage

4.5.1.4 Status of Heritage

The fourth research question was concerned with the status of heritage in towns along the Kenya Railway. The heritage inventory, physical status, conservation status and townscape status of the identified heritage. First, the townscape heritage inventory addresses the type of ownership, the status of accessibility, the status of usage level of occupancy, as well as the characteristics of the heritage footprint. Standalone buildings were the most predominant type of townscape heritage in the three towns, at 82%, while zoned precincts or clusters of buildings with heritage value were 18%. These two categories of the urban fabric constitute the built heritage. In their argument, Said et al. (2013) posit that urban heritage is a combination of buildings and streetscape. Further, Isa et al. (2018), in their categorisation of the type of cultural heritage, under

tangible immovable heritage, list historic buildings, monuments and archaeological sites. The three towns studied only present buildings as the type of townscape heritage. Notably, other types of townscape heritage, such as monuments, sites and open spaces, were not present. None of the streets was considered to have heritage significance.

The ownership of the townscape heritage was mainly either privately owned at 50% or owned by corporations at 43%. Publicly owned places were the least at 7%. Further, in all cases, all the heritage places were accessible. According to Muhor et al. (2016), most gazetted buildings were privately owned, bringing about the question of the responsibility of conservation, which in many instances is a costly endeavour, putting the buildings' notable qualities at risk of being lost. A great number of the townscape heritage maintained their original use at 86%, while those under adaptive reuse were 14%. In this regard suggests that continuity in usage is important for the sustainability of heritage places that were under the pressure of urban development. Economic incentives can be instituted by the authorities to encourage the protection and preservation of heritage by owners. Such incentives for conservation planning are discussed by Radzuan, Ahmad, Fukami, & Inho (2013). They include public subsidy schemes on conservation works, loans for conservation work, tax relief on conserved properties, and infrastructure improvement planning incentives.

On land use, commercial land use was predominant at 57%, followed by industrial at 21%, public purpose at 14%, educational at 4% and mixed-use at 4%. The predominant commercial land use meant that many urban users interacted with the identified heritage areas, therefore developing and sustaining a sense of connection. The level of occupation in places of heritage was high, where the fully occupied were 78.5%, while semi-occupied places were 18%, and unoccupied places represented 3.5%. The relatively high level of occupation, similar to adaptive reuse, was significant to the conservation of townscape heritage.

The characteristics of the heritage footprint for Limuru, Naivasha and Molo are as follows: The ground floor area for the townscape heritage averages 0.27 ha, 0.13 ha and 0.33 ha respectively; the length of the street fronting the heritage places averages 77 meters, 34 meters and 131meters respectively; the mean width of the street was 16

meters, 21 meters, 16 meters respectively. In a study of historic streetscape characterisation, Ismail et al. (2019) and Mehta (2013) underscore that streets and streetscape play the role of defining the character of urban areas because people use them for access and movement, and the most essential element that forms the history and civilisation of a place. The mean height of the townscape heritage for Limuru, Naivasha and Molo was 10 meters, 8 meters, and 7 meters, respectively. It therefore meant that the average size of identified heritage, together with wide and long streets, enabled the ease of appreciation at the town scale. The relatively short height meant that, due to the future development needs, there will be pressure from urban renewal and densification, and the townscape heritage was in danger of loss.

Second, the physical status addressed the type of damage observed, threats to heritage and effects of change. Decay and disintegration due to weather at 78.6% each and defacement at 39.3% were the three main types of damage observed in the order of magnitude across the towns, while vandalism occurrences were negligible. The two major threats to heritage identified were neglect at 32.1% and new development at 21.4%. Obsolescence and theft were not considered a threat. The main effect of change was deterioration as observed in 78.6% of cases, and a slight decline in usage and brownfields in 28.6% and 21.4% of cases, respectively, for the three towns. The Global Heritage Fund (2010) identified five primary threats to humanity's cultural heritage in developing countries to include: development pressures, unsustainable tourism, insufficient management, looting, war, and conflict. However, the studied townscape heritage only showed evidence of insufficient management and development pressure, and its conservation can be approached by historic planning policy action. This inference partly agrees with Phetsuriya & Heath (2021), who assert that a significant challenge to urban heritage in present-day society is the desire for urban growth and urban areas' densification. In addition, Oter (2022) reveals that despite the tremendous economic and socio-cultural benefits, not adequate attention and investment are accorded to global heritage, a situation that needs to be dealt with to enrich heritage communities.

Third, the study on conservation status looked at the conservation action taken on the identified townscape heritage. The conservation actions carried out the most were

retention of original use at 89.3%, regular maintenance at 67.9%, repair at 28.6 and adaptive reuse at 14.3% of the townscape heritage. Fourth, the townscape status of the identified heritage was observed through townscape characteristics in the form of physical elements such as signage positioning, visual access, pedestrian friendliness, street environmental condition and street planting Condition. These were rated between the range of very poor to fair, which was generally a below-average rating. On other townscape elements, street parking was available for 75.0% of the heritage areas. 92.3% of the heritage areas front a street, while 75.0% have street lights. In addition, 57% of the townscape heritage places were open with no fences. A comparison between the findings on conservation action and townscape status reveals that there was a mismatch between the conservation of individual buildings and the conservation of the townscape context, since there was effort in the former, while there was less effort in the latter. Both need to be addressed in the context of the historic urban landscape approach (HUL), where the notion is to move beyond the preservation of the physical environment and focus on the entire human environment with all of its tangible and intangible qualities (UNESCO, 2011a, 2016).

4.5.2 Objective Two: Heritage Values for Railway Townscapes

The research question that was addressed here was: What values do residents hold for heritage in towns along the Kenya Railway? Factor analysis of data from Limuru, Naivasha and Molo towns produced 13 components explaining 63.060% of the total variance that was originally obtained. Further, a parallel analysis narrowed down the factors to five components that explain 43.276% of the total variance. Heritage value terminologies are interpreted in diverse ways according to Ginzarly and Teller (2018). The examination of the clusters of factors under the five extracted components formed their thematic identification and interpretation.

The theme of the first component was appropriately identified as ‘cultural continuity’; eight factors that account for 25.445% of the total variance formed the basis of this component. This was the component with the highest significance. The desired cultural continuity was a result of the aesthetics, rarity, uniqueness and cultural significance of the heritage in the towns. The eight original factors are an emphasis on the townscape

heritage's importance to the towns' residents. Places of cultural significance are important in enriching people's lives by providing a deep inspirational sense of connection to community and place, to the past, and lived experiences (ICOMOS Australia, 2013).

The second component put forward the 'functional-economic' theme. The extracted component, made up of seven factors, represented 6.920% of the total variance. It represented the second-highest significance. It explained by the fact that the desire for heritage conservation is encompassed in the functions and economic benefits that are drawn from the significant places. As Al-Saffa (2018) points out, conserving historic centres is significant in protecting cities' identity and character, contributing to their economic development and demonstrating interdependencies of heritage values.

'Identity' was the thematic interpretation of the third component, represented by a cluster of four factors that accounts for 4.145% of the total variance. This theme refers to the origin of the towns, which was directly related to the establishment of the railway station and the desire to have the current continuously linked to the past origins. Del et al. (2020) support the notion that conserved architectural heritage promotes the identity of the community, and a society with great identity cares about its cultural values and strives to preserve them. Shehata (2022) asserts that urban heritage reflects the local community's identity, memories, and authenticity, easily connected to the concept of the spirit of place. In contrast, the demolition of historic buildings weakens the identity of the society, in the long run, so that a society without identity does not care about its cultural values.

The fourth component extracted, themed as 'placeness', made up of four factors to represent 3.586% of the total variance of the factor analysis. Its interpretation considered the view that the familiarity and memory of the townscape heritage to people bring forth a sense of ownership and attachment to place. The conception of 'placeness' was evoked by the idea of the sense of place or *genius loci* where it was desirous of people to orient themselves in the space that they are in and to identify themselves with the environment (Cullen, 2013; Day, 2012; Nasser, 2003; Norberg-Schulz, 1979; Timothy & Boyd, 2003).

The fifth component extracted, ‘historicity’, made up of five factors, accounted for 3.180% of the total variance and had the historicity theme. From the original factors, it can be expressed with the idea that the continued existence of the townscape heritage supports different needs in the towns, and they are also pleasant and significant places laden with historic information. Historicity is one of the outstanding attributes of historic townscapes, together with uniqueness, significance, and testimony (Landscape Institute, 2017). Therefore, people are drawn to the historicity of a place with the curiosity of the past messages and therefore form a sense of connection.

In addition, it was notable that, apart from the five components produced by the factor solution, three other components could be picked from the pattern matrix. The three components were identified as rarity, evidence and memory. They accounted for 2.93%, 2.84%, and 2.65% of variance, respectively. In the justification of the consideration of the other three factors apart from the first five identified, ICOMOS Australia (2013) asserts that the conservation of a place should identify and consider all aspects of significance as opposed to emphasising any one value at the expense of others. Rarity as a theme was the sixth component created by the heritage values statements, pointing to the uniqueness of the urban spaces. Evidence was the seventh component, whose four statements point to evidence that can be seen in the townscape heritage. The eighth component represented a theme related to memory and the desire to have it preserved.

The five extracted heritage values, together with the additional three in the research findings, fit within the three overall themes that emerged from the review of literature, including social-cultural, economic, and environmental values as illustrated in Figure 4.49. The three general thematic categorisations are a product of the identification and classification of heritage values done over time by various authors (Abbaszadeh et al., 2016; Feilden, 2007; Ginzarly & Teller, 2018; ICOMOS Australia, 2013; Judson & Iyer-Raniga, 2010; Mason, 2002; Olukoya, 2021; Vancouver Heritage Foundation, 2016; Zacharopoulou, 2015). Five out of eight extracted values of cultural continuity, identity, historicity, rarity, and memory are seen to fit within the social-cultural values category, making it the major category. Second, functional-economic as an extracted

value fits within the economic group of values. Third, the extracted values of placeness and evidence fit within the environmental values category.

Further, in a recap from 4.2.2, the expressed heritage values when identifying the townscape heritage in order of importance are economic, age, historic, function and identity. There was a strong similarity between the expressed values obtained during townscape heritage identification and the extracted values from factor analysis. It therefore gives further credibility to the obtained heritage values. The expressed heritage values broadly fit within the economic values and social-cultural values categories. The economic values category encompasses economic-function, while the social-cultural values category bears age, historic, and identity, while there was no representation under the environmental category. It is apparent that heritage values are interdependent; for example, economic-functional value can be a product of cultural continuity, historicity and identity, while the latter three rely on economic-functional value for their sustainability.

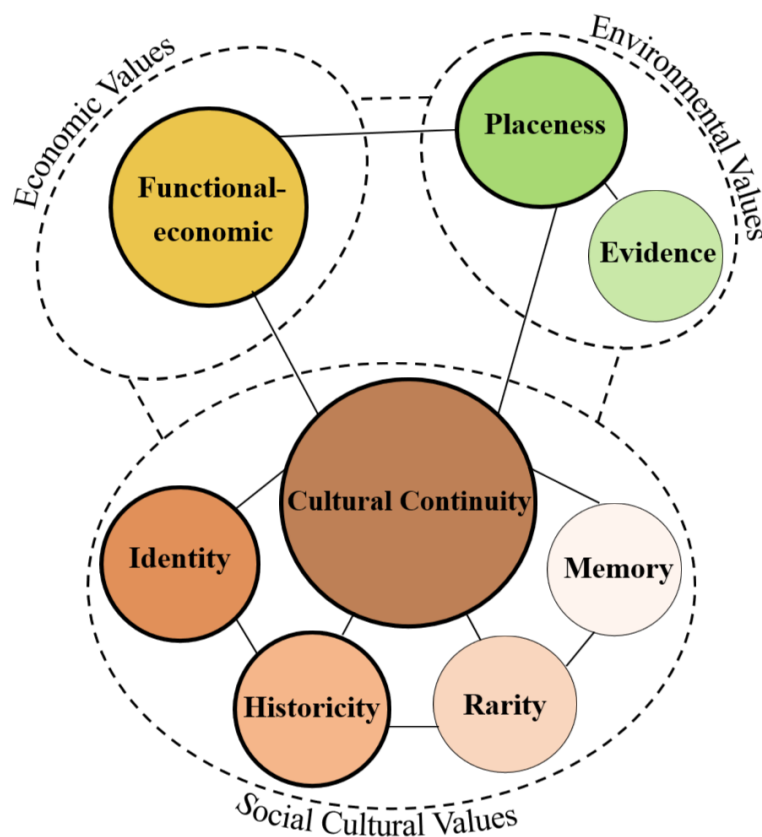


Figure 4.49: Categorisation of Townscape Heritage Values

4.5.3 Objective Three: Townscape Heritage Conservation Needs

The research question that was aimed at was concerned with the conservation needs of heritage in towns along the Kenya Railway. The conservation needs were looked at in the three sampled towns of Limuru, Naivasha and Molo. The main townscape conservation needs in Limuru included the level of cleanliness, condition of walkways, capacity to provide employment, level of tourism, level of railway functions and state of the heritage. In Naivasha, the main townscape conservation needs were: the capacity to provide employment, the level of railway functions, the state of the heritage, and knowledge of heritage. In the third town, Molo, the key townscape conservation needs included: the condition of lighting; the condition of walkways, the condition of roads and parking, the capacity to provide employment; the level of tourism; the state of the heritage and knowledge of heritage. Overall, Naivasha town was rated fairer of the three on conservation needs, while Limuru was rated the worst. In addition, the townscape status of the identified heritage, including signage, visual access, pedestrian friendliness, street environmental condition and street planting, was rated between the range of very poor to fair, a below average rating.

The five main crosscutting needs for the three towns included the condition of walkways, capacity to provide employment, level of tourism, level of railway functions, state of heritage and knowledge of heritage. Yet, the towns possess valuable townscape heritage that requires conservation attention. As acknowledged by Leun (2013) and Slack (2020), historic planning is concerned with planning for places with historic merit, worthy of conservation, but present sustainability challenges. Contrarily, Trill et al. (2020) believe that heritage assets such as historic urban patterns and features are not adequately acknowledged and protected, as is the case with the three studied towns. Conservation actions related to making the townscape good should be done ‘regularly’ as suggested by residents of the towns. In addition, building new townscape elements to address emerging needs should be embraced. The focus should be on ‘heritage’, ‘drainage’, ‘architecture’, ‘roads’, ‘lighting’, ‘structures’, ‘infrastructure’, ‘parking’, ‘water’, ‘spaces’, and ‘houses’. Most importantly, conserved townscape heritage must meet and support the social and economic factors as expected by the concerned communities of the towns.

The historic urban landscape (HUL) approach advocates that historic context and new development can interact to integrate the objectives of urban heritage conservation and those of social and economic development (UNESCO, 2016). The holistic approach can well contribute to the achievement of social, economic and environmentally sustainable development objectives (Historic England, 2023). The HUL approach has had positive and significant results in urban conservation practice in the Netherlands and South Africa through the Belvedere Memorandum and programme and the integration of built heritage resources in urban development through spatial planning, respectively (Janssen et al., 2014; Puren & Jordaan, 2014). The benefits from the two examples where the heritage sector is linked with other spatial needs included interest conservation in the history of buildings, neighbourhoods and landscapes; and the integration of urban heritage resources into the contemporary uses and future development to ensure their continued existence. The HUL is thus an approach that can be adopted locally to advance urban conservation while ensuring social, economic and environmental sustainability.

CHAPTER FIVE

PLANNING FRAMEWORK FOR HISTORIC TOWNSCAPES ALONG THE KENYA RAILWAY

5.1 Introduction

The framework for historic planning of railway townscapes is intended to guide the identification of heritage, justification for conservation, as well as conservation planning. Its formulation is the fourth objective of the study and is based on the review of existing literature, applied methodology, the findings and the practical implications for this research. Frameworks organise diagnostic, descriptive, and prescriptive inquiry, providing the basic vocabulary of concepts and terms to construct the causal to provide identity and guide effort (Partelow, 2023).

The proposed Planning Framework for Historic Townscapes along the Kenya railway is action-oriented. Cumming (2014) asserts that action-oriented frameworks recommend a specific course of action by an established set of actors in response to a specific type of problem of concern. They focus on the implementation of solutions and not on the establishment of the causes of problems.

The six research questions serve as to guide the suggested framework, which aims to efficiently solve the research problem and harmonise the different areas that were being examined. The research questions highlight the issues that need to be harmonised in the historic planning of townscapes along the Kenya railway. The six issues were: the figure-ground characteristics of railway precincts; the townscape heritage; the heritage footprint; the status of heritage; the attitudes of residents on heritage; and the challenges associated with conservation.

In the development of this framework, some lessons were learnt from local and international cases. Locally, there exist historic planning frameworks such as Planning Lamu: Conservation in an East African Sea Port (Siravo & Pulver, 1986). Though viewed as progressive, it did not address the financial implications of its implementation (Young, 1986). Additionally, it brought forth the significance of values but did not identify them based on the communities' attitudes. Therefore, the

proposed planning framework addresses this through actions guided by the meanings held by the community.

5.2 Components of the Proposed Framework

Heritage survey and the implications of the findings were the basis of the framework components. Heritage survey was based on an information and data gathering approach that was done through townscape and heritage analysis, and heritage value analysis. A visual survey of the conservation area is important in the understanding of the townscape character and elements that are desirable to preserve. The state of conservation in which the townscape heritage is currently, and the historic, economic, social and cultural impact on its context, needs to be understood through diagnostic analysis.

In addition, the assessment of the cultural significance of a place is achieved by analysing evidence gathered through the physical investigation of the place, research, and consultation. People of a given urban locality contribute to the definition of character, in their perceptions or attitudes and identify what they like and dislike about the character of a place. Therefore, the survey of the character of an area is significant in providing a historic townscape characterisation as perceived by people. In summary, an urban heritage survey is achievable through townscape and heritage analysis, and the assessment of heritage values. Heritage Survey and its practical implications gave rise to four components for the proposed framework: townscape characteristics, heritage values, townscape conservation needs and sustainable historic planning, as shown in the conceptual structure shown in Figure 5.1. The four components are discussed below.

5.2.1 Townscape Characteristics

The survey in this part would undertake townscape analysis, identifying townscape heritage, measuring heritage footprint, establishing the status of heritage and determining conservation needs. Streets, squares, trees, boundaries, hedges, gardens, the feeling of enclosure, traffic volumes, people in the townscape, buildings and the spaces between them, and the buildings' historical background all contribute to the

townscape's character (Walsh, 2012). All these must be enhanced in the conservation planning of townscapes. Further, out of the listed townscape elements, the street is the most important element since it is the network that connects the others (Mehta, 2013).

5.2.2 Heritage Values

Heritage value analysis would be concerned with why each identified townscape heritage was significant enough to warrant its conservation. The survey process here was concerned with obtaining heritage values directly attributable to the established townscape heritage inventory and also extracting heritage values from an attitudinal survey. The intended output was a set of heritage values representing the significance of townscape heritage to people. It is also expected that the public is involved in providing opinions on the values held for places perceived as significant.

5.2.3 Townscape Conservation Needs

Conservation actions should respond to the identified conservation needs in the context of the urban area scale, and while focusing on the identified townscape heritage, promote the associated heritage values. Second, conservation actions can then be used to make a conservation plan specific to the whole historic planning area. Conservation planning presents an opportunity to address the specific needs at the townscape scale. It is expected that the planning takes the historic urban landscape approach where the historic fabric and new development harmonise through the integration of the objectives of urban heritage conservation and those of environmental, social-cultural and economic development. The public should be engaged in both the planning and plan validation processes.

5.2.4 Sustainable Historic Planning of Heritage Townscapes

The fourth component is sustainable historic planning, which is a process of decision-making to address the established townscape status under the heritage survey. This study being grounded in the realm of historic planning, seeks to address the sustainability of heritage conservation in urban settings by guiding urban development decisions affecting significant places.

The historic planning framework seeks to deal with planning for places with historic merit, worthy of conservation, but faces social, economic and environmental sustainability challenges. There is therefore the need to integrate urban heritage conservation strategies with sustainable development goals. This integration is aimed at the preservation and enhancement of the human environment.

In Kenya, the counties are the planning agencies for their respective jurisdictions as mandated by the County Government Act in Article 104. (2) The county governments are obligated to plan through a county planning framework that shall integrate economic, physical, social, environmental and spatial planning. It is an action-oriented component that seeks to actualise conservation planning objectives through public investment or control over private investment.

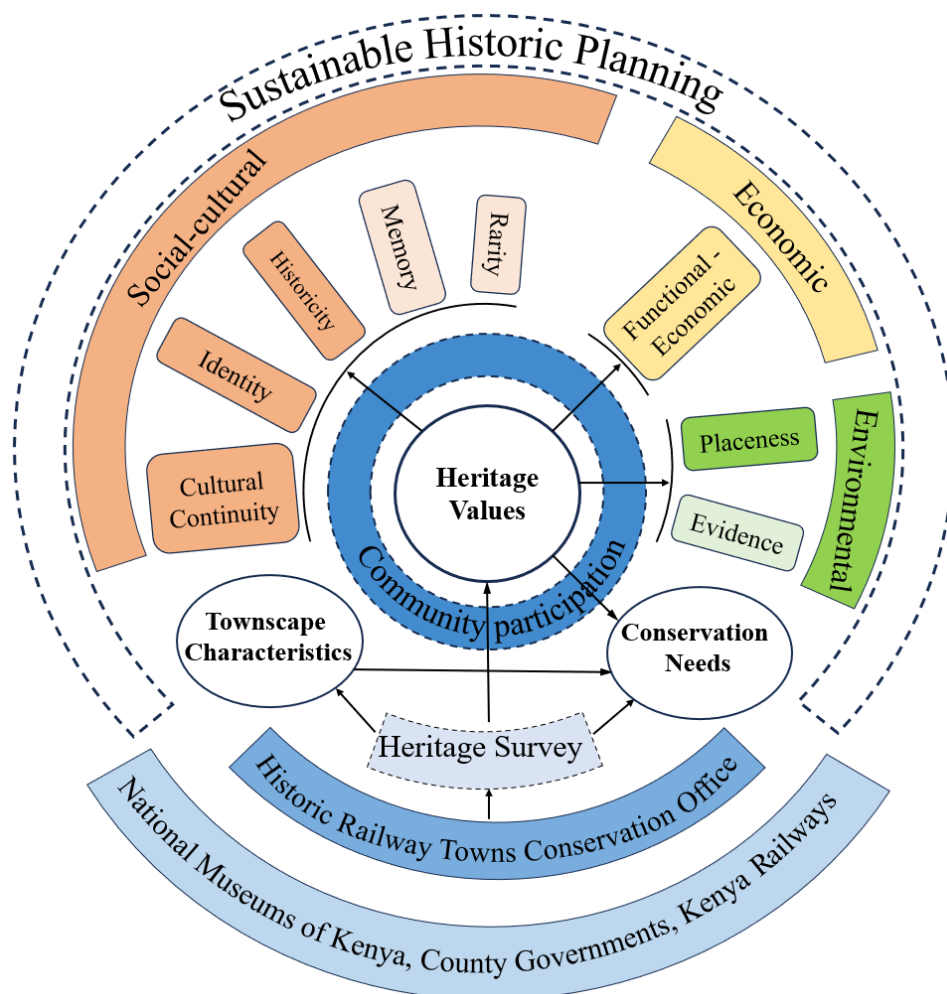


Figure 5.1: Structure for Planning of Historic Townscapes

5.3 Framework Formulation

As previously discussed, the structure of the framework is divided into four components: Townscape characteristics, heritage values, conservation needs, and sustainable historic planning. The nature of the framework is a bottom-up approach to historic planning, and where the concerned community is at the centre. In addition, there is the application of planning, conservation and governance laws and public involvement at all stages. The relevant laws in this case are the National Museums and Heritage Act, Cap. 216, 2012; County Governments Act No. 17, 2012; and Physical and Land Use Planning Act, 2019. The historic planning process would ideally begin with a heritage survey that involves the first three of the framework components. The ultimate component is the goal of the framework, where all proposed actions answer to the sustainability of the historic planning.

5.3.1 Actors in the Historic Planning Process

The actors in the framework are the National Museums of Kenya (NMK), county governments, Kenya Railways, the Historic Railway Towns Conservation Office, property owners and the public. The concerned county governments are expected to take the lead in historic planning of the towns under their jurisdiction as mandated by the County Governments Act No. 17 (2012). For example, Limuru town is under Kiambu county, while Naivasha and Molo towns are under Nakuru county. The National Museums of Kenya and the Kenya Railway are key institutional stakeholders in partnering with county governments for the historic planning initiative.

At the bottom of the framework are the county governments, whose role is primarily to initiate and facilitate the historic planning process, and coordinate the involvement of stakeholders, including the public. It is expected that the initiation of the process involves engaging the proposed historic railway towns conservation office, which should be an expert-led historic planning intermediary institution. The proposed Historic Railway Towns Conservation Office would have the role to coordinate the NMK, county governments and Kenya Railways. Other key roles are supervising the conservation process and action in the form of heritage survey and historic planning,

as well as considering applications for any form of alterations or development in the historic planning area.

Heritage survey is concerned with examining the townscape character, determining heritage values, and determining conservation needs. On the other hand, historic planning is responsible for responding to the needs associated with townscape heritage conservation. At the centre of the framework are the concerned communities to provide meanings, their priorities and aspirations for the historic townscapes. A value-based approach advocates for community participation in conservation programmes since it is asserted to facilitate a more democratic and comprehensive approach to heritage management.

5.3.2 Enhancement of the Quality of Townscape Characteristics

Townscape characteristics examined under heritage survey are concerned with the patterns of the urban context, the heritage that is subject to conservation, its footprint, and its status. The expected output from the analysis of townscape characteristics is a detailed heritage inventory. For townscape characteristics, the proposed actions based on the findings of the research are, establish up to date heritage inventory; create network of connected heritage areas; carryout periodic heritage surveys to increase townscape heritage footprints, provide incentives to heritage conservation; plan and design of public spaces to complement townscape heritage and harmonise the character of new development with heritage. These recommended actions generally take the direction of the Historic Urban Landscape approach, where the focus is to integrate urban heritage conservation strategies to support actions aimed at preserving and enhancing the quality of the human environment.

5.3.3 Conscious Response to Heritage Values

To determine the underlying values that people hold for their heritage, exploratory factor analysis for their attitudinal evaluation should be carried out. The heritage values need to be exhaustive. Consequently, heritage values are at the core of the proposed framework since they are the basis of the value-based conservation. The aim is to retain or improve the collective meaning heritage has for a particular community.

Values are categorised into social-cultural values, economic, and environmental. Decisions to conserve a heritage are based on the collective perception of an asset's significance or value. The proposed actions in response to the determined underlying values that retain and improve the meaning of heritage to the concerned communities are outlined in Table 5.1.

Table 5.1: Heritage Value Conservation Actions

Category	Heritage Value	Ref.	Proposed Conservation Actions	Detailed Action
Social-Cultural	Cultural Continuity	i.	Sustain original functions of heritage places:	By modernising and updating service needs such as power, water, and parking.
		ii.	Continued conservation of heritage:	By use of property-specific conservation plans.
		iii.	Create awareness of heritage:	Educating the communities through programmes, media and digital platforms.
		iv.	Continuous conservation research:	Providing research grants and collaboration with universities and research organisations.
	Identity	i.	Make heritage places accessible:	By opening to the public and using signage
		ii.	Maintain connection to railway stations:	Through integrated transport planning and strengthening non-motorised transport routes linking to the railway stations
		iii.	Conserve architectural heritage:	By appropriate conservation practices such as repair, rehabilitation and restoration.
		iv.	Prevent demolition of heritage:	Gazettement and legal protection of heritage places.
		v.	Harmony of new development with heritage:	Through developing and applying conservation development control.
	Historicity	i.	Document tangible and intangible heritage:	Heritage surveys and using print and digital archives.
		ii.	Sensitise the communities on heritage significance:	Through workshops and public forums.
		iii.	Maintain the authenticity of heritage:	Using experts to apply conservation principles such as the Venice Charter and Nara Document on Authenticity, to establish the truthfulness of heritage.
	Memory	i.	Establish associated museums at the county level:	Allocate space, equip and manage facilities to accommodate movable heritage.
		ii.	Transmit heritage information to future generations:	Through images and literature in print and digital media.
	Rarity	i.	Accentuate unique heritage:	Through space branding and urban design.
		ii.	Keep inventories of unique heritage:	Through surveys and keeping print and digital inventories.
		iii.	Gazettement of heritage as national monuments:	Apply to list specific heritage for conservation.

Category	Heritage Value	Ref.	Proposed Conservation Actions	Detailed Action
Economic	Functional –Economic	i.	Provide incentives for adaptive reuse:	Giving tax breaks, grants, relaxed building codes and technical assistance.
		ii.	Development and promotion of townscape tourism:	Local capacity building and developing townscape heritage as a tourist product.
		iii.	Improvement of infrastructure that supports business and entrepreneurship:	Invest in enhancing infrastructure to support the performance of heritage places, such as parking.
		iv.	Encourage local industries:	Provide incentives to improve existing industries and establish new ones for improved economic activity.
		v.	Advocate for the continuity of railway services:	By lobbying for the government to invest in the Kenya railway transport infrastructure to boost the level of activities
		vi.	Update old heritage to modern uses:	Updating service needs such as power, water, parking and internet.
Environmental	Placeness	i.	Accentuate landmarks:	Enhance visibility and improve context through urban design strategies such as providing vistas.
		ii.	Enhance the quality of the heritage context:	Through making people-friendly urban spaces
		iii.	Increase public spaces:	Through the acquisition of space for pedestrian streets, urban parks, and squares.
		iv.	Enhance and maintain the natural environment:	Through tree planting programs, environmental clean-up plans, and the prevention of air pollution.
	Evidence	i.	Document tangible heritage:	Through heritage surveys and digital and print archiving.
		ii.	Maintain the integrity of heritage:	Prevent any form of further physical deterioration of heritage through sound, continuous maintenance actions.
		iii.	Collect and keep vulnerable historic heritage elements in museums:	Salvage and display in museums historic and significant items that are in danger of getting lost or destroyed.

5.3.4 Addressing Conservation Needs

After the determination of heritage values, it is critical to deal with the environmental and social context in the form of conservation needs. The conservation needs for assessment include, condition of the physical environment, level of accessibility, economic capacity and social and cultural status. The needs relate to people and their historic environment. Based on a conservation needs assessment to understand the state of heritage in the townscape context, appropriate actions are proposed.

In light of the research's findings, the proposed courses of action responding to conservation needs in the framework are: periodic townscape quality assessments;

enhancement and maintenance of townscape infrastructure such as walkways, drainage and landscaping; continuous cleanup of public spaces; and support local business and entrepreneurship associated with heritage. These actions are expected to be undertaken by the county governments in their urban planning and conservation programmes. Sustainable planning, therefore, must address these needs and harmonise response actions with heritage values identified.

5.3.5 Pursuit of Sustainable Historic Townscapes

On sustainable historic planning at the top end of the framework, the resulting conservation plan should be made to respond to the social-cultural, economic and environmental conservation needs. Sustainable historic planning would rely on the harmonised actions in the three components that consist of townscape characteristics, heritage values and conservation needs. The proposed conservation actions are interdependent, and some are overlapping. The conservation plans must address the aspirations of people expressed as heritage values. The vision is to achieve sustainable outcomes based on the threefold heritage value categories. Public participation in planning would be aimed at forging partnerships with concerned communities in townscape conservation. All actors that include the County governments, National Museums of Kenya, Railways, property owners and the public, guided by the Conservation office, must endeavour to contribute to sustainable historic planning actions. Periodic reviews are required to address social, cultural, economic and environmental demands that occur with change in time.

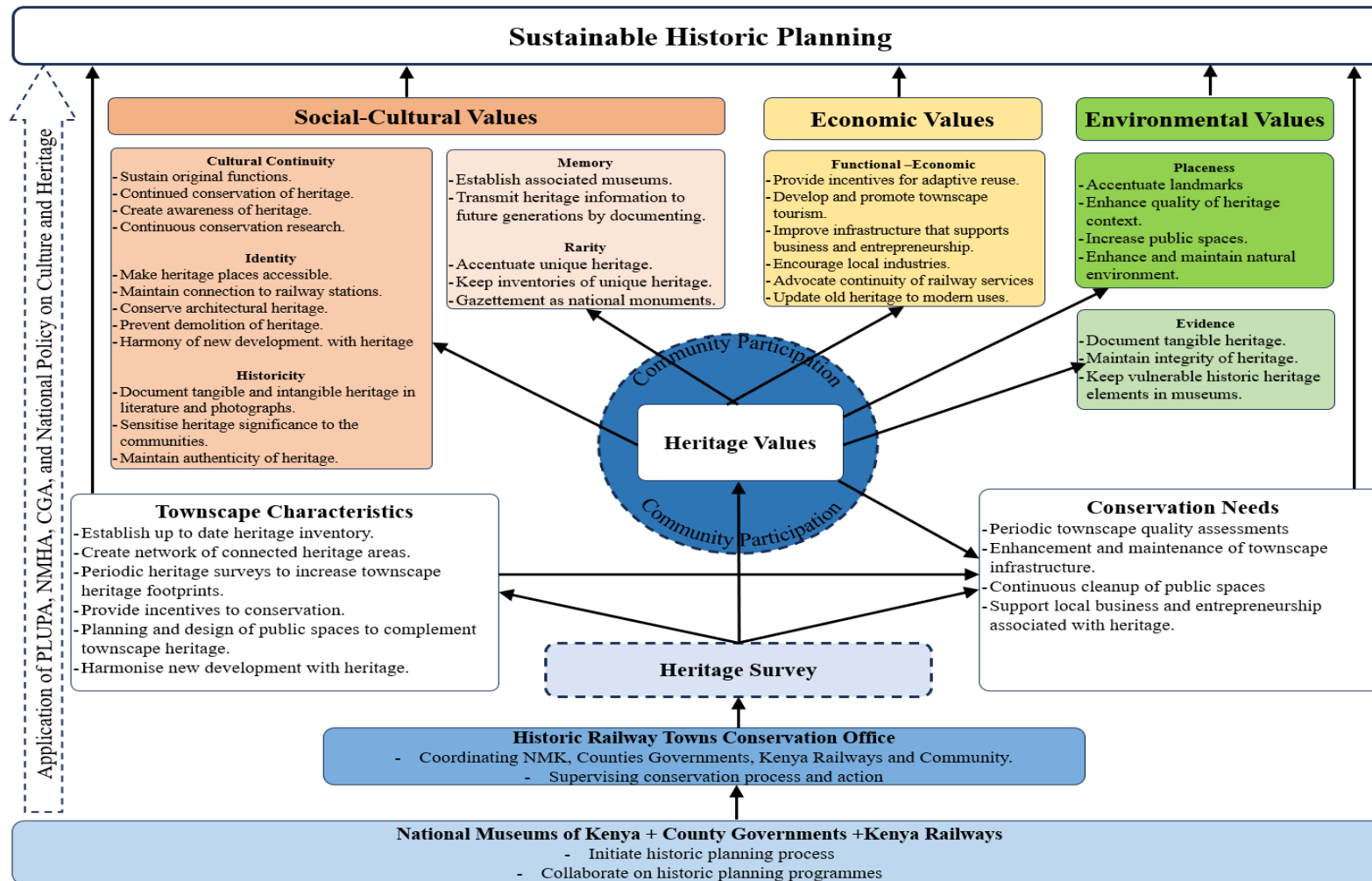


Figure 5.2: Planning Framework for Historic Townscapes along the Kenya Railway

5.4 Principles of the Framework

The proposed framework for historic planning of towns along the Kenya railway assumes several principles outlined below.

- i. The basis of the framework is a comprehensive heritage survey of the townscape, heritage and its values as well as conservation needs.
- ii. The conservation planning process must be people-centred and value-based, while the experts' role is to provide guidance.
- iii. All actors must be involved as provided in the Physical and land use planning and heritage conservation laws in Kenya.
- iv. Physical and land use planning must take into consideration the culture and heritage of the people concerned.
- v. Full involvement of the concerned communities where conservation planning is being done in a democratic approach.
- vi. Conservation planning must respond to the needs beyond the heritage object.
- vii. The framework is to conform to the cyclic nature of the planning process and to always seek to respond to change.
- viii. Encourage the continuity in the usage of heritage areas as the best practice in conservation.

5.5 Conservation Management Plan

The conservation management plan for the Planning Framework presented in Table 5.2 outlines the proposed actions, projects the anticipated timeframe, identifies the actors and points out the desirable outcomes whose success is measurable. Timeframes point to when an action is implemented and completed, where short-term is one to three years, mid-term four to 5 years, and long-term, more than five years continuously. Values and corresponding actions can vary in time and place, and should be substituted as would be relevant.

Table 5.2: Conservation Management Plan

Category	Heritage Value	Ref.	Proposed Conservation Actions	Timeframe	Actors	Desirable Outcome/ Measurement
Social-Cultural	Cultural Continuity	i.	Sustain original functions of heritage places: by modernising and updating service needs such as power, water, and parking.	Short-term	Kenya Railways Property Owners	An increased number of heritage places that maintain their original functions.
		ii.	Continued conservation of heritage: by use of property-specific conservation plans.	Long-term	Kenya Railways Property Owners	An increased number of heritage places with implemented conservation plans.
		iii.	Create awareness of heritage: educating the communities through programmes, media and digital platforms.	Mid-term	Historic Railway Towns Conservation Office The public	An increased number of people who are aware of their townscape heritage.
		iv.	Continuous conservation research: providing research grants and collaboration with universities and research organisations.	Long-term	Historic Railway Towns Conservation Office National Museums of Kenya	Increased number of research on townscape heritage
	Identity	i.	Make heritage places accessible: by opening them to the public and using signage.	Short-term	Kenya Railways Property Owners	An increased number of heritage places accessible to the public.
		ii.	Maintain connection to railway stations: through integrated transport planning and strengthening non-motorised transport routes linking to the railway stations.	Long-term	Kenya Railways County governments	Improved level of connectedness between the railway stations and their associated urban zones
		iii.	Conserve architectural heritage: by appropriate conservation practices such as repair, rehabilitation and restoration.	Mid-term	County governments Property Owners	An increased number of heritage places are conserved for their architectural properties by experts.
		iv.	Prevent demolition of heritage: gazettement and legal protection of heritage places.	Short-term	Historic Railway Towns Conservation Office The public	Number of townscape heritage protected from demolition.
	Historicity	v.	Harmony of new development with heritage: through developing and applying conservation development control.	Mid-term	County governments Property Owners	Increased number of developments whose development adheres to relevant aspects of conservation development control
		i.	Document tangible and intangible heritage: heritage surveys and using print and digital archives.	Mid-term	Historic Railway Towns Conservation Office National Museums of Kenya Kenya Railways	An increased number of heritage places and intangible aspects surveyed and documented.
		ii.	Sensitise the communities on heritage significance: through workshops and public forums.	Short-term	Historic Railway Towns Conservation Office National Museums of Kenya County governments The public	Increased number of people who are sensitised on the heritage significance of their townscape heritage.

Category	Heritage Value	Ref.	Proposed Conservation Actions	Timeframe	Actors	Desirable Outcome/ Measurement		
Economic	Memory	iii.	Maintain the authenticity of heritage: Using experts to apply conservation principles to establish the truthfulness of heritage. (e.g. Nara Document on Authenticity)	Long-term	Historic Railway Conservation Office	Towns	An increased number of heritage places that are investigated and recorded in the inventories as bearing authenticity.	
		i.	Establish associated museums at the county level: allocate space, equip and manage facilities to accommodate movable heritage.	Long-term	National Museums of Kenya	County governments	Increased and localised number of museums for movable heritage and archiving.	
		ii.	Transmit heritage information to future generations: through images and literature in print and digital media.	Long-term	Historic Railway Conservation Office	Towns	An increased number of heritage places whose information is available and accessible in print and digital media.	
	Rarity	i.	Accentuate unique heritage: through space branding and urban design.	Mid-term	County governments	Historic Railway Conservation Office	Towns	An increased number of heritage places that are accentuated through urban design.
		ii.	Keep inventories of unique heritage: through surveys and keeping print and digital inventories.	Long-term	Historic Railway Conservation Office	Kenya Railways	Towns	Enhanced inventory of unique heritage available and accessible in print and digital media.
		iii.	Gazettement of heritage as national monuments: list identified townscape heritage for conservation.	Mid-term	County governments	National Museums of Kenya	Historic Railway Conservation Office	Towns
	Functional –Economic	i.	Provide incentives for adaptive reuse: giving tax breaks, grants, relaxed building codes and technical assistance.	Short-term	County governments			An increased number of heritage conserved through adaptive reuse, benefiting from tax breaks, grants, relaxed building codes and technical assistance.
		ii.	Development and promotion of townscape tourism: local capacity building and developing townscape heritage as a tourist product.	Short-term	Historic Railway Conservation Office	County governments	Towns	An increased number of capacity-building programs targeting the local communities to tap into the townscape tourism potential.
		iii.	Improvement of infrastructure that supports business and entrepreneurship: invest in enhancing infrastructure to support the performance of heritage places, such as parking.	Short-term	County governments			An increased number of infrastructure improvement projects aimed at enhancing business and entrepreneurship around townscape heritage.
		iv.	Encourage local industries: provide incentives to improve existing industries and establish new ones for improved economic activity.	Short-term	County governments			An increased number of local industries set up within the towns, and the number of people employed in such industries.

Category	Heritage Value	Ref.	Proposed Conservation Actions	Timeframe	Actors	Desirable Outcome/ Measurement
Environmental		v.	Advocate for the continuity of railway services: by lobbying for the government to invest in the Kenya railway transport infrastructure to boost the level of activities.	Mid-term	Historic Railway Conservation Office Kenya Railways	Towns An increased number of users of railway transport services.
		vi.	Update old heritage to modern uses: updating service needs such as power, water, parking and internet.	Mid-term	Kenya Railways Property Owners	An increased number of modernised heritage areas with up-to-date services.
	Placeness	i.	Accentuate landmarks: enhance visibility and improve context through urban design strategies such as providing vistas.	Mid-term	County governments	An increased number of identified landmarks and accentuated through urban design.
		ii.	Enhance the quality of the heritage context by making people-friendly urban spaces.	Short-term	County governments	Increased number of designed and improved urban public spaces for enhanced user experience.
		iii.	Increase public spaces: through the acquisition of space for pedestrian streets, urban parks, and squares.	Long-term	County governments	Increased number of public spaces acquired for pedestrian streets, urban parks and squares.
		iv.	Enhance and maintain the natural environment: through tree planting programs, environmental clean-up plans, and the prevention of air pollution.	Short-term	County governments	Increased areas in the urban space with enhanced, appropriately maintained and clean natural environment.
	Evidence	i.	Document tangible heritage: through heritage surveys and digital and print archiving.	Short-term	Historic Railway Conservation Office National Museums of Kenya	Towns Increased number of heritage whose information is surveyed and archived digitally and in print.
		ii.	Maintain the integrity of heritage: prevent any form of further physical deterioration of heritage through sound, continuous maintenance actions.	Long-term	Historic Railway Conservation Office Kenya Railways Property Owners	Towns An increased number of heritage that are continuously maintained and protected from further physical deterioration.
		iii.	Collect and keep vulnerable historic heritage elements in museums: salvage and display in museums historic and significant items that are in danger of getting lost or destroyed.	Short-term	National Museums of Kenya Historic Railway Conservation Office	Towns An increased number of salvaged vulnerable historic heritage elements that are displayed in museums

CHAPTER SIX

CONCLUSIONS AND RECOMMENDATIONS

6.1 Introduction

This chapter presents final inferences whose basis is the information and data presented, analysed and discussed in the previous chapters. The significance and implications of the study on conservation and planning theory, methodology and practice are discussed. Recommendations for sustainable historic planning are also presented. Finally, areas for further study are outlined.

6.2 Summary

The summary of findings is given hereunder based on the four objectives and associated research questions that guided this study.

Objective One: To examine the characteristics of selected heritage townscapes along the Kenya Railway.

Research Question (a): What are the figure-ground characteristics of railway precincts of towns along the Kenya Railway?

There was evidence that the growth of towns was influenced by railway stations and caused the establishment of places that were regarded as having heritage significance within the precincts. Even though there was a relationship between the railway stations and the immediate urban fabric, the link was weak due to the decline in Kenya Railways operations. The delimited precinct areas were sufficiently served by a hierarchy of paths and a network of nodal spaces for public activities. The patterns of solids and voids of the three towns were either grid or linear, with a few instances of organic.

Research Question (b): What constitutes the heritage in towns along the Kenya Railway?

A combined inventory of 28 townscape heritage areas, nine for Limuru, nine for Naivasha and ten for Molo was identified by a survey. The values cited directly during the identification of significant places of heritage in order of importance were economic, age, historic, function and identity.

Research Question (c): What is the heritage footprint of towns along the Kenya Railway?

Further, for Limuru, Naivasha, and Molo, evidence was that the precincts have a considerable heritage footprint of 10.3%, 8.4% and 19.4% respectively. Buildings were the most predominant type of townscape heritage in the three towns.

Research Question (d): What is the status of heritage in towns along the Kenya Railway?

The ownership of the townscape heritage was either private at 50% or owned by corporations at 43%. Publicly owned places were the least at 7%, while in all cases, heritage places were accessible. The townscape heritage was either under original use at 86% or adaptive reuse at 14%. The predominant land use was commercial at 57%, followed by industrial at 21%, and public purpose at 14%. The two main threats to the conservation of townscape heritage were neglect at 32.1% and pressure from development at 21.4%. Four main conservation actions were being carried out were retention of original use, regular maintenance, repair, and adaptive reuse.

Objective Two: To identify the heritage values in selected towns along the Kenya Railway.

Research Question: What are the opinions of residents on heritage in towns along the Kenya Railway?

In the analysis of attitudes towards townscape heritage, five extracted heritage values that explain 43.276% of the total variance emerged. Identified in order of significance, they included: cultural continuity, functional-economic, historicity, placeness and identity. Three additional values that included rarity, evidence, and memory were considered and identified to provide the completeness of meanings. All eight identified

heritage values fit within the three overall themes of social culture, economics and environment. The main heritage value category based on the strength of individual components was the social-cultural, the second was the economic value, and the third was the environmental value. A strong similarity between the expressed values obtained during townscape heritage identification and the extracted values from factor analysis was evident. Accordingly, this evidence gives further credibility to the five heritage values obtained. In addition, the extracted heritage values are interdependent, where one is a product of the other.

Objective Three: To determine the conservation needs in selected towns along the Kenya Railway.

Research Question: What are the challenges associated with conservation in towns along the Kenya Railway?

The main five townscape conservation needs for Limuru, Naivasha and Molo towns included 1. condition of walkways; 2. capacity to provide employment; 3. level of tourism; 4. level of railway functions; and 5. state of heritage and knowledge of heritage. Of the three towns, Naivasha town was rated fair on conservation needs, while Limuru was rated the worst, where the lower the score, the higher the level of the need. In addition, the townscape status of the identified heritage, including signage, visual access, pedestrian friendliness, street environmental condition and street planting, was generally rated between the range of very poor to fair, a below average rating. Even though the towns possessed valuable heritage, the condition of the environmental context was poor.

Objective Four: To formulate a planning framework for historic townscapes along the Kenya Railway.

Research Question: What are the strategies to be used to conserve townscape heritage along the Kenya Railway?

A planning framework for historic townscapes along the railway was formulated in the realm of urban conservation and planning. It was intended to guide the identification

of heritage, justify its conservation through heritage values and plan for its conservation. The four main components of the framework included Townscape characteristics, heritage values, conservation needs and sustainable historic planning. At all levels, there is the application of planning and conservation laws. In addition, the democratic approach of public involvement is envisioned to enhance sustainability. The major idea of the framework is facilitating a conclusive heritage survey, since it enables the measurement of heritage footprint, the development of a detailed heritage inventory, the determination of conservation needs and the determination of heritage values - all elements of historic planning. The proposed actions in the framework respond to the social, cultural, economic and environmental heritage value categories; townscape characteristics and the conservation needs.

6.3 Conclusions

6.3.1 General Conclusion

Even though the Historic Kenya Railway line is credited with the establishment of many towns along it and providing a rich heritage legacy, the townscapes remain without an appropriate conservation strategy in the face of change. The objectives pursued under the problem statement were answered as outlined below.

First, on the characteristics of selected heritage townscapes, even though there was a relationship between the railway stations and the immediate urban fabric, the link was weak due to the decline in Kenya Railways operations. The Heritage footprint (HF) ratios in Limuru at 10.3%, Naivasha at 8.4%, and Molo at 19.4% indicate the variation and extent of the urban fabric in each of the towns that there was indeed heritage that was significant to residents. Additionally, Buildings, being the most predominant type of townscape heritage, were threatened by neglect and pressure from development. It was found out that there existed townscape heritage relatable to residents that was not acknowledged and that needed to be conserved.

Second, the five underlying heritage values that included cultural continuity, functional-economic, identity, placeness and historicity gave significance to the identified heritage, and successful conservation should focus on these. The other three values, rarity, evidence, and memory also although not the main ones, were important

in giving the full picture of the meanings people have of significant heritage places. All the identified heritage values generally show the aspirations of the communities where the townscape heritage exists and give a guide to the value-based approach to conservation. As people interact with the urban environment, over time, their attitudes are influenced, and they are subconsciously aware of their surroundings. They develop attachment and desire cultural continuity and the preservation of historicity and identity. The benefits derived from the urban areas people appreciate the economic and functional aspects of places. On the other hand, placeness was how people understood and related to the environment, and the yearning is for it to be maintained or enhanced. The eight extracted latent underlying values associated with residents' attitudes towards townscape heritage conform to the alternate hypothesis.

Third, on the conservation needs, conservation action was focused on individual townscape heritage with a neglect of the urban context. The mismatch between the conservation of individual buildings and the conservation of the townscape context, where the latter was in a poor state, needed to be addressed using the Historic Urban Landscape approach.

Finally, the proposed planning framework for historic townscapes along the Kenya railway is a practical tool to guide planning and conservation of heritage. For effective performance of the framework and sustainability of conservation planning actions, there must be public involvement.

6.3.2 Theoretical Implications of the Study

Values cannot be assumed and must be determined within the townscape heritage locale. This study emphasises that conservation discourse must always ask and answer the question, 'heritage for whom', since every townscape heritage has different narratives associated with it, grounded in history and attached to individual communities.

The study also adds value to planning theory by borrowing the accounting concept from the theory of ecological Footprint, adopting it in reverse and simplifying it to achieve the measurement of heritage footprint. Heritage footprint is a concept that is

useful to measure the area of land covered by heritage to bring knowledge on its size compared to the area of focus. For analysis and effective visual communication, the figure-ground theory is suitable when considering the relationship of the core as the source of historic places, which are a heritage unto themselves and the surrounding townscape heritage. The figure-ground theory, therefore, accounts for the spatial distribution of townscape heritage. It is therefore practical to fuse the accounting concept of the theory of ecological footprint and the figure-ground theory to explain the density of the townscape heritage in the urban space.

With the concerned communities at the centre, the study achieved its objectives through the heritage survey, establishing heritage values and proposing historic planning measures. Therefore, the significance of people's role in providing meaning for heritage, as explained by the contemporary theory of conservation by Muñoz-Viñas (2012), cannot be overstated. Findings showed the yearning for prosperity enabled by the ability of places to provide economic opportunities.

6.3.3 Methodological Implications of the Study

The triangulation method that involves the direct deduction of values from respondents when identifying townscape and comparing findings from factor analysis of attitudes provides credibility to the obtained heritage values. A people-centred identification process provides confidence to experts that the townscape heritage is indeed significant to the community concerned and that the intangible heritage attributes can be extracted. The identification of heritage values must be conclusive by being keen to identify even the minor ones.

Procedures of townscape analysis and heritage survey provide a practical approach beyond the expert-driven heritage documentation. The townscape analysis on figure-ground maps provides a visual appreciation, while figure-ground calculations give an arithmetic appreciation of the measure of heritage in space. Additionally, it may raise a methodological curiosity to extend the heritage footprint to the measurement vertically into the third dimension. The assessment of the urban environmental condition within which heritage exists is significant to check the level of differences in conservation status to match the object and context. Lastly, heritage survey and the

identification of heritage values are processes that are intertwined since the former relates to unearthing what should be conserved, while the latter is concerned with why they should be conserved.

6.3.4 Practical Implications of the Study

The main implication of this study has on practice is the need to apply the proposed historic planning framework for townscapes along the Kenya railway. It is a bottom-up, people-centred approach. The role of the county government in townscape conservation, as envisioned by the framework, augments the planning role as mandated by the County Government Act. In addition, an expert-led Historic Railway Towns Conservation Office is proposed as an intermediary institution to coordinate all historic planning activities. The framework calls for proposed actions to respond sensibly to each underlying heritage value held by the concerned communities. Further, the framework advocates for upgrading and updating urban infrastructure when carrying out historic planning of the townscapes.

Even though Kenya's planning and conservation laws acknowledge the need to conserve urban heritage, they do not compel any specific planning or conservation agency to undertake the task. Further, it seems the harmony of the planning and conservation laws is required to integrate historic planning practice, providing the link between urban planning and development and heritage conservation. Communities at the centre of conservation planning are valuable in identifying heritage areas and providing associated values. The role of conservation experts in heritage surveys is to be the stewards of the conservation planning process, with people at the centre. On the other hand, the accounting of heritage footprint in space is informative to practitioners, and figure-ground maps are effective tools for visual communication to highlight the spread of heritage in an area.

On the physical environment, within the urban areas, the two likely threats to the heritage are neglect and pressure from new development. In this light, owners of properties, whether listed as heritage or not in a given urban area, are key stakeholders in the conservation planning and decision-making process. Furthermore, the relationship between the heritage core and the immediate urban area is that, if it is

neglected or faces decline, its link with the rest of the urban fabric weakens even though its heritage value is not lost. From the discussion beforehand, good conservation practice attends to the object as well as the context for reinforcement of the intrinsic values. Historic planning should not only focus on the conservation of heritage areas but also on enabling people's prosperity through the improvement of the places' ability to provide economic opportunities.

6.4 Recommendations

In light of the literature review and the objective outcomes of this study, various recommendations discussed below are proposed for effective historic planning of towns along the Kenya Railway.

- i. Historic planning considerations, such as identifying historic areas, establishing urban heritage footprints and generation of conservation plans, should be part of the urban planning process and programmes by the planning agencies.
- ii. There is, therefore, a need to build technical capacity for historic planning experts who will then advance heritage conservation for urban areas.
- iii. The study provided evidence of a rich townscape heritage inventory along railway towns. Consequently, an extensive survey should be done to identify and protect these areas of interest to document, gazette and conserve to expand the townscape heritage inventory in Kenya. In addition, heritage surveys can be done periodically to keep updating the inventories so that these are also not frozen in time. This form of documentation can thus provide material for future urban conservation research. The documentation of the identified places through heritage inventories would also cover cases of unforeseeable future loss of heritage and, similarly, be the basis for continuous maintenance.
- iv. The National Museums of Kenya, in collaboration with county governments, should then list the identified urban heritage as a special category to promote awareness and tap into the potential of townscape heritage tourism.
- v. In the historic planning of urban areas, heritage values should be identified, acknowledged and fully integrated, since they represent the communities'

endeavours. For example, to address economic concerns, the focus should be on the creation of opportunities through historic planning. These underlying values are the significance required to guide sustainable historic planning of townscape heritage. Besides, the development of architectural conservation guidelines on material conservation based on various international conservation principles should be generated, and their application should be case-by-case to safeguard the heritage values of cultural continuity, historicity and placeness. Consequently, for planning programmes, urban conservation plans for each of the towns should be guided by heritage values and identified townscape heritage to respond to the communities' aspirations, while concerned communities should be engaged in the process.

- vi. To address conservation needs, conservation plans need to enhance and package railway stations as the nucleus of heritage areas within the urban areas and ensure their sustainability. Urban renewal programmes must be guided by conservation plans where townscape heritage is identified and mapped out for its preservation.
- vii. Where areas are identified wholly as being purely heritage clusters within the townscape, they should be zoned out as special planning areas and planned for conservation.
- viii. It is also recommended that the continued usage and adaptive reuse of heritage places should be encouraged. In such cases, incentives such as heritage conservation grants should be given to encourage owners to continue conserving areas of heritage significance. The provision of heritage incentives should be legislated in conservation law.
- ix. In addition, update and maintain historic townscape infrastructure such as walkways, street parking and street lighting, waste management and drainage to keep up with the growing population, as well as preserve identified townscape heritage. Such urban infrastructure programmes should go hand in hand with the promotion of townscape tourism using the identified urban heritage by county governments in Kenya.
- x. Urban planning programmes need to identify and enhance special local heritage areas where people can learn about towns' cultural heritage. This

intervention can also be used to raise revenue through local and international tourism and make such places sustainable.

- xi. The railway stations, being special core heritage areas, need to be made accessible to the public as a way of tapping into the economic benefits of tourism.
- xii. Finally, it is recommended that the value-based historic planning framework for selected townscapes along the Kenya Railway be implemented.

In summary of the recommendations, it is important to adopt the Historic Urban Landscape (HUL) approach and adapt it to the local context to benefit from its advantages. It can begin by assessing urban conservation needs and initiating urban development programmes that prioritise the ordering and the improvement of social-cultural aspects, the townscapes' physical environment, accessibility, and economics. Given the railway's importance to the existence of the country, it calls for the reactivation of socio-economic development through urban conservation of the towns along the Kenya railway. The action focus should be threefold: to conserve significant heritage areas, enhance the historic urban environment context and contribute to urban communities' social-cultural and economic prosperity.

6.5 Areas for Further Study

Based on the curiosity that arose during the development of this thesis, areas for further study on the subject were proposed below.

- i. An extension of the study to establish what heritage footprint has been lost over time in towns along the railway line in Kenya.
- ii. The heritage footprint study was done in a two-dimensional area; the next step would be to explore the calculation in the form of volumes, as it is related to the townscape outlook.
- iii. Carry out a Confirmatory Factor Analysis (CFA) to test the factor structure realised in this study through Exploratory Factor Analysis (EFA).
- iv. Compare the underlying heritage values among the towns along the Kenya railway by increasing the sample size for each town sufficient to carry out an EFA.

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GLOSSARY

Heritage footprint - an accounting index for the precinct of interest, which is the extent of land occupied by townscape heritage within a setting. The ratio of the area occupied by the designated legacy to the entire land area of the delimited precinct is used to express the heritage footprint. This definition has been appropriated from the theory of ecological footprint by Wackernagel & Beyers (2019).

Heritage values – the degree of the relative social attribution of qualities to things classified into three groups: emotional, cultural-training, and functional. It is aesthetic, historic, scientific, social, or spiritual worth for past, present, or future generations (ICOMOS Australia, 2013). These values come about as a process of growth and people's experiences in the towns (Orbasli, 2002).

Historic significance - the capacity of townscape heritage to exhibit outstanding qualities that includes uniqueness, significance, testimony, historicity, aesthetics, rarity, and association through architecture, technology, arts, town planning or landscape design in the urban context; human settlement or land use; and living traditions of outstanding universal significance. It also relates to the notion of Outstanding Universal Value, which refers to natural or cultural significance that is so extraordinary that it goes beyond national borders and is shared by all of humanity's current and future generations (UNESCO, 2021).

Townscape - is the built-up environment that encompasses buildings and takes into account the relationships between them, the many kinds of urban open spaces, and the link between buildings and open spaces. (Landscape Institute, 2017).

Townscape characteristics - a town's identity and personality are made from the way individual buildings create a general outlook and make up a recognisable local townscape (Nasser, 2003). It is influenced by the urban form of an area, including architectural style, streetscape, urban block structure, public spaces, street pattern, sense of enclosure, movement patterns of trees, boundaries, hedges, gardens, wildlife, windows, doors, the colour and material of roofs and walls, the sense of enclosure, roadways, traffic levels, and people moving within the townscape, as well as the

history of the buildings (Walsh, 2012). They also include the natural or semi-natural characteristics of an area, such as trees, gardens, hedge lines, small woods, fields, commons, and parks (Walsh, 2012).

Townscape Heritage – any immovable property or space of great importance to the cultural heritage of people within a defined urban centre. They are elements of character or appearance that are desirable to preserve or enhance (Historic England, 2019).

APPENDICES

Appendix I: Townscape Heritage Observation and Mapping Guide

Ref. No. _____



JOMO KENYATTA UNIVERSITY OF AGRICULTURE AND TECHNOLOGY
CENTRE FOR URBAN STUDIES

Research Title: Development of an Urban Conservation Planning Framework Based on Heritage Values: A Survey of Historic Townscapes along the Kenya Railway

Note:

1. Items needed: measuring wheel, line and satellite maps, coloured pens and a camera.
2. Photos under each observation item should be taken

Observer _____ Date _____ Town _____.

Objective 1: To examine the characteristics of the townscape heritage of precincts in towns along the Kenya Railway.

I. Townscape characteristics on a line map

1. Show the precinct core (railway station)
2. Show the direction in which the station is facing in the context of the precinct.
3. Delimit the precinct area. (*Where the periphery of a precinct is defined by measuring an average walkable radius of 400 meters from the centre of the railway station.*)
4. Highlight on the map the solids of heritage features identified in the defined precinct.
5. Highlight on the map the voids of heritage areas identified in the defined precinct.

6. Map linkages and lines of connectivity or paths that act as the datum for the town fabric. (Primary, secondary and tertiary levels.
7. Identify and show the edges.
8. Identify districts.
9. Show significant nodes.
10. Indicate and name the landmarks.
11. Indicate the designated open spaces.
12. Identify and illustrate the typological patterns of solids and voids (grid, angular, curvilinear, concentric, organic).
13. Sketch out a 3-dimensional outline of the precinct area.
14. Show the Landscape and physiographic features defining the town.

Objective 1: To examine the characteristics of the townscape heritage of precincts in towns along the Kenya Railway.

II. Heritage footprint on a figure-ground map

15. Map out the identified places of heritage significance by transferring them to the figure-ground map.
16. Highlight on the map the voids of heritage open spaces identified in the defined precinct.
17. Calculation of the area of the delimited precinct and the core _____ ha
18. Calculation of the area of the core (railway station area) _____ ha
19. Calculation of the total area (ta) of the precinct (17– 18 above) _____ ha
20. From the figure-ground map, compute the area of all solids in the precinct area (19 -20) _____ ha
21. From the figure-ground map, compute the area of the voids in the precinct area. _____ ha
22. From the figure-ground map, compute the total area covered by solids of identified places of heritage significance in the precinct area. _____ ha
23. From the figure-ground map, compute the area covered by the voids of identified heritage open spaces in the precinct area _____ ha

24. Adding 22 and 23 above, and compute the total heritage area (solids and voids of identified places of heritage significance) in the precinct area _____ ha

(Compute the sum of the heritage footprint of a precinct ('hf'), i.e., by summing all (n) identified heritage areas (ha_i) in the precinct.)

25. Calculating the heritage footprint ratio (hf_r): by dividing the heritage footprint obtained by the total area of the precinct of interest: $hf_r = hf : ta$

Appendix II: Interview Schedule for Residents



Ref. No. _____

JOMO KENYATTA UNIVERSITY OF AGRICULTURE AND TECHNOLOGY
CENTRE FOR URBAN STUDIES

Research Title: Development of an Urban Conservation Planning Framework Based on Heritage Values: A Survey of Historic Townscapes along the Kenya Railway

Ethics of social science research: As an interviewee for the study, your response in the interview will be highly appreciated. The information collected during this survey will be treated with confidentiality and anonymity, and individual responses will not be divulged.

Items needed for this exercise: Line and satellite maps, a camera and a voice recorder.

Interviewer _____ Date _____ Town _____

I. Respondents' Background Information

1. How long have you lived in the town (years):

(1) Below 5, (2) 5 – 10, (3) 11 – 25, (4) 26– 40, (5) 41- 55, (6) over 55

2. Age: (1) Below 18, (2) 18 – 28, (3) 29 – 39, (4) 40 – 50, (5) 51- 61, (6) Above 61

3. Gender: (1) female, (2) Male

4. Highest Level of Education: (1) None, (2) Primary, (3) Secondary, (4) College, (5) University

5. Occupation: _____

6. Nature of Occupation: (1) Student, (2) Unemployed, (3) Self-Employed, (4) Employed, (5) Retired

Objective 1: To examine the characteristics of the townscape heritage of precincts in towns along the Kenya Railway.

II. Identification of Townscape Heritage

Identify three important places in the town you consider for conservation for future generations. Show these on the map.

Sno.	a. Identify three most important places around the railway station that you consider important to the origin of this town.	b. Why do you consider the place important?
TH 1.		
TH 2.		
TH 3.		

Objective 2: To identify the underlying heritage values in selected towns along the Kenya Railway.

III. Identifying Heritage Values (Attitudinal Survey)

You are requested to rate the score that best represents your view towards the heritage of this town. *(Using the provided scale, tick ✓) on the table, the value that best represents the opinion on every statement.)*

	Score	1	2	3	4	5	6	7
Code	Variable /Statement	Strongly disagree	Disagree	Slightly disagree	Neutral	Slightly agree	Agree	Strongly agree
St. 1	I get a sense of belonging when I am in the area near the railway station.							
St. 2	The old architectural designs can be adopted for new buildings.							
St. 3	The historic features will help you know your location.							
St. 4	The heritage should be easily accessible to all.							
St. 5	The town's heritage should be preserved.							
St. 6	The built heritage should be conserved for its artistic value.							
St. 7	Preserving the built heritage will enhance business opportunities.							
St. 8	The heritage precinct can be used for learning a lot of information.							
St. 9	Old buildings around the station are special features to see.							
St. 10	The look of the townscape is unique.							
St. 11	The townscape heritage was well-built for its intended functions.							
St. 12	The old technology can be borrowed and improved.							
St. 13	The townscape heritage is considered to be aesthetic.							
St. 14	Recorded information about the origins of the town is insufficient.							
St. 15	The original purpose of buildings and places should be maintained.							
St. 16	Information on building technology can be learned from the town's heritage.							
St. 17	Townscape heritage in the town symbolises its railway origin.							

	Score	1	2	3	4	5	6	7
Code	Variable /Statement	Strongly disagree	Disagree	Slightly disagree	Neutral	Slightly agree	Agree	Strongly agree
St. 18.	There are adequate public spaces within the town.							
St. 19	The heritage buildings have a unique architectural style.							
St. 20	The railway created a unique culture among the residents of the town.							
St. 21	The collection of buildings creates a beautiful scenery.							
St. 22	Townscape heritage is easily identifiable.							
St. 23	There is history to be learned from the existing townscape heritage.							
St. 24	The heritage represents the history of the town.							
St. 25	Townscape heritage is representative of the colonial past.							
St. 26	Generations in the future will appreciate the heritage.							
St. 27	The streets in the town are well defined for wayfinding.							
St. 28	The built heritage areas are productive places.							
St. 29	It is pleasant to move through the town where the historic features are.							
St. 30	I value the important features of the town.							
St. 31	I would like to see the townscape heritage conserved for future generations.							
St. 32	Rehabilitation/renovations of the built environment should be done to enhance its usability.							
St. 33	The townscape heritage brings economic benefits.							
St. 34	The conservation of the old buildings and structures should continue.							
St. 35	The townscape heritage is appreciated because of its old age.							
St. 36	The town has good landmarks.							
St. 37	The town is illustrative of past events.							
St. 38	The heritage features in the town are admirable.							
St. 39	The townscape heritage supports different needs in the town.							
St. 40	I am familiar with the town's old important places.							
St. 41	The heritage played a role in the development of the town and nation.							
St. 42	The town's character is distinct due to the built-up area around the railway.							
St. 43	The continued existence of heritage is important for the town.							
St. 44	The important features have been able to withstand development pressure.							
St. 45	I would like to see the built heritage continue to exist.							
St. 46	The natural landscape of the town contributes to the outlook of the town.							
St. 47	I would want important features to be protected from destruction.							

	Score	1	2	3	4	5	6	7
Code	Variable /Statement	Strongly disagree	Disagree	Slightly disagree	Neutral	Slightly agree	Agree	Strongly agree
St. 48	I have known about the heritage through oral literature.							
St. 49	Buildings surrounding the railway station should be protected.							
St. 50	Stories about the origin of the town should be documented.							
St. 51	The important historic features are easy to remember.							
St. 52	Some memorable events related to the railway took place in the town.							
St. 53	The reuse of old buildings benefits people.							
St. 54	Old buildings in the town are worthy.							
St. 55	The conservation of heritage will increase tourism.							
St. 56	Townscape heritage gives the town its identity.							
St. 57	The town has a rich history.							
St. 58	Older people here have special memories of this town.							
St. 59	The town exists due to the railway station.							
St. 60	This town is significant in the region's history.							
St. 61	The townscape heritage contributes to a beautiful scenery.							
St. 62	The town's important features can easily be connected to the past.							
St. 63	The heritage represents the history of Kenya.							
St. 64	Old industrial functions should be retained.							
St. 65	The town is a place where most people meet.							
St. 66	The town's history should be passed down to future generations.							
St. 67	The townscape heritage is well conserved.							
St. 68	Improvement of the original buildings has positive effects on the aesthetics of the townscape.							
St. 69	Information is available about the townscape heritage.							
St. 70	Most of the abandoned areas are re-usable.							
St. 71	The old buildings in the town are likeable.							

St. = Statement

Objective 3: To determine the conservation needs of townscape heritage in selected towns along the Kenya Railway

IV. Conservation Needs of Towns along the Kenya Railway

How would you rate the state of the desired needs related to the townscape heritage conservation? *(Tick (✓) on the table, the value that best represents the opinion on every item)*

		Desirable State						
		1	2	3	4	5	6	7
Sno.		Very poor	poor	Mildly Poor	Fair	Mildly good	Good	Very Good
A.	Physical Environmental							
CN 1	Cleanliness of the environment							
CN 2	Safety of spaces							
CN 3	Infrastructure							
B.	Accessibility							
CN 4	Lighting in public spaces							
CN 5	Pedestrian walkways							
CN 6	Roads and parking							
C.	Economic							
CN 7	Capacity to provide employment							
CN 8	As a place for tourism							
CN 9	Usability of the existing buildings							
CN 10	Level of railway functions/activity							
D.	Social Cultural							
CN 11	State of important heritage places							
CN 12	Education /Knowledge of heritage							

17. Any other comments on the desirable state of the townscape:

Thank you for participating in this interview.

If the interviewee would like to read the research report, they can provide an email address.

Appendix III: Observation Checklist for Rapid Assessment of Identified Heritage

Ref. No. _____



JOMO KENYATTA UNIVERSITY OF AGRICULTURE AND TECHNOLOGY
CENTRE FOR URBAN STUDIES

Research Title: Development of an Urban Conservation Planning Framework Based on Heritage Values: A Survey of Historic Townscapes along the Kenya Railway

Note:

- i. Items needed: measuring wheel, line and satellite maps, camera.
- ii. A key informant guide will be required in this exercise, as is necessary
- iii. Photos under each observation item should be taken

Observer: _____ Date _____ Town _____

Objective 1: To examine the characteristics of the townscape heritage of precincts in towns along the Kenya Railway.

I. The Townscape Heritage Footprint

A. Heritage Identity

A1: Name of the townscape heritage _____

A2: Type of townscape heritage:

1	2	3	4	5	6
Building (s)	Monument	Street	Landscape	Open Site	Zoned precinct

A3: Ownership:

1	2	3	4	5
Private	Corporation	Public organisation	Religious organisation	Community

B. Use/Function

B1: Accessibility: 0. Not accessible 1. Accessible

B2: Original use/ function_____

B3: Change from the original function. 0. No, 1. Yes

B4: If yes, what is the current use/ function: _____

B5: The current land use classification

1	2	3	4	5	6	7	8	9
Residential	Industrial	Educational	Recreational	Public purpose	Commercial	Public utility	Transportation	Agriculture

B6: Level of occupancy:

0	1	2	3
Not applicable	Unoccupied	Semi-occupied	Fully occupied

C. Characteristics of the Physical Footprint

C1: The area of the ground occupied by the heritage property in ha _____

C2: The length of the section of the street in front of the property in m _____

C3: The width of the street fronting the property in m _____

C4: In case of a building, indicate the number of stories: _____

C5: Approximate height of the heritage property in m _____

Objective 1: To examine the characteristics of the townscape heritage of precincts in towns along the Kenya Railway.

D. Physical Condition

Type of damage observed:

	The type of damage observed	0. No	1. Yes
D1	Decay		
D2	Disintegration due to weather		
D3	Vandalism		
D4	Defacement		

E. Threats to Heritage

Factors threatening the integrity of the property.

	Factors threatening the integrity of the property	0.No	1. Yes
E1	Lack of maintenance/ Neglect		
E2	Air pollution		
E3	New development Abutting/near		
E4	Obsolescence		
E5	Theft		

F. Observable effects of change

	Observable effects of change	0.No	1. Yes
F1	Decline in usage		
F2	Abandonment		
F3	Deterioration		
F4	Brownfields		

G. Conservation Action,

Action that has been carried out on the property

	Action that has been carried out on the property	0.No	1. Yes
G1	Adaptive reuse (New use)		
G2	Retention of original use		
G3	Reintroduction of a use		
G4	Regular maintenance		
G5	Repair		
G6	Reconstruction		
G7	Demolition		

IV. Townscape Heritage Evaluation

H. Townscape Characteristics

H1: Rate the appropriateness of the property signage positioning (rating)

0	1	2	3	4	5
None	Very Poor	Poor	Fair	Good	Very good

H2: The heritage visual accessibility from the street (e.g., availability of walkways) (score)

0	1	2	3	4	5
None	Very Poor	Poor	Fair	Good	Very good

H3: The level of pedestrian friendliness of the street (score).

0	1	2	3	4	5
None	Very Poor	Poor	Fair	Good	Very good

H4: Environmental condition of the street. (cleanliness) (score).

1	2	3	4	5
Very Poor	Poor	Fair	Good	Very good

H5: The Condition of Street Planting. (Trees and shrubs) (score)

0	1	2	3	4	5
None	Very Poor	Poor	Fair	Good	Very good

I Presence of other Townscape Elements

I1: Parking provision on the street: 0. No, 1. Yes

I2: Heritage property fronting the street directly: 0. No, 1. Yes

I3: Presence of street lights present: 0. No, 1. Yes

I4: Type of plot fences

0	1	2	3	4	5
No fence (open)	Live fence	Masonry wall	Chain-link	Barbed wire	Steel grill

J. *From a vantage point, take a photograph of the heritage property.*

[Record Photograph details (Name of place, date and time taken)]

K. *The location of the property should be marked and its name labelled on the map*

END

Appendix IV: Interview Guide for Key Informants

Ref. No. _____



JOMO KENYATTA UNIVERSITY OF AGRICULTURE AND TECHNOLOGY
CENTRE FOR URBAN STUDIES

Research Title: Development of an Urban Conservation Planning Framework Based on Heritage Values: A Survey of Historic Townscapes along the Kenya Railway

Ethics of social science research: As an interviewee for the study, your response in the interview will be highly appreciated. The information collected during this survey will be treated with confidentiality and anonymity, and individual responses will not be divulged.

Interviewer: _____ Date _____ Town _____

Gender: _____ Age: _____ Duration of residence: _____

A. Townscape Heritage (Objective 1)

1. What is the history of the town from its establishment to its current state?

2. What was the influence of the railway on the town?

3. What are the most remarkable areas or built structures that are notable around the railway station?

4. Within the area around the railway station, what features, in your opinion, qualify to be called heritage?

5. What are the threats to the existence of the identified features?

6. What are the notable physical changes since the decline of the railway?

7. What are the current uses/adaptive reuse of old buildings?

8. What are the challenges facing the old parts of the town?

B. Heritage Values (Objective 2)

9. Are there any identified and protected heritage properties in the town?

10. What is the general perception of the people of the heritage?

11. What is the difference in perception of the railway heritage among the different generations? (The elderly, middle-aged, and youth)

12. What benefits can be derived from the conservation of heritage areas?

C. Conservation Needs (Objective 3)

13. What conservation measures have been undertaken?

14. Do you think the conservation actions that have been taken to conserve the built heritage areas in the town are appropriate?

15. What are the challenges associated with the conservation of the identified features?

16. What should be done to enhance the conservation of heritage in the town?

17. What should be done to enhance the conservation of heritage in the town?

18. In the conservation of the heritage areas, what needs to be achieved?

i. Physical infrastructure

ii. Environment

iii. Social Cultural

iv. Accessibility

v. Economic

Thank you for participating in this interview.

Appendix V: Attitudinal Statements Generated under the Different Values

I	Emotional Values
A.	Wonder
1.	Old buildings around the station are special features to see.
2.	The heritage features in the town are admirable.
3.	Old buildings in the town are worthy.
4.	The old buildings in the town are interesting.
B.	Identity
5.	Townscape heritage gives this town its identity.
6.	Townscape heritage is easily identifiable.
7.	The look of the townscape is unique.
8.	The Existence of the town is due to the railway station.
9.	The town's character is distinct due to the built-up area around the railway.
C.	Continuity
10.	I would like to see the townscape heritage conserved for future generations.
11.	The important features have been able to withstand development pressure.
12.	The town's important features can easily be connected to the past.
13.	The conservation of the old buildings and structures should Continue.
14.	The townscape heritage is disappearing.
D.	Respect and Veneration
15.	I hold in high regard the important features of the town.
16.	I wouldn't want the destruction of important features to happen.
E.	Symbolic
17.	Townscape heritage in the town symbolises its railway origin.
18.	Representative of the colonial past.
19.	The town is illustrative of past events.
20.	The town demonstrates the ability for great development.
II	Cultural Values
F.	Documentary
21.	Information is available about the townscape heritage.
22.	I have known about the heritage through oral literature.
23.	Recorded information about the origins of the town is insufficient.
24.	Stories about the origin of the town should be documented.
25.	The town has a rich history.
G.	Historic
26.	The townscape heritage has unique historic information.
27.	The historic information is important to the town.
28.	This town is significant in the region's history.
29.	Some memorable events related to the railway took place in the town.
30.	Older people here have special memories of this place.
31.	The town's heritage should be preserved.
32.	The town's History should be passed down to future generations.
H.	Archaeological and age
33.	The townscape heritage is appreciated because of its age.
34.	Generations in the future will appreciate the heritage.
35.	The townscape heritage should be preserved because it has lasted for a long time.

I	Emotional Values
36.	It is sad to see the built heritage disintegrating.
I.	Aesthetic and Architectural Values
37.	The townscape heritage is considered to be aesthetic.
38.	The heritage buildings have a unique architectural style.
39.	The material used for building is aesthetically pleasing.
40.	The old architectural designs can be adopted for new buildings.
41.	The townscape heritage was well-built for its intended functions.
42.	Alterations of the original designs have negative effects on the use and outlook of the townscape.
43.	The built heritage should be conserved for its artistic value.
44.	The style of building for the early buildings was creative.
J.	Townscape
45.	The experience of the townscape heritage is pleasant.
46.	The collection of buildings creates a beautiful scenery.
47.	Many of the important historic features are vivid.
48.	The town has good landmarks.
49.	It is pleasant to move through the town where the historic features are.
50.	The historic features will help you know your location.
51.	There are sufficient public spaces within the town.
52.	The town is made good by its people.
53.	The natural landscape of the town contributes to the outlook of the town.
54.	The streets in the town are well-defined for wayfinding.
K.	Landscape and Ecological
55.	The townscape heritage contributes to a beautiful scenery.
56.	The environment around the railway station needs to be cleaned.
57.	Surrounding buildings near the railway station need to be protected.
L.	Technological and Scientific
58.	The heritage represents important technology.
59.	The technology can be borrowed and improved.
60.	The technique for building is unique.
61.	Industrial functions need to be retained.
III	Use Values
M.	Functional
62.	The townscape heritage supports different needs in the town.
63.	There are challenges in the usage of the townscape heritage.
64.	Rehabilitation/renovations should be done to enhance the usability.
65.	The original purpose of buildings and places should be maintained.
66.	The old buildings and places can be made productive again.
67.	Most of the abandoned areas are reusable.
N.	Economic and Tourism
68.	The townscape heritage brings economic benefits.
69.	The buildings can be used as places for commercial activities.
70.	The built heritage areas are productive places.
71.	The reuse of old buildings has benefited people.
72.	Demolishing the built heritage will lead to the loss of business opportunities.
73.	The conservation of heritage will increase tourism.
O.	Social

I	Emotional Values
74.	I get a sense of belonging when I visit this area.
75.	The town provides a shared heritage among residents.
76.	The railway created a unique culture among the residents of the town.
77.	The town is a place where most people meet.
78.	The community in this town is built around the town's significant places.
79.	I am familiar with the town's old important places.
80.	Conservation of heritage in the town will ensure its continued existence.
P.	Educational
81.	There is history to be learned from the existing townscape heritage.
82.	Information on building technology can be learned from the town's heritage.
83.	The heritage precinct can be used for learning a lot of information.
84.	The heritage represents the history of Kenya.
Q.	Political
85.	The heritage represents the history of the town.
86.	The built heritage played a role in the development of the town and nation.
87.	The heritage should be easily accessible to all.

Appendix VI: Principal Component Analysis

According to Jolliffe (2003), the aim of principal component analysis (PCA) is to reduce the dimensionality of a data set consisting of a large number of interrelated variables, while retaining as much as possible of the variation present in the data set. It is achieved by transforming to a new set of variables referred to as principal components (PCs), which are uncorrelated, and are ordered so that the first few retain most of the variation present in all of the original variables (Jolliffe, 2003). Demšar, Harris, Brunsdon, Fotheringham, & McLoone (2013) add that PCA maps the original n dimensions (variables) of the data matrix X onto a new orthogonal space, such that the new axes are oriented in directions of the largest variance in the data to obtain new dimensions called the PCs. Kothari (2004) states that the aim of the principal component method of factor analysis is the construction of a given set of variables, X_j 's ($j = 1, 2, \dots, k$) of new variables (P_i), called principal components, which are linear combinations of the X_s .

$$P_1 = a_{11}X_1 + a_{12}X_2 + \dots a_{1k}X_k$$

$$P_2 = a_{21}X_1 + a_{22}X_2 + \dots a_{2k}X_k$$

$$\begin{matrix} \cdot & & \cdot & \cdot & \cdot & \cdot \\ \cdot & & \cdot & \cdot & \cdot & \cdot \end{matrix}$$

$$P_k = a_{k1}X_1 + a_{k2}X_2 + \dots a_{kk}X_k$$

standardized variables i.e. $z_j = \frac{(X_j - \bar{X}_j)}{\sigma_j}$, are used to apply this method. The a_{ij} 's are the 'loadings' and are worked out so that the extracted principal components satisfy two conditions: (i) principal components are uncorrelated (orthogonal), and (ii) the first principal component (P_1), has the maximum variance, followed by the second principal component (P_2), and so forth (Kothari, 2004).

Pallant (2020) outlines the assumptions related to principal components analysis as follows:

1. Sample size: Ideally, the overall sample size should be 150+ and there should be a ratio of at least five cases for each of the variables.
2. Factorability of the correlation matrix: To be considered suitable for factor analysis, the correlation matrix should show at least some correlations of $r = .3$ or greater.
3. Linearity: Because factor analysis is based on correlation, it is assumed that the relationship between the variables is linear. It is certainly not practical to check scatterplots of all variables with all other variables.
4. Outliers among cases: Factor analysis can be sensitive to outliers, so as part of your initial data screening process, you should check for these and either remove or recode to a less extreme value.

Additionally, Bartlett's Test of sphericity should be significant ($p < .05$) for the factor analysis to be considered appropriate, while the Kaiser-Meyer-Olkin (KMO) index ranges from 0 to 1, with .6 suggested as the minimum value for a good factor analysis (Pallant, 2020).

Appendix VII: Correlation Matrix of Attitudinal Statements

*	St. 1	St. 2	St. 3	St. 4	St. 5	St. 6	St. 7	St. 8	St. 9	St. 10	St. 11	St. 12	St. 13	St. 14	St. 15	St. 16	St. 17	St. 18
St. 1	1.000	0.183	0.179	0.207	0.143	0.179	0.117	0.170	0.247	0.163	0.257	0.228	0.119	0.016	0.150	0.188	0.212	0.113
St. 2	0.183	1.000	0.094	0.088	0.202	0.237	0.158	0.153	0.263	0.108	0.049	0.324	0.188	0.140	0.205	0.166	0.060	0.079
St. 3	0.179	0.094	1.000	0.179	0.289	0.220	0.203	0.328	0.201	0.288	0.157	0.234	0.233	0.110	0.251	0.219	0.129	0.099
St. 4	0.207	0.088	0.179	1.000	0.235	0.199	0.106	0.246	0.176	0.125	0.125	0.178	0.211	0.089	0.053	0.166	0.083	-0.002
St. 5	0.143	0.202	0.289	0.235	1.000	0.600	0.469	0.438	0.466	0.396	0.249	0.380	0.454	0.169	0.466	0.328	0.154	0.112
St. 6	0.179	0.237	0.220	0.199	0.600	1.000	0.418	0.397	0.513	0.370	0.244	0.356	0.477	0.175	0.435	0.346	0.182	0.071
St. 7	0.117	0.158	0.203	0.106	0.469	0.418	1.000	0.427	0.355	0.379	0.206	0.304	0.400	0.206	0.330	0.241	0.016	0.139
St. 8	0.170	0.153	0.328	0.246	0.438	0.397	0.427	1.000	0.435	0.412	0.389	0.374	0.349	0.194	0.264	0.363	0.237	0.058
St. 9	0.247	0.263	0.201	0.176	0.466	0.513	0.355	0.435	1.000	0.533	0.240	0.461	0.518	0.138	0.452	0.477	0.302	0.222
St. 10	0.163	0.108	0.288	0.125	0.396	0.370	0.379	0.412	0.533	1.000	0.267	0.361	0.497	-0.040	0.345	0.448	0.190	0.143
St. 11	0.257	0.049	0.157	0.125	0.249	0.244	0.206	0.389	0.240	0.267	1.000	0.269	0.245	0.083	0.181	0.205	0.344	0.079
St. 12	0.228	0.324	0.234	0.178	0.380	0.356	0.304	0.374	0.461	0.361	0.269	1.000	0.402	0.068	0.388	0.496	0.174	0.129
St. 13	0.119	0.188	0.233	0.211	0.454	0.477	0.400	0.349	0.518	0.497	0.245	0.402	1.000	0.140	0.468	0.486	0.201	0.181
St. 14	0.016	0.140	0.110	0.089	0.169	0.175	0.206	0.194	0.138	-0.040	0.083	0.068	0.140	1.000	0.132	0.063	0.006	-0.005
St. 15	0.150	0.205	0.251	0.053	0.466	0.435	0.330	0.264	0.452	0.345	0.181	0.388	0.468	0.132	1.000	0.416	0.191	0.228
St. 16	0.188	0.166	0.219	0.166	0.328	0.346	0.241	0.363	0.477	0.448	0.205	0.496	0.486	0.063	0.416	1.000	0.333	0.151
St. 17	0.212	0.060	0.129	0.083	0.154	0.182	0.016	0.237	0.302	0.190	0.344	0.174	0.201	0.006	0.191	0.333	1.000	0.145
St. 18	0.113	0.079	0.099	-0.002	0.112	0.071	0.139	0.058	0.222	0.143	0.079	0.129	0.181	-0.005	0.228	0.151	0.145	1.000
St. 19	0.195	0.150	0.165	0.230	0.308	0.290	0.250	0.344	0.488	0.408	0.234	0.261	0.403	0.013	0.225	0.403	0.265	0.166
St. 20	0.124	0.048	0.063	0.051	0.135	0.111	0.139	0.121	0.269	0.187	0.107	0.150	0.187	0.058	0.149	0.260	0.234	0.260
St. 21	0.202	0.081	0.179	0.116	0.283	0.315	0.274	0.194	0.440	0.476	0.263	0.283	0.464	-0.005	0.374	0.415	0.230	0.298
St. 22	0.102	0.004	0.226	0.097	0.197	0.202	0.214	0.264	0.320	0.367	0.185	0.233	0.235	0.028	0.228	0.342	0.297	0.224
St. 23	0.217	0.071	0.156	0.164	0.070	0.091	0.032	0.297	0.203	0.140	0.314	0.215	0.115	0.012	0.188	0.327	0.336	0.080
St. 24	0.224	0.078	0.201	0.205	0.170	0.217	0.117	0.311	0.263	0.224	0.357	0.307	0.204	0.016	0.222	0.318	0.393	0.095
St. 25	0.194	0.041	0.069	0.040	-0.015	0.184	-0.110	0.160	0.229	0.144	0.272	0.130	0.086	-0.044	0.046	0.263	0.339	0.130
St. 26	0.200	0.072	0.259	0.167	0.372	0.389	0.287	0.305	0.455	0.449	0.262	0.331	0.443	0.086	0.452	0.387	0.302	0.228
St. 27	0.154	0.017	0.193	0.080	0.293	0.182	0.246	0.188	0.319	0.341	0.169	0.295	0.347	-0.008	0.295	0.295	0.093	0.271
St. 28	0.184	0.023	0.254	0.162	0.359	0.224	0.324	0.249	0.350	0.358	0.194	0.317	0.337	0.057	0.278	0.346	0.174	0.234
St. 29	0.207	0.115	0.185	0.146	0.355	0.318	0.282	0.282	0.495	0.389	0.179	0.320	0.500	0.093	0.264	0.396	0.183	0.239
St. 30	0.216	0.044	0.225	0.200	0.442	0.387	0.359	0.328	0.423	0.400	0.217	0.328	0.470	0.081	0.357	0.371	0.230	0.227
St. 31	0.222	0.111	0.169	0.163	0.530	0.463	0.357	0.297	0.431	0.413	0.265	0.324	0.497	0.100	0.392	0.359	0.171	0.139
St. 32	0.147	-0.015	0.095	0.198	0.151	0.021	0.065	0.169	0.079	0.098	0.132	0.143	0.078	0.188	0.122	0.138	0.167	-0.023
St. 33	0.141	0.021	0.210	0.167	0.373	0.235	0.371	0.264	0.271	0.303	0.300	0.271	0.371	0.092	0.280	0.304	0.186	0.135
St. 34	0.177	0.230	0.240	0.230	0.565	0.421	0.313	0.374	0.487	0.407	0.243	0.379	0.513	0.067	0.423	0.426	0.262	0.117
St. 35	0.290	0.131	0.167	0.183	0.321	0.415	0.116	0.312	0.444	0.295	0.299	0.382	0.319	0.078	0.338	0.374	0.369	0.120
St. 36	0.224	0.037	0.187	0.191	0.231	0.194	0.049	0.171	0.357	0.273	0.173	0.249	0.259	0.042	0.292	0.295	0.274	0.184
St. 37	0.257	0.099	0.156	0.253	0.145	0.138	0.025	0.261	0.311	0.223	0.285	0.179	0.209	-0.022	0.115	0.214	0.314	0.172
St. 38	0.101	0.158	0.215	0.194	0.409	0.404	0.322	0.311	0.471	0.406	0.254	0.349	0.442	0.131	0.356	0.406	0.218	0.125
St. 39	0.247	0.120	0.238	0.085	0.206	0.167	0.218	0.258	0.301	0.269	0.267	0.334	0.301	0.078	0.344	0.337	0.303	0.201
St. 40	0.116	0.088	0.112	0.098	0.089	0.121	0.071	0.106	0.155	0.120	0.143	0.136	0.142	0.054	0.086	0.133	0.084	0.119

*	St. 1	St. 2	St. 3	St. 4	St. 5	St. 6	St. 7	St. 8	St. 9	St. 10	St. 11	St. 12	St. 13	St. 14	St. 15	St. 16	St. 17	St. 18
St. 41	0.190	0.099	0.146	0.289	0.161	0.216	0.056	0.261	0.168	0.159	0.391	0.215	0.185	0.105	0.109	0.153	0.279	-0.035
St. 42	0.227	0.011	0.087	0.129	0.127	0.153	0.012	0.235	0.222	0.143	0.400	0.200	0.263	0.086	0.177	0.238	0.288	0.118
St. 43	0.133	0.099	0.207	0.157	0.533	0.493	0.405	0.280	0.390	0.309	0.197	0.305	0.440	0.208	0.424	0.317	0.235	0.140
St. 44	0.155	0.144	0.027	0.181	0.164	0.196	0.036	0.171	0.179	0.103	0.246	0.150	0.231	0.166	0.190	0.249	0.157	0.011
St. 45	0.118	0.150	0.278	0.082	0.498	0.411	0.341	0.265	0.407	0.305	0.175	0.384	0.468	0.151	0.392	0.398	0.185	0.092
St. 46	0.122	0.036	0.130	0.103	0.226	0.264	0.175	0.258	0.241	0.188	0.240	0.276	0.257	0.153	0.177	0.246	0.269	0.095
St. 47	0.200	0.085	0.303	0.166	0.480	0.449	0.316	0.290	0.435	0.376	0.269	0.405	0.490	0.171	0.363	0.380	0.176	0.115
St. 48	0.189	0.125	0.078	0.138	0.063	0.112	0.011	0.048	0.125	0.108	-0.031	0.071	0.115	0.028	0.088	0.138	0.029	0.157
St. 49	0.213	0.196	0.120	-0.009	0.340	0.302	0.131	0.150	0.421	0.265	0.208	0.349	0.330	0.033	0.406	0.300	0.251	0.280
St. 50	0.344	0.210	0.222	0.174	0.156	0.211	0.012	0.247	0.211	0.133	0.279	0.250	0.151	0.204	0.221	0.215	0.317	0.108
St. 51	0.230	0.101	0.102	0.121	0.242	0.188	0.148	0.134	0.250	0.230	0.181	0.200	0.261	0.017	0.201	0.228	0.171	0.125
St. 52	0.188	0.083	0.126	0.029	0.146	0.152	0.141	0.070	0.200	0.159	0.092	0.190	0.182	-0.002	0.143	0.278	0.124	0.126
St. 53	0.146	0.072	0.078	0.149	0.222	0.191	0.141	0.194	0.275	0.207	0.268	0.207	0.125	0.112	0.218	0.206	0.215	0.141
St. 54	0.209	0.183	0.133	0.191	0.374	0.342	0.264	0.280	0.487	0.340	0.177	0.319	0.354	0.123	0.388	0.369	0.205	0.182
St. 55	0.139	0.107	0.143	0.125	0.338	0.263	0.336	0.194	0.300	0.210	0.128	0.257	0.301	0.149	0.219	0.269	0.128	0.107
St. 56	0.187	0.037	0.172	0.091	0.212	0.186	0.188	0.308	0.310	0.287	0.207	0.190	0.201	0.095	0.186	0.272	0.239	0.130
St. 57	0.233	0.032	0.102	0.111	0.051	0.112	0.127	0.200	0.124	0.146	0.307	0.179	0.203	0.074	0.117	0.135	0.264	0.094
St. 58	0.333	0.040	0.209	0.225	0.175	0.108	0.097	0.372	0.176	0.169	0.335	0.282	0.156	-0.014	0.123	0.206	0.228	0.038
St. 59	0.221	0.040	0.093	0.196	0.041	0.090	-0.046	0.228	0.208	0.169	0.271	0.099	0.091	-0.073	0.026	0.165	0.339	0.046
St. 60	0.205	0.084	0.197	0.325	0.117	0.182	0.094	0.305	0.102	0.206	0.265	0.184	0.158	0.071	-0.036	0.201	0.191	0.027
St. 61	0.124	0.083	0.313	0.115	0.383	0.313	0.278	0.282	0.411	0.498	0.228	0.352	0.539	-0.023	0.410	0.453	0.210	0.213
St. 62	0.224	0.057	0.208	0.330	0.202	0.166	0.041	0.335	0.224	0.146	0.290	0.285	0.246	0.078	0.099	0.287	0.202	0.068
St. 63	0.293	0.080	0.140	0.215	0.097	0.157	-0.025	0.247	0.138	0.036	0.268	0.147	0.162	-0.014	0.058	0.232	0.393	0.047
St. 64	0.294	0.111	0.196	0.163	0.359	0.269	0.266	0.194	0.288	0.319	0.152	0.316	0.319	0.048	0.256	0.238	0.193	0.144
St. 65	0.227	0.021	0.168	0.160	0.070	0.083	0.091	0.186	0.142	0.136	0.121	0.224	0.087	0.062	0.185	0.182	0.163	0.137
St. 66	0.258	0.041	0.198	0.191	0.190	0.152	0.108	0.285	0.192	0.218	0.306	0.238	0.252	0.061	0.165	0.258	0.215	0.056
St. 67	0.145	0.164	0.156	0.094	0.222	0.224	0.146	0.177	0.270	0.217	0.251	0.160	0.260	0.004	0.223	0.224	0.194	0.213
St. 68	0.123	-0.003	0.125	0.142	0.189	0.124	0.083	0.220	0.302	0.341	0.198	0.241	0.278	0.017	0.182	0.293	0.206	0.107
St. 69	0.096	0.084	0.096	0.078	0.180	0.071	0.134	0.062	0.089	0.216	0.074	0.184	0.136	-0.063	0.183	0.214	0.083	0.175
St. 70	0.205	0.087	0.118	0.169	0.131	0.107	0.071	0.253	0.200	0.122	0.116	0.204	0.075	0.099	0.102	0.197	0.213	0.007
St. 71	0.211	0.157	0.163	0.199	0.388	0.339	0.254	0.261	0.518	0.423	0.206	0.400	0.488	0.035	0.362	0.413	0.242	0.185

*St. = Heritage Statement

Correlation Matrix (Continued 1)

*	St. 19	St. 20	St. 21	St. 22	St. 23	St. 24	St. 25	St. 26	St. 27	St. 28	St. 29	St. 30	St. 31	St. 32	St. 33	St. 34	St. 35	St. 36
St. 1	0.195	0.124	0.202	0.102	0.217	0.224	0.194	0.200	0.154	0.184	0.207	0.216	0.222	0.147	0.141	0.177	0.290	0.224
St. 2	0.150	0.048	0.081	0.004	0.071	0.078	0.041	0.072	0.017	0.023	0.115	0.044	0.111	-0.015	0.021	0.230	0.131	0.037
St. 3	0.165	0.063	0.179	0.226	0.156	0.201	0.069	0.259	0.193	0.254	0.185	0.225	0.169	0.095	0.210	0.240	0.167	0.187
St. 4	0.230	0.051	0.116	0.097	0.164	0.205	0.040	0.167	0.080	0.162	0.146	0.200	0.163	0.198	0.167	0.230	0.183	0.191
St. 5	0.308	0.135	0.283	0.197	0.070	0.170	-0.015	0.372	0.293	0.359	0.355	0.442	0.530	0.151	0.373	0.565	0.321	0.231
St. 6	0.290	0.111	0.315	0.202	0.091	0.217	0.184	0.389	0.182	0.224	0.318	0.387	0.463	0.021	0.235	0.421	0.415	0.194
St. 7	0.250	0.139	0.274	0.214	0.032	0.117	-0.110	0.287	0.246	0.324	0.282	0.359	0.357	0.065	0.371	0.313	0.116	0.049
St. 8	0.344	0.121	0.194	0.264	0.297	0.311	0.160	0.305	0.188	0.249	0.282	0.328	0.297	0.169	0.264	0.374	0.312	0.171
St. 9	0.488	0.269	0.440	0.320	0.203	0.263	0.229	0.455	0.319	0.350	0.495	0.423	0.431	0.079	0.271	0.487	0.444	0.357
St. 10	0.408	0.187	0.476	0.367	0.140	0.224	0.144	0.449	0.341	0.358	0.389	0.400	0.413	0.098	0.303	0.407	0.295	0.273
St. 11	0.234	0.107	0.263	0.185	0.314	0.357	0.272	0.262	0.169	0.194	0.179	0.217	0.265	0.132	0.300	0.243	0.299	0.173
St. 12	0.261	0.150	0.283	0.233	0.215	0.307	0.130	0.331	0.295	0.317	0.320	0.328	0.324	0.143	0.271	0.379	0.382	0.249
St. 13	0.403	0.187	0.464	0.235	0.115	0.204	0.086	0.443	0.347	0.337	0.500	0.470	0.497	0.078	0.371	0.513	0.319	0.259
St. 14	0.013	0.058	-0.005	0.028	0.012	0.016	-0.044	0.086	-0.008	0.057	0.093	0.081	0.100	0.188	0.092	0.067	0.078	0.042
St. 15	0.225	0.149	0.374	0.228	0.188	0.222	0.046	0.452	0.295	0.278	0.264	0.357	0.392	0.122	0.280	0.423	0.338	0.292
St. 16	0.403	0.260	0.415	0.342	0.327	0.318	0.263	0.387	0.295	0.346	0.396	0.371	0.359	0.138	0.304	0.426	0.374	0.295
St. 17	0.265	0.234	0.230	0.297	0.336	0.393	0.339	0.302	0.093	0.174	0.183	0.230	0.171	0.167	0.186	0.262	0.369	0.274
St. 18	0.166	0.260	0.298	0.224	0.080	0.095	0.130	0.228	0.271	0.234	0.239	0.227	0.139	-0.023	0.135	0.117	0.120	0.184
St. 19	1.000	0.341	0.416	0.247	0.296	0.214	0.149	0.390	0.299	0.342	0.394	0.378	0.387	0.041	0.326	0.415	0.270	0.225
St. 20	0.341	1.000	0.408	0.249	0.196	0.242	0.168	0.223	0.113	0.188	0.228	0.183	0.182	0.019	0.071	0.134	0.199	0.142
St. 21	0.416	0.408	1.000	0.332	0.165	0.225	0.116	0.595	0.414	0.427	0.449	0.405	0.427	0.063	0.294	0.330	0.434	0.367
St. 22	0.247	0.249	0.332	1.000	0.324	0.293	0.199	0.276	0.179	0.254	0.279	0.271	0.276	0.163	0.153	0.139	0.246	0.273
St. 23	0.296	0.196	0.165	0.324	1.000	0.627	0.450	0.272	0.179	0.190	0.213	0.245	0.193	0.137	0.157	0.234	0.275	0.165
St. 24	0.214	0.242	0.225	0.293	0.627	1.000	0.490	0.304	0.168	0.250	0.204	0.279	0.239	0.215	0.198	0.262	0.445	0.244
St. 25	0.149	0.168	0.116	0.199	0.450	0.490	1.000	0.173	0.057	0.097	0.191	0.163	0.123	0.228	0.095	0.141	0.326	0.200
St. 26	0.390	0.223	0.595	0.276	0.272	0.304	0.173	1.000	0.451	0.439	0.477	0.529	0.550	0.054	0.387	0.417	0.400	0.356
St. 27	0.299	0.113	0.414	0.179	0.179	0.168	0.057	0.451	1.000	0.487	0.461	0.394	0.322	0.085	0.327	0.331	0.213	0.351
St. 28	0.342	0.188	0.427	0.254	0.190	0.250	0.097	0.439	0.487	1.000	0.537	0.560	0.393	0.196	0.598	0.352	0.329	0.313
St. 29	0.394	0.228	0.449	0.279	0.213	0.204	0.191	0.477	0.461	0.537	1.000	0.652	0.482	0.205	0.471	0.365	0.330	0.283
St. 30	0.378	0.183	0.405	0.271	0.245	0.279	0.163	0.529	0.394	0.560	0.652	1.000	0.574	0.239	0.501	0.443	0.420	0.307
St. 31	0.387	0.182	0.427	0.276	0.193	0.239	0.123	0.550	0.322	0.393	0.482	0.574	1.000	0.216	0.408	0.525	0.383	0.303
St. 32	0.041	0.019	0.063	0.163	0.137	0.215	0.228	0.054	0.085	0.196	0.205	0.239	0.216	1.000	0.164	0.195	0.142	0.149
St. 33	0.326	0.071	0.294	0.153	0.157	0.198	0.095	0.387	0.327	0.598	0.471	0.501	0.408	0.164	1.000	0.347	0.285	0.151
St. 34	0.415	0.134	0.330	0.139	0.234	0.262	0.141	0.417	0.331	0.352	0.365	0.443	0.525	0.195	0.347	1.000	0.471	0.339
St. 35	0.270	0.199	0.434	0.246	0.275	0.445	0.326	0.400	0.213	0.329	0.330	0.420	0.383	0.142	0.285	0.471	1.000	0.407
St. 36	0.225	0.142	0.367	0.273	0.165	0.244	0.200	0.356	0.351	0.313	0.283	0.307	0.303	0.149	0.151	0.339	0.407	1.000
St. 37	0.229	0.134	0.312	0.234	0.385	0.396	0.329	0.254	0.302	0.281	0.209	0.236	0.192	0.142	0.187	0.306	0.373	0.496
St. 38	0.410	0.184	0.318	0.238	0.231	0.274	0.144	0.426	0.287	0.406	0.444	0.430	0.417	0.052	0.366	0.347	0.286	0.234

*	St. 19	St. 20	St. 21	St. 22	St. 23	St. 24	St. 25	St. 26	St. 27	St. 28	St. 29	St. 30	St. 31	St. 32	St. 33	St. 34	St. 35	St. 36
St. 39	0.216	0.159	0.305	0.208	0.268	0.356	0.220	0.441	0.327	0.489	0.380	0.469	0.311	0.166	0.465	0.348	0.359	0.294
St. 40	0.126	0.071	0.079	0.059	0.147	0.181	0.169	0.101	0.118	0.150	0.107	0.164	0.057	0.094	0.113	0.138	0.137	0.131
St. 41	0.254	0.017	0.084	0.135	0.292	0.344	0.282	0.178	0.085	0.210	0.218	0.269	0.231	0.218	0.313	0.275	0.282	0.150
St. 42	0.292	0.160	0.208	0.150	0.333	0.288	0.300	0.235	0.189	0.174	0.269	0.289	0.223	0.085	0.171	0.314	0.312	0.269
St. 43	0.344	0.221	0.353	0.237	0.125	0.157	0.023	0.427	0.184	0.350	0.362	0.480	0.530	0.123	0.395	0.496	0.376	0.286
St. 44	0.190	0.101	0.183	0.098	0.267	0.246	0.125	0.250	0.168	0.238	0.264	0.309	0.233	0.186	0.208	0.294	0.327	0.283
St. 45	0.308	0.141	0.309	0.297	0.228	0.271	0.068	0.386	0.220	0.328	0.398	0.472	0.556	0.102	0.353	0.554	0.383	0.331
St. 46	0.195	0.098	0.217	0.187	0.289	0.361	0.190	0.332	0.155	0.249	0.347	0.440	0.351	0.230	0.305	0.272	0.324	0.236
St. 47	0.358	0.171	0.328	0.336	0.212	0.242	0.105	0.415	0.294	0.330	0.446	0.507	0.569	0.157	0.358	0.464	0.344	0.316
St. 48	0.146	0.220	0.183	0.084	0.051	0.110	0.168	0.138	0.045	0.070	0.144	0.114	0.133	0.147	0.075	0.128	0.168	0.099
St. 49	0.287	0.197	0.368	0.169	0.221	0.268	0.240	0.356	0.215	0.201	0.336	0.357	0.452	0.174	0.179	0.359	0.336	0.335
St. 50	0.230	0.076	0.193	0.145	0.346	0.393	0.262	0.304	0.144	0.201	0.214	0.274	0.263	0.262	0.222	0.321	0.356	0.244
St. 51	0.189	0.179	0.258	0.228	0.214	0.246	0.260	0.213	0.212	0.234	0.372	0.369	0.391	0.332	0.229	0.286	0.289	0.271
St. 52	0.182	0.217	0.221	0.036	0.174	0.160	0.183	0.221	0.217	0.198	0.244	0.213	0.184	0.083	0.206	0.162	0.099	0.133
St. 53	0.261	0.233	0.282	0.198	0.249	0.242	0.215	0.213	0.189	0.184	0.204	0.231	0.186	0.188	0.193	0.320	0.287	0.275
St. 54	0.454	0.313	0.402	0.197	0.238	0.233	0.179	0.387	0.213	0.299	0.367	0.389	0.416	0.144	0.297	0.540	0.418	0.341
St. 55	0.255	0.223	0.212	0.140	0.164	0.276	0.053	0.309	0.208	0.260	0.293	0.301	0.398	0.180	0.309	0.438	0.207	0.166
St. 56	0.282	0.176	0.189	0.251	0.282	0.280	0.248	0.327	0.223	0.298	0.373	0.376	0.356	0.221	0.281	0.361	0.305	0.343
St. 57	0.245	0.126	0.116	0.166	0.359	0.373	0.268	0.253	0.166	0.161	0.172	0.242	0.257	0.180	0.276	0.222	0.300	0.202
St. 58	0.203	0.064	0.073	0.223	0.370	0.299	0.261	0.168	0.183	0.193	0.192	0.278	0.173	0.320	0.210	0.282	0.212	0.166
St. 59	0.210	0.156	0.161	0.130	0.243	0.251	0.370	0.218	0.041	0.060	0.148	0.122	0.096	0.167	0.053	0.217	0.232	0.167
St. 60	0.232	0.091	0.055	0.192	0.302	0.334	0.275	0.160	0.115	0.212	0.227	0.259	0.165	0.264	0.227	0.186	0.162	0.195
St. 61	0.456	0.278	0.482	0.284	0.230	0.202	0.164	0.534	0.395	0.371	0.473	0.457	0.515	0.147	0.360	0.484	0.300	0.303
St. 62	0.256	0.146	0.160	0.137	0.308	0.385	0.328	0.222	0.194	0.205	0.169	0.255	0.195	0.304	0.189	0.314	0.208	0.211
St. 63	0.212	0.121	0.088	0.053	0.326	0.305	0.415	0.150	0.116	0.078	0.131	0.195	0.131	0.169	0.168	0.243	0.220	0.180
St. 64	0.270	0.136	0.248	0.258	0.189	0.149	0.047	0.293	0.191	0.315	0.341	0.459	0.463	0.181	0.312	0.406	0.248	0.236
St. 65	0.185	0.066	0.206	0.188	0.245	0.234	0.172	0.245	0.186	0.195	0.155	0.230	0.252	0.258	0.141	0.283	0.230	0.283
St. 66	0.248	0.081	0.186	0.150	0.301	0.322	0.214	0.253	0.213	0.164	0.171	0.268	0.310	0.285	0.222	0.377	0.266	0.198
St. 67	0.256	0.113	0.212	0.052	0.231	0.179	0.137	0.367	0.332	0.280	0.221	0.204	0.228	0.011	0.256	0.320	0.210	0.273
St. 68	0.287	0.088	0.296	0.215	0.200	0.224	0.218	0.382	0.230	0.333	0.385	0.346	0.293	0.252	0.386	0.355	0.287	0.208
St. 69	0.137	0.133	0.203	0.179	0.195	0.238	0.063	0.208	0.284	0.246	0.138	0.202	0.154	0.107	0.148	0.183	0.182	0.250
St. 70	0.129	0.038	0.074	0.184	0.298	0.369	0.263	0.121	0.205	0.205	0.218	0.261	0.089	0.281	0.162	0.247	0.259	0.251
St. 71	0.470	0.248	0.464	0.215	0.279	0.274	0.218	0.529	0.372	0.394	0.455	0.464	0.405	0.091	0.331	0.451	0.343	0.329

*St. = Heritage Statement

Correlation Matrix (Continued 2)

*	St. 37	St. 38	St. 39	St. 40	St. 41	St. 42	St. 43	St. 44	St. 45	St. 46	St. 47	St. 48	St. 49	St. 50	St. 51	St. 52	St. 53	St. 54
St. 1	0.257	0.101	0.247	0.116	0.190	0.227	0.133	0.155	0.118	0.122	0.200	0.189	0.213	0.344	0.230	0.188	0.146	0.209
St. 2	0.099	0.158	0.120	0.088	0.099	0.011	0.099	0.144	0.150	0.036	0.085	0.125	0.196	0.210	0.101	0.083	0.072	0.183
St. 3	0.156	0.215	0.238	0.112	0.146	0.087	0.207	0.027	0.278	0.130	0.303	0.078	0.120	0.222	0.102	0.126	0.078	0.133
St. 4	0.253	0.194	0.085	0.098	0.289	0.129	0.157	0.181	0.082	0.103	0.166	0.138	-0.009	0.174	0.121	0.029	0.149	0.191
St. 5	0.145	0.409	0.206	0.089	0.161	0.127	0.533	0.164	0.498	0.226	0.480	0.063	0.340	0.156	0.242	0.146	0.222	0.374
St. 6	0.138	0.404	0.167	0.121	0.216	0.153	0.493	0.196	0.411	0.264	0.449	0.112	0.302	0.211	0.188	0.152	0.191	0.342
St. 7	0.025	0.322	0.218	0.071	0.056	0.012	0.405	0.036	0.341	0.175	0.316	0.011	0.131	0.012	0.148	0.141	0.141	0.264
St. 8	0.261	0.311	0.258	0.106	0.261	0.235	0.280	0.171	0.265	0.258	0.290	0.048	0.150	0.247	0.134	0.070	0.194	0.280
St. 9	0.311	0.471	0.301	0.155	0.168	0.222	0.390	0.179	0.407	0.241	0.435	0.125	0.421	0.211	0.250	0.200	0.275	0.487
St. 10	0.223	0.406	0.269	0.120	0.159	0.143	0.309	0.103	0.305	0.188	0.376	0.108	0.265	0.133	0.230	0.159	0.207	0.340
St. 11	0.285	0.254	0.267	0.143	0.391	0.400	0.197	0.246	0.175	0.240	0.269	-0.031	0.208	0.279	0.181	0.092	0.268	0.177
St. 12	0.179	0.349	0.334	0.136	0.215	0.200	0.305	0.150	0.384	0.276	0.405	0.071	0.349	0.250	0.200	0.190	0.207	0.319
St. 13	0.209	0.442	0.301	0.142	0.185	0.263	0.440	0.231	0.468	0.257	0.490	0.115	0.330	0.151	0.261	0.182	0.125	0.354
St. 14	-0.022	0.131	0.078	0.054	0.105	0.086	0.208	0.166	0.151	0.153	0.171	0.028	0.033	0.204	0.017	-0.002	0.112	0.123
St. 15	0.115	0.356	0.344	0.086	0.109	0.177	0.424	0.190	0.392	0.177	0.363	0.088	0.406	0.221	0.201	0.143	0.218	0.388
St. 16	0.214	0.406	0.337	0.133	0.153	0.238	0.317	0.249	0.398	0.246	0.380	0.138	0.300	0.215	0.228	0.278	0.206	0.369
St. 17	0.314	0.218	0.303	0.084	0.279	0.288	0.235	0.157	0.185	0.269	0.176	0.029	0.251	0.317	0.171	0.124	0.215	0.205
St. 18	0.172	0.125	0.201	0.119	-0.035	0.118	0.140	0.011	0.092	0.095	0.115	0.157	0.280	0.108	0.125	0.126	0.141	0.182
St. 19	0.229	0.410	0.216	0.126	0.254	0.292	0.344	0.190	0.308	0.195	0.358	0.146	0.287	0.230	0.189	0.182	0.261	0.454
St. 20	0.134	0.184	0.159	0.071	0.017	0.160	0.221	0.101	0.141	0.098	0.171	0.220	0.197	0.076	0.179	0.217	0.233	0.313
St. 21	0.312	0.318	0.305	0.079	0.084	0.208	0.353	0.183	0.309	0.217	0.328	0.183	0.368	0.193	0.258	0.221	0.282	0.402
St. 22	0.234	0.238	0.208	0.059	0.135	0.150	0.237	0.098	0.297	0.187	0.336	0.084	0.169	0.145	0.228	0.036	0.198	0.197
St. 23	0.385	0.231	0.268	0.147	0.292	0.333	0.125	0.267	0.228	0.289	0.212	0.051	0.221	0.346	0.214	0.174	0.249	0.238
St. 24	0.396	0.274	0.356	0.181	0.344	0.288	0.157	0.246	0.271	0.361	0.242	0.110	0.268	0.393	0.246	0.160	0.242	0.233
St. 25	0.329	0.144	0.220	0.169	0.282	0.300	0.023	0.125	0.068	0.190	0.105	0.168	0.240	0.262	0.260	0.183	0.215	0.179
St. 26	0.254	0.426	0.441	0.101	0.178	0.235	0.427	0.250	0.386	0.332	0.415	0.138	0.356	0.304	0.213	0.221	0.213	0.387
St. 27	0.302	0.287	0.327	0.118	0.085	0.189	0.184	0.168	0.220	0.155	0.294	0.045	0.215	0.144	0.212	0.217	0.189	0.213
St. 28	0.281	0.406	0.489	0.150	0.210	0.174	0.350	0.238	0.328	0.249	0.330	0.070	0.201	0.201	0.234	0.198	0.184	0.299
St. 29	0.209	0.444	0.380	0.107	0.218	0.269	0.362	0.264	0.398	0.347	0.446	0.144	0.336	0.214	0.372	0.244	0.204	0.367
St. 30	0.236	0.430	0.469	0.164	0.269	0.289	0.480	0.309	0.472	0.440	0.507	0.114	0.357	0.274	0.369	0.213	0.231	0.389
St. 31	0.192	0.417	0.311	0.057	0.231	0.223	0.530	0.233	0.556	0.351	0.569	0.133	0.452	0.263	0.391	0.184	0.186	0.416
St. 32	0.142	0.052	0.166	0.094	0.218	0.085	0.123	0.186	0.102	0.230	0.157	0.147	0.174	0.262	0.332	0.083	0.188	0.144
St. 33	0.187	0.366	0.465	0.113	0.313	0.171	0.395	0.208	0.353	0.305	0.358	0.075	0.179	0.222	0.229	0.206	0.193	0.297
St. 34	0.306	0.347	0.348	0.138	0.275	0.314	0.496	0.294	0.554	0.272	0.464	0.128	0.359	0.321	0.286	0.162	0.320	0.540
St. 35	0.373	0.286	0.359	0.137	0.282	0.312	0.376	0.327	0.383	0.324	0.344	0.168	0.336	0.356	0.289	0.099	0.287	0.418
St. 36	0.496	0.234	0.294	0.131	0.150	0.269	0.286	0.283	0.331	0.236	0.316	0.099	0.335	0.244	0.271	0.133	0.275	0.341
St. 37	1.000	0.219	0.313	0.171	0.270	0.334	0.142	0.290	0.207	0.266	0.192	0.100	0.184	0.298	0.261	0.147	0.290	0.278

*	St. 37	St. 38	St. 39	St. 40	St. 41	St. 42	St. 43	St. 44	St. 45	St. 46	St. 47	St. 48	St. 49	St. 50	St. 51	St. 52	St. 53	St. 54
St. 38	0.219	1.000	0.365	0.140	0.239	0.189	0.364	0.214	0.386	0.309	0.402	0.051	0.293	0.193	0.195	0.174	0.202	0.336
St. 39	0.313	0.365	1.000	0.171	0.311	0.284	0.298	0.251	0.367	0.348	0.221	0.078	0.300	0.367	0.230	0.268	0.243	0.334
St. 40	0.171	0.140	0.171	1.000	0.152	0.177	0.077	0.144	0.105	0.172	0.075	0.098	0.113	0.124	0.153	0.160	0.129	0.115
St. 41	0.270	0.239	0.311	0.152	1.000	0.431	0.272	0.314	0.131	0.255	0.270	0.082	0.212	0.400	0.200	0.169	0.164	0.194
St. 42	0.334	0.189	0.284	0.177	0.431	1.000	0.295	0.332	0.142	0.352	0.184	0.104	0.314	0.323	0.250	0.225	0.349	0.316
St. 43	0.142	0.364	0.298	0.077	0.272	0.295	1.000	0.240	0.581	0.316	0.545	0.056	0.368	0.249	0.271	0.233	0.299	0.490
St. 44	0.290	0.214	0.251	0.144	0.314	0.332	0.240	1.000	0.289	0.310	0.219	0.197	0.177	0.224	0.210	0.140	0.205	0.296
St. 45	0.207	0.386	0.367	0.105	0.131	0.142	0.581	0.289	1.000	0.378	0.674	0.026	0.354	0.175	0.225	0.154	0.194	0.455
St. 46	0.266	0.309	0.348	0.172	0.255	0.352	0.316	0.310	0.378	1.000	0.367	0.048	0.264	0.243	0.288	0.133	0.193	0.291
St. 47	0.192	0.402	0.221	0.075	0.270	0.184	0.545	0.219	0.674	0.367	1.000	0.099	0.416	0.231	0.298	0.150	0.173	0.376
St. 48	0.100	0.051	0.078	0.098	0.082	0.104	0.056	0.197	0.026	0.048	0.099	1.000	0.204	0.172	0.254	0.223	0.120	0.226
St. 49	0.184	0.293	0.300	0.113	0.212	0.314	0.368	0.177	0.354	0.264	0.416	0.204	1.000	0.342	0.337	0.272	0.319	0.434
St. 50	0.298	0.193	0.367	0.124	0.400	0.323	0.249	0.224	0.175	0.243	0.231	0.172	0.342	1.000	0.333	0.179	0.278	0.301
St. 51	0.261	0.195	0.230	0.153	0.200	0.250	0.271	0.210	0.225	0.288	0.298	0.254	0.337	0.333	1.000	0.276	0.264	0.318
St. 52	0.147	0.174	0.268	0.160	0.169	0.225	0.233	0.140	0.154	0.133	0.150	0.223	0.272	0.179	0.276	1.000	0.182	0.181
St. 53	0.290	0.202	0.243	0.129	0.164	0.349	0.299	0.205	0.194	0.193	0.173	0.120	0.319	0.278	0.264	0.182	1.000	0.590
St. 54	0.278	0.336	0.334	0.115	0.194	0.316	0.490	0.296	0.455	0.291	0.376	0.226	0.434	0.301	0.318	0.181	0.590	1.000
St. 55	0.120	0.286	0.208	0.062	0.119	0.154	0.422	0.110	0.418	0.278	0.342	0.106	0.250	0.277	0.269	0.218	0.214	0.385
St. 56	0.229	0.215	0.381	0.104	0.206	0.267	0.375	0.198	0.350	0.357	0.314	0.137	0.293	0.343	0.292	0.148	0.267	0.402
St. 57	0.313	0.104	0.323	0.130	0.410	0.377	0.238	0.259	0.182	0.355	0.225	0.082	0.170	0.408	0.297	0.088	0.208	0.154
St. 58	0.344	0.117	0.253	0.178	0.404	0.348	0.195	0.188	0.135	0.185	0.213	0.063	0.233	0.377	0.244	0.097	0.283	0.204
St. 59	0.273	0.078	0.197	0.093	0.283	0.326	0.163	0.127	0.121	0.178	0.135	0.115	0.179	0.223	0.135	0.179	0.256	0.226
St. 60	0.319	0.116	0.234	0.142	0.394	0.265	0.227	0.228	0.155	0.264	0.290	0.119	0.099	0.328	0.169	0.189	0.210	0.146
St. 61	0.183	0.392	0.386	0.089	0.196	0.254	0.380	0.116	0.405	0.227	0.458	0.138	0.301	0.156	0.297	0.234	0.297	0.455
St. 62	0.358	0.173	0.285	0.161	0.317	0.361	0.166	0.268	0.201	0.296	0.242	0.107	0.135	0.340	0.211	0.181	0.261	0.225
St. 63	0.338	0.096	0.222	0.098	0.370	0.298	0.191	0.191	0.095	0.246	0.150	0.121	0.172	0.337	0.254	0.295	0.180	0.150
St. 64	0.164	0.240	0.270	0.113	0.256	0.146	0.360	0.235	0.413	0.288	0.493	0.109	0.300	0.246	0.314	0.191	0.225	0.394
St. 65	0.229	0.102	0.233	0.072	0.256	0.204	0.200	0.205	0.197	0.236	0.261	0.148	0.280	0.390	0.227	0.038	0.263	0.302
St. 66	0.265	0.103	0.247	0.114	0.372	0.284	0.240	0.199	0.268	0.258	0.360	0.034	0.271	0.488	0.223	0.134	0.197	0.244
St. 67	0.316	0.198	0.277	0.110	0.217	0.219	0.227	0.224	0.235	0.248	0.271	0.052	0.228	0.177	0.156	0.184	0.161	0.306
St. 68	0.216	0.230	0.322	0.075	0.226	0.244	0.232	0.190	0.220	0.251	0.295	0.218	0.224	0.258	0.359	0.201	0.227	0.282
St. 69	0.181	0.160	0.228	0.132	0.065	0.205	0.198	0.214	0.161	0.153	0.157	0.147	0.183	0.134	0.238	0.180	0.243	0.279
St. 70	0.353	0.086	0.268	0.094	0.222	0.265	0.181	0.242	0.206	0.247	0.144	0.136	0.130	0.303	0.230	0.167	0.307	0.190
St. 71	0.317	0.386	0.414	0.175	0.237	0.334	0.397	0.268	0.391	0.291	0.395	0.193	0.378	0.217	0.258	0.323	0.333	0.514

*St. = Heritage Statement

Correlation Matrix (Continued 3)

*	St. 55	St. 56	St. 57	St. 58	St. 59	St. 60	St. 61	St. 62	St. 63	St. 64	St. 65	St. 66	St. 67	St. 68	St. 69	St. 70	St. 71
St. 1	0.139	0.187	0.233	0.333	0.221	0.205	0.124	0.224	0.293	0.294	0.227	0.258	0.145	0.123	0.096	0.205	0.211
St. 2	0.107	0.037	0.032	0.040	0.040	0.084	0.083	0.057	0.080	0.111	0.021	0.041	0.164	-0.003	0.084	0.087	0.157
St. 3	0.143	0.172	0.102	0.209	0.093	0.197	0.313	0.208	0.140	0.196	0.168	0.198	0.156	0.125	0.096	0.118	0.163
St. 4	0.125	0.091	0.111	0.225	0.196	0.325	0.115	0.330	0.215	0.163	0.160	0.191	0.094	0.142	0.078	0.169	0.199
St. 5	0.338	0.212	0.051	0.175	0.041	0.117	0.383	0.202	0.097	0.359	0.070	0.190	0.222	0.189	0.180	0.131	0.388
St. 6	0.263	0.186	0.112	0.108	0.090	0.182	0.313	0.166	0.157	0.269	0.083	0.152	0.224	0.124	0.071	0.107	0.339
St. 7	0.336	0.188	0.127	0.097	-0.046	0.094	0.278	0.041	-0.025	0.266	0.091	0.108	0.146	0.083	0.134	0.071	0.254
St. 8	0.194	0.308	0.200	0.372	0.228	0.305	0.282	0.335	0.247	0.194	0.186	0.285	0.177	0.220	0.062	0.253	0.261
St. 9	0.300	0.310	0.124	0.176	0.208	0.102	0.411	0.224	0.138	0.288	0.142	0.192	0.270	0.302	0.089	0.200	0.518
St. 10	0.210	0.287	0.146	0.169	0.169	0.206	0.498	0.146	0.036	0.319	0.136	0.218	0.217	0.341	0.216	0.122	0.423
St. 11	0.128	0.207	0.307	0.335	0.271	0.265	0.228	0.290	0.268	0.152	0.121	0.306	0.251	0.198	0.074	0.116	0.206
St. 12	0.257	0.190	0.179	0.282	0.099	0.184	0.352	0.285	0.147	0.316	0.224	0.238	0.160	0.241	0.184	0.204	0.400
St. 13	0.301	0.201	0.203	0.156	0.091	0.158	0.539	0.246	0.162	0.319	0.087	0.252	0.260	0.278	0.136	0.075	0.488
St. 14	0.149	0.095	0.074	-0.014	-0.073	0.071	-0.023	0.078	-0.014	0.048	0.062	0.061	0.004	0.017	-0.063	0.099	0.035
St. 15	0.219	0.186	0.117	0.123	0.026	-0.036	0.410	0.099	0.058	0.256	0.185	0.165	0.223	0.182	0.183	0.102	0.362
St. 16	0.269	0.272	0.135	0.206	0.165	0.201	0.453	0.287	0.232	0.238	0.182	0.258	0.224	0.293	0.214	0.197	0.413
St. 17	0.128	0.239	0.264	0.228	0.339	0.191	0.210	0.202	0.393	0.193	0.163	0.215	0.194	0.206	0.083	0.213	0.242
St. 18	0.107	0.130	0.094	0.038	0.046	0.027	0.213	0.068	0.047	0.144	0.137	0.056	0.213	0.107	0.175	0.007	0.185
St. 19	0.255	0.282	0.245	0.203	0.210	0.232	0.456	0.256	0.212	0.270	0.185	0.248	0.256	0.287	0.137	0.129	0.470
St. 20	0.223	0.176	0.126	0.064	0.156	0.091	0.278	0.146	0.121	0.136	0.066	0.081	0.113	0.088	0.133	0.038	0.248
St. 21	0.212	0.189	0.116	0.073	0.161	0.055	0.482	0.160	0.088	0.248	0.206	0.186	0.212	0.296	0.203	0.074	0.464
St. 22	0.140	0.251	0.166	0.223	0.130	0.192	0.284	0.137	0.053	0.258	0.188	0.150	0.052	0.215	0.179	0.184	0.215
St. 23	0.164	0.282	0.359	0.370	0.243	0.302	0.230	0.308	0.326	0.189	0.245	0.301	0.231	0.200	0.195	0.298	0.279
St. 24	0.276	0.280	0.373	0.299	0.251	0.334	0.202	0.385	0.305	0.149	0.234	0.322	0.179	0.224	0.238	0.369	0.274
St. 25	0.053	0.248	0.268	0.261	0.370	0.275	0.164	0.328	0.415	0.047	0.172	0.214	0.137	0.218	0.063	0.263	0.218
St. 26	0.309	0.327	0.253	0.168	0.218	0.160	0.534	0.222	0.150	0.293	0.245	0.253	0.367	0.382	0.208	0.121	0.529
St. 27	0.208	0.223	0.166	0.183	0.041	0.115	0.395	0.194	0.116	0.191	0.186	0.213	0.332	0.230	0.284	0.205	0.372
St. 28	0.260	0.298	0.161	0.193	0.060	0.212	0.371	0.205	0.078	0.315	0.195	0.164	0.280	0.333	0.246	0.205	0.394
St. 29	0.293	0.373	0.172	0.192	0.148	0.227	0.473	0.169	0.131	0.341	0.155	0.171	0.221	0.385	0.138	0.218	0.455
St. 30	0.301	0.376	0.242	0.278	0.122	0.259	0.457	0.255	0.195	0.459	0.230	0.268	0.204	0.346	0.202	0.261	0.464
St. 31	0.398	0.356	0.257	0.173	0.096	0.165	0.515	0.195	0.131	0.463	0.252	0.310	0.228	0.293	0.154	0.089	0.405
St. 32	0.180	0.221	0.180	0.320	0.167	0.264	0.147	0.304	0.169	0.181	0.258	0.285	0.011	0.252	0.107	0.281	0.091
St. 33	0.309	0.281	0.276	0.210	0.053	0.227	0.360	0.189	0.168	0.312	0.141	0.222	0.256	0.386	0.148	0.162	0.331
St. 34	0.438	0.361	0.222	0.282	0.217	0.186	0.484	0.314	0.243	0.406	0.283	0.377	0.320	0.355	0.183	0.247	0.451
St. 35	0.207	0.305	0.300	0.212	0.232	0.162	0.300	0.208	0.220	0.248	0.230	0.266	0.210	0.287	0.182	0.259	0.343
St. 36	0.166	0.343	0.202	0.166	0.167	0.195	0.303	0.211	0.180	0.236	0.283	0.198	0.273	0.208	0.250	0.251	0.329
St. 37	0.120	0.229	0.313	0.344	0.273	0.319	0.183	0.358	0.338	0.164	0.229	0.265	0.316	0.216	0.181	0.353	0.317
St. 38	0.286	0.215	0.104	0.117	0.078	0.116	0.392	0.173	0.096	0.240	0.102	0.103	0.198	0.230	0.160	0.086	0.386

*	St. 55	St. 56	St. 57	St. 58	St. 59	St. 60	St. 61	St. 62	St. 63	St. 64	St. 65	St. 66	St. 67	St. 68	St. 69	St. 70	St. 71
St. 39	0.208	0.381	0.323	0.253	0.197	0.234	0.386	0.285	0.222	0.270	0.233	0.247	0.277	0.322	0.228	0.268	0.414
St. 40	0.062	0.104	0.130	0.178	0.093	0.142	0.089	0.161	0.098	0.113	0.072	0.114	0.110	0.075	0.132	0.094	0.175
St. 41	0.119	0.206	0.410	0.404	0.283	0.394	0.196	0.317	0.370	0.256	0.256	0.372	0.217	0.226	0.065	0.222	0.237
St. 42	0.154	0.267	0.377	0.348	0.326	0.265	0.254	0.361	0.298	0.146	0.204	0.284	0.219	0.244	0.205	0.265	0.334
St. 43	0.422	0.375	0.238	0.195	0.163	0.227	0.380	0.166	0.191	0.360	0.200	0.240	0.227	0.232	0.198	0.181	0.397
St. 44	0.110	0.198	0.259	0.188	0.127	0.228	0.116	0.268	0.191	0.235	0.205	0.199	0.224	0.190	0.214	0.242	0.268
St. 45	0.418	0.350	0.182	0.135	0.121	0.155	0.405	0.201	0.095	0.413	0.197	0.268	0.235	0.220	0.161	0.206	0.391
St. 46	0.278	0.357	0.355	0.185	0.178	0.264	0.227	0.296	0.246	0.288	0.236	0.258	0.248	0.251	0.153	0.247	0.291
St. 47	0.342	0.314	0.225	0.213	0.135	0.290	0.458	0.242	0.150	0.493	0.261	0.360	0.271	0.295	0.157	0.144	0.395
St. 48	0.106	0.137	0.082	0.063	0.115	0.119	0.138	0.107	0.121	0.109	0.148	0.034	0.052	0.218	0.147	0.136	0.193
St. 49	0.250	0.293	0.170	0.233	0.179	0.099	0.301	0.135	0.172	0.300	0.280	0.271	0.228	0.224	0.183	0.130	0.378
St. 50	0.277	0.343	0.408	0.377	0.223	0.328	0.156	0.340	0.337	0.246	0.390	0.488	0.177	0.258	0.134	0.303	0.217
St. 51	0.269	0.292	0.297	0.244	0.135	0.169	0.297	0.211	0.254	0.314	0.227	0.223	0.156	0.359	0.238	0.230	0.258
St. 52	0.218	0.148	0.088	0.097	0.179	0.189	0.234	0.181	0.295	0.191	0.038	0.134	0.184	0.201	0.180	0.167	0.323
St. 53	0.214	0.267	0.208	0.283	0.256	0.210	0.297	0.261	0.180	0.225	0.263	0.197	0.161	0.227	0.243	0.307	0.333
St. 54	0.385	0.402	0.154	0.204	0.226	0.146	0.455	0.225	0.150	0.394	0.302	0.244	0.306	0.282	0.279	0.190	0.514
St. 55	1.000	0.481	0.287	0.098	0.091	0.218	0.339	0.201	0.174	0.322	0.176	0.312	0.158	0.173	0.222	0.110	0.249
St. 56	0.481	1.000	0.389	0.257	0.185	0.287	0.402	0.236	0.292	0.315	0.323	0.324	0.227	0.217	0.138	0.211	0.242
St. 57	0.287	0.389	1.000	0.338	0.216	0.428	0.196	0.296	0.344	0.250	0.256	0.356	0.202	0.266	0.173	0.294	0.246
St. 58	0.098	0.257	0.338	1.000	0.337	0.465	0.209	0.455	0.412	0.265	0.358	0.418	0.108	0.189	0.077	0.308	0.241
St. 59	0.091	0.185	0.216	0.337	1.000	0.311	0.175	0.383	0.308	0.088	0.168	0.164	0.214	0.220	0.126	0.224	0.226
St. 60	0.218	0.287	0.428	0.465	0.311	1.000	0.267	0.500	0.452	0.249	0.247	0.307	0.149	0.280	0.144	0.296	0.202
St. 61	0.339	0.402	0.196	0.209	0.175	0.267	1.000	0.285	0.204	0.372	0.243	0.212	0.297	0.333	0.266	-0.021	0.471
St. 62	0.201	0.236	0.296	0.455	0.383	0.500	0.285	1.000	0.548	0.220	0.285	0.374	0.206	0.267	0.167	0.302	0.287
St. 63	0.174	0.292	0.344	0.412	0.308	0.452	0.204	0.548	1.000	0.299	0.269	0.327	0.206	0.201	0.071	0.304	0.294
St. 64	0.322	0.315	0.250	0.265	0.088	0.249	0.372	0.220	0.299	1.000	0.291	0.339	0.209	0.229	0.191	0.128	0.398
St. 65	0.176	0.323	0.256	0.358	0.168	0.247	0.243	0.285	0.269	0.291	1.000	0.399	0.181	0.192	0.193	0.274	0.185
St. 66	0.312	0.324	0.356	0.418	0.164	0.307	0.212	0.374	0.327	0.339	0.399	1.000	0.246	0.200	0.074	0.197	0.237
St. 67	0.158	0.227	0.202	0.108	0.214	0.149	0.297	0.206	0.206	0.209	0.181	0.246	1.000	0.267	0.324	0.198	0.391
St. 68	0.173	0.217	0.266	0.189	0.220	0.280	0.333	0.267	0.201	0.229	0.192	0.200	0.267	1.000	0.240	0.388	0.369
St. 69	0.222	0.138	0.173	0.077	0.126	0.144	0.266	0.167	0.071	0.191	0.193	0.074	0.324	0.240	1.000	0.231	0.348
St. 70	0.110	0.211	0.294	0.308	0.224	0.296	-0.021	0.302	0.304	0.128	0.274	0.197	0.198	0.388	0.231	1.000	0.359
St. 71	0.249	0.242	0.246	0.241	0.226	0.202	0.471	0.287	0.294	0.398	0.185	0.237	0.391	0.369	0.348	0.359	1.000

*St. = Heritage Statement

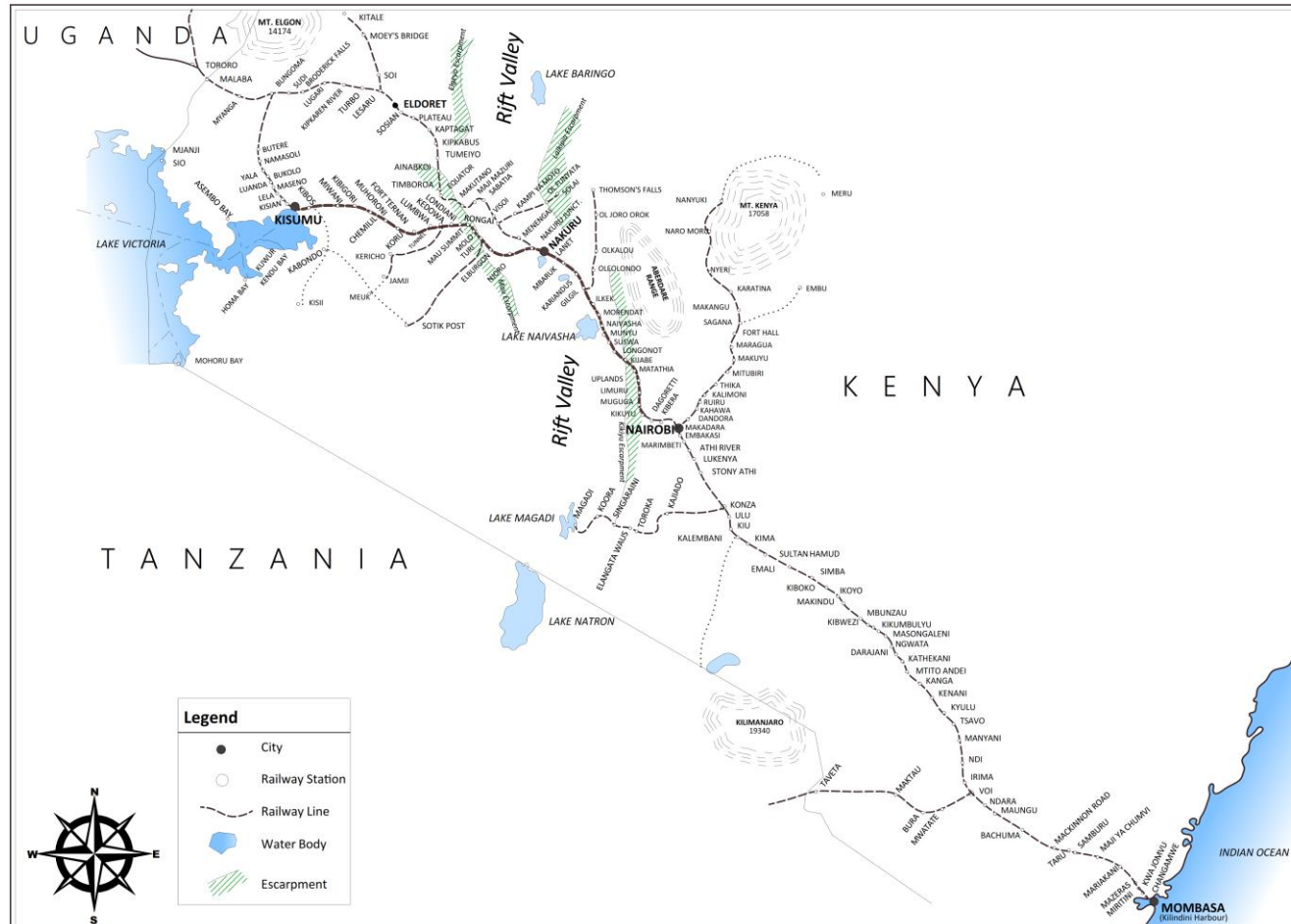
Appendix VIII: Communalities

Variable	Initial	Extraction
Statement 1	1.000	0.592
Statement 2	1.000	0.602
Statement 3	1.000	0.522
Statement 4	1.000	0.592
Statement 5	1.000	0.692
Statement 6	1.000	0.675
Statement 7	1.000	0.705
Statement 8	1.000	0.641
Statement 9	1.000	0.686
Statement 10	1.000	0.635
Statement 11	1.000	0.650
Statement 12	1.000	0.591
Statement 13	1.000	0.638
Statement 14	1.000	0.693
Statement 15	1.000	0.617
Statement 16	1.000	0.622
Statement 17	1.000	0.536
Statement 18	1.000	0.511
Statement 19	1.000	0.642
Statement 20	1.000	0.617
Statement 21	1.000	0.668
Statement 22	1.000	0.635
Statement 23	1.000	0.657
Statement 24	1.000	0.697
Statement 25	1.000	0.622
Statement 26	1.000	0.662
Statement 27	1.000	0.588
Statement 28	1.000	0.702
Statement 29	1.000	0.684
Statement 30	1.000	0.700
Statement 31	1.000	0.684
Statement 32	1.000	0.612
Statement 33	1.000	0.656
Statement 34	1.000	0.663
Statement 35	1.000	0.618
Statement 36	1.000	0.657
Statement 37	1.000	0.636
Statement 38	1.000	0.525
Statement 39	1.000	0.621
Statement 40	1.000	0.437
Statement 41	1.000	0.606
Statement 42	1.000	0.620
Statement 43	1.000	0.675
Statement 44	1.000	0.605
Statement 45	1.000	0.729

Variable	Initial	Extraction
Statement 46	1.000	0.516
Statement 47	1.000	0.691
Statement 48	1.000	0.632
Statement 49	1.000	0.645
Statement 50	1.000	0.674
Statement 51	1.000	0.580
Statement 52	1.000	0.597
Statement 53	1.000	0.706
Statement 54	1.000	0.757
Statement 55	1.000	0.634
Statement 56	1.000	0.587
Statement 57	1.000	0.610
Statement 58	1.000	0.686
Statement 59	1.000	0.535
Statement 60	1.000	0.619
Statement 61	1.000	0.695
Statement 62	1.000	0.659
Statement 63	1.000	0.677
Statement 64	1.000	0.593
Statement 65	1.000	0.575
Statement 66	1.000	0.593
Statement 67	1.000	0.601
Statement 68	1.000	0.668
Statement 69	1.000	0.683
Statement 70	1.000	0.666
Statement 71	1.000	0.631

Extraction Method: Principal Component Analysis.

Appendix IX: Mombasa to Kisumu Railway Stations



Source: Adapted from Gunston, 2004; McCrow (2022); Molesworth (1899)

Appendix X: Research License

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Appendix XI: East African Railways and Harbours Station Codes

STATION OR PORT	CODE	STATION OR PORT	CODE	STATION OR PORT	CODE	STATION OR PORT	CODE	STATION OR PORT	CODE	STATION OR PORT	CODE
Masindi Port ..	MDP	Naivasha ..	NSA	Sabatia ..	SBT	Ainabkoi ..	NBK	Jinja ..	JJS	Kisumu ..	KSM
Masindi Town ..	MDT	Nakuru ..	NRO	Sagana ..	SGA	Arusha ..	ARS			Kisumu Pier ..	KSP
Masongaleni ..	MSL	Nakuru Control Office ..	NRC	Samburu ..	SBU	Asembo Bay ..	ASB	Kabagole ..	KGL	Kitale ..	KTL
Mathathia ..	MIH			Same ..	SEM	Athi River ..	ATR	Kabuga ..	KBA	Kitara Point ..	KTP
Mau Summit ..	MST	Nakuru Junction ..	NJT	Sambwe Pier ..	SAM	Atura Pier ..	ATP	Kachumbala ..	KCB	Kiungu ..	KNG
Maungu ..	MGU	Namaganda ..	NGM	Sango Bay ..	SGO			Kachung Port ..	KIG	Kiu ..	KIU
Maurui ..	MRI	Namanve ..	NMV			Bachuma ..	BMA	Kahawa ..	KAA	Kome North ..	KMN
Mazeras ..	MRS	Namasagali ..	NSG	Seta ..	SET	Bihanga ..	BHG	Kahe Junction ..	KHE	Kome South ..	KMS
Mazinde ..	MZD	Namasali Pier ..	NAM	Shirati Pier ..	SHR	Broderick Falls ..	BDF	Kajiado ..	KAJ	Konza ..	KNZA
Mbale ..	MBL	Namasoli (Halt) ..	NAL	Simba ..	SIM	Bubekke ..	BBK	Kakira ..	KKR	Koora (Halt) ..	KRA
Mbaruk ..	BRK	Namwendwa ..	NWD	Singiraini ..	SGI	Budali Pier ..	BUL	Kalembwani ..	KBN	Korogwe ..	KOR
MBuzinza ..	MBZ	Nansio Port ..	NOP	Sio Pier ..	SIO	Budumba ..	BUD	Kalimoni ..	KMO	Koru ..	KRU
Mbulamuti ..	MLI	Nanyuki ..	NUK	Solai ..	SOL	Bugondo Pier ..	BDO	Kaliro ..	KAL	Kumi ..	KUM
Menengai ..	MNG	Naro Moru ..	NMR	Soroti ..	SRI	Bugungu ..	BUG	Kampala ..	KLA	Kwa Jomvu ..	KJV
Miritini ..	MTI	Ndaiga ..	DEG	Soy ..	SOY	Buiko ..	BKO	Kampala Control Office ..		Kyaka Ferry ..	KYF
Mitubiri ..	MTB	Ndara ..	NDR	Stony Athi ..	STA	Bujoko ..	BJK	Kampi-ya-Moto ..	KBM	Kyulu ..	KYL
Mityana ..	MTY	Ndi ..	NDI	Sudi ..	SUD	Bukakata Pier ..	BKT	Kamuli ..	KML	Lalli Port ..	LLI
Miwani ..	MWN	Ngombezi ..	NBZ	Sultan Hamud ..	SMD	Bukidea ..	BUK	Kamwenge ..	KWG	Lanet ..	LNT
Mjanji Pier ..	MAJ	Ngomeni ..	NGI	Suswa ..	SSW	Bukoba Pier ..	BKB	Kanga ..	KGA	Laropi Pier ..	LRP
Mkomazi ..	MKS	Ngwata ..	NWA	Tanga ..	TAN	Bungoma ..	BGM	Kaptagat ..	KPG	Lela ..	LEL
Mkumbura ..	MBR	Nimule Pier ..	NML	Tanga Wharf ..	TAW	Bura ..	BRA	Karatina ..	KRT	Lembeni ..	LEM
Mnyusi ..	MNU	Njoro ..	NJO	Taru ..	TRU	Busungwe ..	BSW	Kariandus ..	KRD	Leseru ..	LSU
Mohoru Bay ..	MOB	Nkongwe ..	NKE	Taveta ..	TVT	Butere ..	BTR	Karumo ..	KUO	Limuru ..	LMU
Molo ..	MLO	Nsinze ..	NSS	Tengeni ..	TEN	Butiaba Pier ..	BTB	Karungu Pier ..	KGU	Londiani ..	LDI
Mombasa ..	MSA	Nungwe Bay ..	NUN	Thika ..	TKA	Buwaya Pier ..	BYA	Kasanbia ..	KSB	Longonot ..	LON
Mombo ..	MBO	Nyamirembe ..	NMB	Thomson's Falls ..	TFL	Changamwe ..	CGW	Kasenyi Pier ..	KSY	Luanda ..	LUA
Morendat ..	MRT	Nyenga ..	NYG	Timboroa ..	TMB	Chemelil ..	CML	Kasere ..	KSE	Lubanyi ..	LBY
Moshi ..	MOS	Nyeri ..	NER	Toroka (Halt) ..	TRO	Dagoretti ..	DGT	Katebo ..	KTO	Lugari ..	LGR
Mtito Andei ..	MTO	Nzai ..	NZI	Tororo ..	TOR	Dandora ..	DDA	Kathekani ..	KHK	Lukunya ..	LKY
Muguga ..	MUG	Obongi ..	OBG	Tsavo ..	SVO	Darajani ..	DJN	Katunguru ..	KUU	Lumbwa ..	LBA
Muheza ..	MUH	Okungulo ..	OGO	Tumeiyo ..	TUM	Dura River ..	DRR	Kawolo ..	KWO	Lutoboka ..	LUT
Muhoroni ..	MNI	Oleolondo ..	OND	Tunnel ..	TNL			Kawolongojio ..	KOO	Luzinga ..	LZG
Mukono ..	MKO	Ol Joro Orok ..	OJK	Turbo ..	TBO	Elburgon ..	ELB	Kedowa ..	KDW	Mackinnon Road ..	MAK
Murka ..	MUR	Ol Kalou ..	OKU	Turi ..	TRR	Eldoret ..	ELD	Kelli Pier ..	KEL	Magadi ..	MGD
Musoma Pier ..	MSM	Ol Punyata ..	OPA	Ulu ..	ULU	Emali ..	EML	Kenani ..	KNI	Magodes ..	MDS
Musozi ..	MSZ	Onigo ..	ONG	Uplands ..	UPL	Embakasi ..	EKS	Kendu Bay ..	KEN	Mahagi Port ..	MHG
Mutir Pier ..	MTR			Usa River ..	USR	Entebbe Pier ..	NTB	Kibanga Port ..	KNA	Maji Mazuri ..	MZR
Mwanatibu ..	MTU	Pakwach Pier ..	PKH	Visoi ..	VSO	Equator ..	EQA	Kibera ..	KBE	Maji-ya-Chumvi ..	MCV
Mwanyiri Pier ..	MWR	Palango Pier ..	PLG	Voi ..	VOI	Fort Hall ..	FHL	Kibigori ..	KBG	Makanya ..	MKN
Mwanza Pier ..	MZP	Panyamur ..	PNR	Wamala ..	WAM	Fort Ternan ..	FTN	Kiboko ..	KBK	Makindu ..	MKU
Mwatate ..	MTT	Plateau ..	PLT	Wangala ..	WGA	Gilgil ..	GGL	Kibos ..	KBS	Makongeni ..	MGI
Myanga ..	MYG	Pongwe ..	PON	Yala ..	YAL	Hedaru ..	HDU	Kigingiri Pier ..	KGI	Maktano (Halt) ..	MKT
Myanzi ..	MYZ	Port Bell Pier ..	PBL			Hoey's Bridge ..	HBG	Kihuhwi ..	KUH	Makutano ..	MTN
						Homa Bay ..	HMA	Kijabe ..	KJB	Makuyu ..	MYU
Nabieso Pier ..	NBS							Kikuletwa ..	KUL	Makuyuni ..	MKY
Nagongera ..	NGG	Rau River (Halt) ..	RAU					Kikumbulyu ..	KIK	Malaba ..	MLB
Nairobi ..	NRB	Rhino Camp Pier ..	RNP					Kikuyu ..	KYU	Manafwa ..	MFA
Nairobi Control Office ..	NRW	Rongai ..	RNG					Kilindini Harbour ..	KLI	Manjewa ..	MJW
		Ruiru ..	RIU					Kima ..	KMA	Manyani ..	MAY
								Kipkabus ..	KKB	Maragua ..	MRG
								Kipkarren River ..	KPK	Mariakani ..	MKI
								Kisangiro ..	KGO	Marimbeti ..	MMI
								Kisian ..	KIS	Maseno (Halt) ..	MSN

Source: (McCrow, n.d.-b)