USERS PERCEPTION OF STREETSCAPE FOR ITS LIVEABILITY - IN THE CASE OF HOSANNA TOWN

Nathnael Samuel Dana

A Thesis Submitted to

The department of Architecture

School of Civil Engineering and Architecture

Presented in Partial Fulfillment of the Requirement for Master of science degree in Urban Planning and Design

Office of Graduate Studies

Adama Science and Technology University

June, 2022

Adama, Ethiopia

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APPROVAL OF BOARD OF EXAMINER

I, the advisors of the thesis entitled "**Users perception of streetscape for its livability – in the case of hosanna town"** and developed by **Nathnael Samuel,** hereby certify that the recommendation and suggestions made by the board of examiners are appropriately incorporated into the final version of the thesis.

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We, the undersigned, members of the Board of Examiners of the thesis by **Nathnael Samuel,** have read and evaluated the thesis entitled "**Users perception of streetscape for its livability – in the case of hosanna town"** and examined the candidate during open defense. This is, therefore, to certify that the thesis is accepted for partial fulfillment of the requirement of the degree of Master of Science in **Urban Planning and Design**.

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I hereby declare that this Master Thesis entitled **"Users perception of streetscape for its livability – In the case of hosanna town"** is my original work. That is, it has not been submitted for the award of any academic degree, diploma, or certificate in any other university. All sources of materials that are used for this thesis have been duly acknowledged through citation

Nathnael Samuel Dana	_____	_____
Name of student	Signature	Date

Recommendation

I, the Advisor of this thesis, hereby certify that I have read the revised version of the thesis entitled "**Users perception of streetscape for its livability – In the case of hosanna town".** prepared under my guidance by **Nathnael Samuel Dana** and submitted in partial fulfillment of the requirements for the degree of Mater's of Science in **Urban Planning and Design**. Therefore, I recommend the submission of the revised version of the thesis to the department following the applicable procedures.

Prof. Samson Kassahun	_____	_____
Major Advisor	Signature	Date

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LIST OF ACRONYMS AND ABBREVIATIONS

AI	Adobe illustrator
ASTU	Adama science and technology university
GIS	Geographic Information System
HCM	Highway Capacity Manual
LOS	Level of Service
PF	Pedestrians flow
PFR	Pedestrians flow Rate
PLOS	Pedestrians Level of Service
SAD	Shy Distance
SDG	Sustainable Development Goals
SNNPRs	South Nations, Nationalities and people's Regional State
SPSS	Statically Package for Social Science.
TCM	Traffic Calming Measurements
TRB	Transportation Research Board
UN	United Nations
We	Effective width

ABSTRACT

It is critical to recognize urbanization trends and to be prepared to deal with the effects of urbanization on land, air, and water. Street and streetscape are highly affected by this phenomenon and have impact on livability of streetscapes. As a fast-growing town, Hosanna doesn't have a planned streetscape at all and the existing streets are also inaccessible, making livability for both pedestrians and vehicles problematic. Hence the main objective of this research was to understand the streetscapes of Hosanna town for better urban livability by developing effective and appropriate strategies. To achieve the objectives of the research both qualitative and quantitative or a mixed approach was used as a research method to deeply understand user's perception of streetscape for its livability. The results showed that the current characteristics and condition of the streetscape lacks the majority of facilities and lacks character and Pedestrian level of service result in two surveyed areas resulting 33.93 ped/min/m and 65.63 ped/min/m putting the sidewalks level of service in D and level of service in E which implies there is insufficient space for users in the existing sidewalks. In another hand the study identified that problems perceived by main pedestrians and vehicular drivers affected their livability. The existing streetscape is uncomfortable, inaccessible, visually unattractive, unsafe, it's not inclusive, inconvenient, and making livability difficult for users and making livability difficult on the existing streetscape, pedestrians demanded to have all streetscape elements, overall physical change of the street, widening street and sidewalks. Depending those demands from pedestrians and drivers the study identified streetscape design as the most effective methods for overcoming the identified problems. Generally, it's very clear that the existing street is affecting the livability of the town as well as the users and it is important to develop an improved streetscape for better urban livability. Finally, Streetscape design recommendation had been prepared as the urban design and planning intervention to overcome different problems identified in this study.

.

Keywords: Congestion, Livable city, Pedestrians, Street, Streetscape, livability, perception

CHAPTER ONE

INTRODUCTION

Rapid urban population growth strains cities, generating congestion and other problems on city streets and leading to urban transformation (Andrew, 2019). The planning, design, and use of a variety of urban infrastructure, from streets to highways, from pedestrian, bicycle, bus, or train lines and their connecting transport hubs to different facilities, is directly related to urban transformation. They are critical to the change of the urban Structure. Recent societal changes, particularly in developing countries, have an impact on the planning and design strategies used to transform or extend urbanized areas by planning or renewing existing infrastructure (Kris, 2015; Esteve, 2016).

Streets must accommodate the massive expansion while also catering to the needs of all types of users. All streets should be designed with all users' comfort, affordability, safety, accessibility, and mobility in mind. Streets contribute to the social, economic, and environmental well-being of a city (Kuma & Juan, 2016). In this approach, urban planning should maximize the use of urban land to ensure the urban environment's long-term vitality.

Streets are the most numerous and widely dispersed urban public spaces. They are the sites of much of a city's activity. Streetscapes, or the three-dimensional built environments that surround them, are indisputable components of urban livability (Harvey, 2014) Cities consist of 20-30% streets (Stavroulaki & Meta, 2020). The design of streets, as well as their surrounding streetscapes, has an impact on whether they are simply conduits for accessing distributed features of a livable community, or whether they are livable spaces in and of themselves (Campoli, 2012). Because streets are such an important part of everyday life and are the most common public spaces in the developed world, it is obvious that the characteristics of street design influence their aesthetic appeal and, as a result, livability for a wide range of users (Andrew, 2019).

In this context, the study developed some strategies which activate the role of the streetscape as an experience to the user, in turn, provide a mobile, livable, accessible attractive, safe, and memorable urban environment, and sustain the development process for better urban livability of cities.

1.1 Background of the Study

It is critical to recognize urbanization trends and to be prepared to deal with the effects of urbanization on land, air, and water. Growing city sizes influence the environment and infrastructure of cities, resulting in issues such as air pollution, water pollution, traffic congestion, depletion of nonrenewable resources, safety, gas emissions, and so on. Building Resilient Cities (Goal 9) and Developing Infrastructure for the Future (Goal 11) are two of the goals outlined in the 2030 Agenda for Sustainable Development that emphasizes the importance of street design in achieving a sustainable future (United oNations, 2016).

As cities grow, there will be less space for us to live in the heart of our city. Issues and problems, as well as conflicts, emerge. We need to find a solution because those problems have gotten worse (An, 2019). Cities' livability and sustainability are widely regarded as essential challenges for the planet's future. Governments, institutions, designers, planners, academics, and organizations all around the world are looking for methods to improve cities while consuming less energy and resources, stimulating innovation and stronger communities, and delivering the most livable settings for people (Isocarp, 2010). A city's livability can be assessed in a variety of ways. A livable city has complete communities, accessibility and sustainable mobility, a diverse and powerful local economy, dynamic public spaces, and affordability (Harvey, 2014).

The design and comfort of a community are heavily influenced and determined by the city's streets; streets are more than a public utility, traffic conduits, or a location where only municipal properties are located. People are free to walk around the streets. Except for private gardens, which many city inhabitants do not have or want, or quick access to courtyards or parks, streets are the primary form of outdoor space for many city dwellers.

Given their civic functions in urban life, it is not unexpected that streets necessitate and consume a large quantity of land. The roads should be designed with everyone in mind, as well as being safe, healthy, and long-lasting. The route must provide equal access to all age groups, ethnic groups, and socioeconomic categories. Streets should also be free of illegal activity and provide a safer environment for all. A good street is defined as a long-term infrastructure that can withstand future dangers, engages the community in social interactions and economic value, develops a sense of place in the city, and increases safety (Sauter & Huettenmoser, 2008).

1.2 Statement of the Problem

Hosanna town is growing in population in recent years. The is town growing without plan and strategies, because of this there will be less space for dwellers to live in the heart the town. Issues and problems, as well as conflicts, were emerging in the town. As a fast-growing town, Hosanna doesn't have a planned streetscape at all and the existing streets are also inaccessible, making livability for both pedestrians and vehicles problematic. Such low-quality and unusual streets create an unappealing visual environment and make livability difficult for users. Existing streets in the city do not have facilities, which make them livable spaces in the heart of the city while also eligible, and as a result, there are a significant number of vehicular accidents, and loss of physical and social well-being occurring in the city. Crowded streets are the common characteristics of the existing street which are affecting the livability of the street for its users. In this regards the Hosanna town streets do not conform to the livability of the existing street because it lakes fulfilling the characteristics of how a livable town looks like.

It is also continuous and which seems nonstop growth in traffic or motorized volumes in recent years in hosanna town besides this emerging issue there are no spaces are provided for pedestrians and streetscape elements do not develop in the town and this issue, directly and indirectly, affects social, physical and mental wellbeing of the residents which are direct relation with the livability.

There has been far less or no research has been done on different urban streetscape aspects in terms of physical quality and their influence on users' perception of livability. This study addresses and fills the gap in users' perception of the streetscape for its livability by understanding the user's perceptions of the existing condition of streets and identifying some strategies which activate the role of the streetscape as an experience for the user, in turn, providing a mobile, livable, accessible attractive, safe, and memorable urban environment, and sustain the development process for better urban livability of town.

1.3 Objective of the study

1.3.1 General objective:

To understand the streetscapes of Hosanna town for better urban livability by developing effective and appropriate strategies.

1.3.2 Specific objectives:

1. To examine the current condition of the existing streetscape.
2. To understand streetscape problems that affect the livability of the town.

1.4 Research Question

This research answered the following questions:

1. What is a common characteristic of the existing streetscapes that affect the livability of the streets?
2. How do streetscape problems affect the livability of the urban area?

1.5 Significance of the study

The significance of this study is to demonstrate the user's perception of streetscape for its livability. This research will help and aid in determining the quality of streetscape that have a direct impact on user's livability by understanding their perception towards the existing streetscape. This study will help to identify and understand the gap in the existing knowledge about streetscape and perception of peoples towards its impact on livability, which needs refinement or revisions for creating livable cities as well as livable streets at the same time. The study is also beneficial for researchers to do similar types of research for other town of to contribute for creating livable streetscape and streetscape livability in general. Generally, the findings and recommendations of this specific study will contribute to creating a solid understanding of how streetscapes are important to for towns livability.

1.6 Scope of the study

The thematic scope of the study has covered assessing the importance of streetscape in enhancing urban livability in hosanna town. The people who live in hosanna city are facing different problems because of damaged and unconventional streetscapes which are located in the town specifically the street from hosanna Mariam church up to hosanna bus stop. The spatial scope of the study encompasses the street from hosanna Mariam church to the hosanna bus stop which is 1.5 Km in total and this street was taken as an inspection area of the study.

1.7 Limitation of the study

A potential limitation of this research is that, when doing pedestrian count digital video and digital speed meter martials were not used instead manual count by using hand tally material was used this obviously create a bias data on determining accurate number of pedestrian who are using that specific street at a given period of time. Another additional limitation is photographs which are taken in this research were may be interpreted differently by this research compared to photographs which are taken in different time but the same places for different purpose. Finally, this study has been challenged by political instability in hosanna town at the time of data collection, freely measuring the sidewalks, counting pedestrians was difficult at this time and also people are afraid to talk about anything.These problems somehow affected the process of data collection and analysis.

1.8 Organization of the paper

This thesis is organized into five chapters: - The first chapter of the research contains, introduction, background of the study, statement of the problem, objectives as general and specific, research question significance, delimitation or scope of the study, limitation of the study, and finally a description of the selected site and organization of the research were clearly stated. In the second chapter border area of the research was examined, evaluated, and stated from different literature in literature review. It contains an Introduction, basic conceptual definitions, and theoretical and empirical views of the research area were referred carefully. Chapter three discusses the method and materials used for this specific research. It explains the research approach, research design, research methods, methods for data collection, types and sources of data and finally, data analysis and presentation methods were discussed. Chapter four Presented results and discussions which are discovered by different methods. This chapter contains criteria for selecting the site, the background of the site, observation, questionnaire, and interview result, and discussions were presented respectively. Chapter five presents the conclusion and recommendations depending on the findings. The research has put concluding remarks and suggested some recommendations to improve the identified problems.

CHAPTER TWO

LITERATURE REVIEW

This literature part incorporates theoretical and empirical works of literature associated with the issue under study. The study deals with the importance of streetscape in enhancing urban livability and important pieces of literature have been reviewed. Taking the research questions as a base and consideration, this literature reviewed the definition of the general study area, basics of street and streetscape concept, livability, street livability, and urban livability in general planning principles and guidelines for streetscapes, urban livability has been reviewed and two empirical reviews were analyzed.

2.2 Theoretical literature review

In this section, the study explored facts and theories that help the issue under the study area reviewed and presented underneath.

2.2.1 The basics of street and streetscape

i. Streets

The word the street has its origin in the Latin Strata, which means ‘paved road’. According to the Merriam Webster Dictionary (2020), a street is a thoroughfare, especially in a city, town, or village that is wider than an alley or lane and usually includes sidewalks A street is a public route in a city, town, or town that usually has residences and structures on one or both sides (Al Odat & Al Kurdi, 2021).

According to Meht (2006) Streets play an essential function in open public space and have become the most influenced emblems of the public domain. People's functional, social, and recreational requirements have been linked to economic progress, physical health, and communal sensibilities on the streets. Researchers propose that the street be viewed as a social place rather than just a means of transportation. Streets, in the form of highways, pathways, and public spaces, are essential to everyone's urban existence. Because of their tiny residences and absence of private gardens, people require the flexibility to wander or remain on the streets or public places. As a result, urban space as represented by squares and streets is seen as an important component of city social life. Many towns throughout the world are now converting their roadways into more pedestrian-friendly public spaces (Tolley et al., 2003).

As (Burton & Mitchell , 2006; Hillman, 1990) stated that a street is an important urban area that is a constituent part of the city's spatial structure. Cities' streets also serve as structural components for the city. The nature of a city's main streets typically contributes to its character and individuality. As a result, they must perform complicated duties. They must have an identity and provide orientation in the city; as a result, their linkages to other major routes and sections of the city must be obvious.

ii. Streetscapes

Streetscape, as a definition from the Oxford Dictionary is a view or scene of streets, it is the visual elements of a street, including the road, adjoining buildings, sidewalks, street furniture, trees, open spaces, etc., that combine to form the street's character, (Oxford Dictionary, 2020)

Urban streets may be thought of as a combination of two major components: roads and streetscapes. Main roads are infrastructure for linear movement, mostly by motor vehicles but also by non-motorized users such as walkers and bicycles. They are designed to be useful to provide safe and efficient transport (Charlwood, 2004). Streetscapes are the three-dimensional outdoor spaces surrounding roadways, outlined on either side by buildings that form streetscape skeletons (Aultman-Hall et al., 2017). Generally, plans of streetscapes are affected by a wide extent of plan subtle elements such as building materials, structural styling, plantings, and road furniture, but urban plan scholars for the most part respect the essential extents and scale of streetscape skeletons as imperative to consolation and social efficiency for human users. In any case, planners regularly assign roads in terms of thruway plans for motor vehicles based on useful classifications such as arterial, collector, and neighborhood.

The aesthetic aspects of a street that combine to establish the street's character are referred to as the streetscape. It is one of the most essential things that contribute to the development of cities and tourist sites through its strategic function in guiding people's movements and boosting business and employment. Improving the streetscape may make the local environment more appealing, healthy, fun, safe, and intriguing, as well as help to build more livable communities (Harvey & Aultman-Hall, 2016).

2.2.2 Element of Streetscape

According to (Harvey et al., 2017) streetscape elements are all those functional and decorative elements that are placed, laid, erected, planted, or suspended within a public or communal urban space. They include public utilities and amenities, visible elements of service infrastructure, street lights, traffic signs and signals, street trees and other horticultural elements, general public furniture, advertising signs, and decorations. In a border sense, this visible element is also categorized as layout, surfacing, landscaping, public furniture**,** service infrastructure, and signage**.**

2.2.3 Aspects of a streetscape concerning Elements.

Legibility. Legibility refers to a city's ability to be easily understood by residents and visitors, allowing them to move around freely. Important places in legible cities appear important, making them easy to find and distinguish from less important ones (Al Odat & Al Kurdi, 2021; Charlwood, 2004).

Comfort and safety. Streetscapes must be active and functional. This means it must cater to the needs and expectations of all of its users, both motorized and non-motorized. In other words, it must be designed and furnished to ensure the comfort and safety of all users, including pedestrians, drivers, strollers, street cafés, street vendors, joggers, and others. etc. (Charlwood, 2004).

Attractiveness. When viewed, the streetscape and its elements must be pleasing to the eye. If a city aspires to become a nationally recognized city, its streetscape and streetscape elements must adhere to the highest urban design standards (Mohammed, 2013).

Liveliness. Streetscapes are the most effective means of improving mobility and creating livable corridors. They must be designed as living spaces where people can see and be seen by others, where they can meet and interact, depending on their role in a larger urban context. The city's social life should not be limited to formal institutions. The image of the city and its appeal to visitors is heavily influenced by its street life. (Harvey , 2014; Isocarp, 2010).

2.2.4 Livability and streetscape

Various definitions of livability exist, all of which are primarily concerned with the "quality of life" issue. In the same way that sustainability is an abstract concept in urban planning, livability is. As a result, an array of design principles and guidelines should be identified, and the quality of urban design should be improved, using the term in the urban design field.

Livability is strongly linked to people spending as much time as possible on the streets, engaging in various activities such as walking, sitting, dining, biking, playing, shopping, and so on (Anderson & Ellis, 2014).

Factors such as connectivity and accessibility to a variety of services and uses, as well as safety, attractiveness, and a sense of place, all contribute to co-presence. Apart from these factors that encourage a large number of people to attend, equal access to all people, regardless of age or mobility impairments, people with strollers, elderly, children, and injured) is a high priority for achieving livability. In another way, the importance of people living and using the streets' perceptions of livability.

In this sense, livability is a two-way street, with safety increasing the perception of livability and livability in the sense of liveliness, and 24/7 street use contributing to the sense of safety (Stavroulaki & Meta , 2020).

iii. Livable streets

A livable street, also known as a living street, is a street concept that, in contrast to traditional urban street concepts, prioritizes pedestrians and cyclists, allowing the street to be used equally by all. The concept of a livable street was first introduced in the Netherlands, as a road with traffic-control devices installed to reduce or slow traffic flow (Bosselmann et al.,1999).

The focus of Livable Street is on safety and comfort. The street should encourage the people to use the public space on the street, as well as give them the freedom to change the space's functions and reform it to suit their needs and inventiveness (Stavroulaki & Meta , 2020).

Livable streets in urban neighborhoods can be great places for public life and social inclusion (Sauter & Huettenmoser, 2008). To create a livable street, another important social factor for designers and engineers is that a street shall be a comfortable setting where people of different ages knowledge and other groups can learn and perceive the nature and social connections in the neighborhood (Francis, 2016).

The development of a livable street concept necessitates the cooperation and participation of all stakeholders. Organizations can lead to fewer conflicts if they strike a balance between the interests of various groups, which could speed up the implementation process. In practice, livable street policies may not always be recognized as a better all-around solution. Several studies look at the challenges of implementing local government policies (Dodson et al., 2014).

2.2.5 Benefits of Streetscape

i. Economic Development. An attractive town center is inviting to new and long-time residents, visitors, and business owners. For many reasons, the cities will have developed economically by creating job opportunities for residents utilizing retail shops, and street selling (Cuthbert, 2003).

ii. Healthy Communities. Heath of communities can be promoted by a good streetscape design by creating interaction among citizens and helping create safe destinations for pedestrians and cyclists (Esteve, 2016).

iii. Pollution Reduction. Trees, greenery, & parks absorb air and water pollutants while providing shade and a cooling effect on public spaces and buildings.

iv. Traffic Calming**.** Street furniture raised crosswalks and other elements of the pedestrian landscape increase driver awareness of their surroundings.

2.3 Empirical Literature Review

This section of the study related streetscapes with livability based on observed and measured phenomena that have been studied and implemented around the world and responded to specific research questions raised in this study, which helped to clarify the general concept of the streetscape.

2.3.1 Promoting Cultural identity along with Streetscape Redesign.

Mohga E. Embaby (2015) conducted a study which is entitled "Promoting Cultural identity along with Streetscape Redesign "Case studies in Cairo and Luxor Cities, Egypt". Focuses on streetscape redesign principles by identifying the major intervention techniques to improve neighborhood character and identity along Cairo's main streets. The study's main goal is to examine urban planning concepts for preserving and developing a community's local identity, originality, and cultural assets along downtown main streets.

This study's method is based on a theoretical and practical approach. This aids in the analysis of ideas for streetscape redesign and cultural identity relationships, as well as the development of a practical framework for defining the major stages of the redesign process. and evaluating the outputs and results of two separate case studies of key streets in Egyptian cities, respectively. This research attempted to present theoretical principles for the development and revitalization of historic streets. When these principles are used, there are significant variances in the actual urban conditions on the street, therefore each of these principles has its significance and effectiveness. This study finds that streetscape redesign is critical for preserving and promoting historic cities' cultural identities.

2.3.2 Measuring Urban Streetscapes for Livability

Chester Harvey and Lisa Aultman-Hall (2016) conducted a review approach study on Measuring Urban Streetscapes for Livability by using Surveys and geographic information systems which are used as traditional qualitative approaches for collecting streetscape measures to measure urban streetscapes livability. This research focused on a broad examination of streetscape livability, which will necessitate precise and efficient measurements of physical characteristics at the spatial scale of individual streetscapes, as well as indicators of experiential quality based on revealed behavior or stated preferences. Field audits are now the most common method for analyzing the mesoscale qualities of entire streetscape settings, as well as intricate microscale design components like architectural styling and materials, according to the study's findings. Although GIS approaches are popular for recording macroscale development patterns across entire neighborhoods or cities, exact geometric data for mesoscale items such as buildings and trees, which are crucial for defining streetscapes, has typically been lacking.

2.4 Lesson learned and Gap of the literature review

2.4.1 Lesson learned from literature review

This research addressed and incorporated different literatures from different journals, articles, publications to achieve the intended aim of the research. Both theoretical and empirical reviews were made. From theoretical review the basics of street and streetscape has reviewed and most of literatures emphasizes how street and streetscape are the most important components of cities livability and improving those streetscapes make the local environment more attractive, comfortable, livable and safe and create a livable community.

This study also learned different streetscape elements and their respective aspect. the basic relationship between streetscape and livability also deeply identified from the theoretical review. From two different empirical reviews the study learned the role of streetscape in determining people's identity and measuring streetscape for livability by different techniques and approaches. In general, from theoretical and empirical review the study understands and learned how street and streetscapes are important for people's livability

2.4.2 Gapes of literature review

In this study of literature reviews, a significant number of papers centers around just only beautification of streetscapes disregarding different issues those ventures are causing and affecting the wholeness of the streets. As a pattern as the study referenced before the majority of papers is not straightforwardly relate streetscapes with the livability concepts and city framework all the more regularly they concentrate on just identifying with perceived things, not those physiological and social well binges which affect the livability of the town.

CHAPTER THREE

MATERIALS AND METHODS

In this chapter, the study provides a selection of research approaches, research design research methods, materials, techniques, analysis methods, sources of data, sampling techniques, data presentation, and instruments for data analysis were discussed in detail. Which are adopted in this specific study and they are highly interrelated with the research questions and the research objective and helped to investigate a lot of research issues likewise. It also determined and explored different techniques of methods that are used in the study and by what means they will be applied to the study.

3.1 Description of the study area

The absolute geographic location of Hosanna town is 7^0 33' North latitude 37^0 51' East longitudes with elevation of 2177 meter above sea level. Total administrative area of the town is 10,414.3 hectares. The town is located 232 km away from Addis Ababa in the southwest direction and 168 km away from Hawassa town which is the capital of SNNPRs and Sidama regional state (see figure 1).

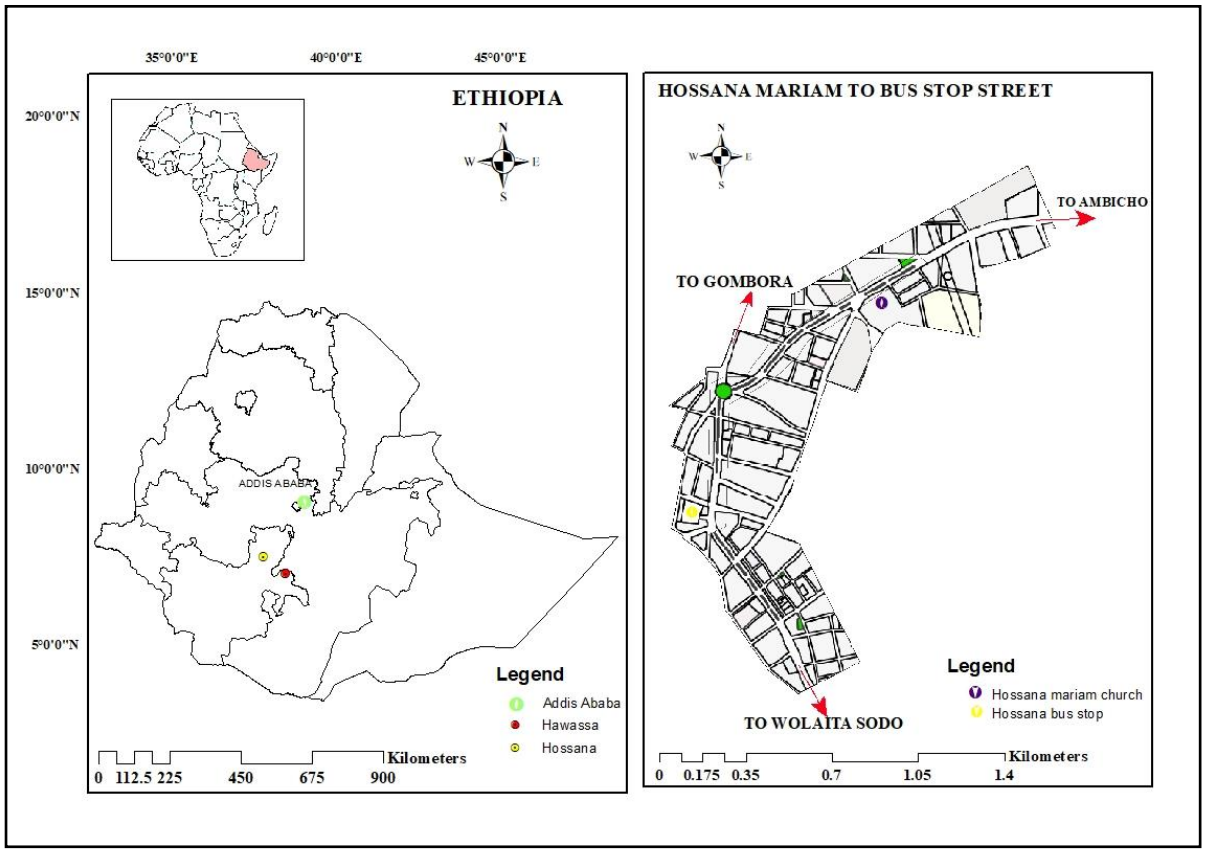

Figure 1: Location map of the study area

3.2 Criteria for selecting the study site

This study developed different selection criteria from standards and aspects of the streetscape to select the street for this research. The street from Hosanna Mariam Church through Bezabh Petros Square to Hosanna Menharia or bus stop was chosen according to the levels of pedestrian traffic, pedestrian activity, and urban characteristics. Based on those selection criteria, observations were made. In this observation, the physical form of the street such as the street's width, building setbacks, land use diversity, and appearance was examined. The other thing is that this street is the major street for the town and a lot of activities are occurring on this street.

3.3 Background about the Study site

The selected street runs from Hosanna Mariam Church through Bezabh Petros Square to Hosanna Menharia or bus stop and is 1.5 kilometers long. The street is distinguished by its diverse urban land uses, which include commercial, mixed-use, residential, and governmental offices, but commercial activities are predominant (See Figure 2). The existing street have two lanes with 8 m width in each right of way with 0.92 median The total street width of the study area is 17 m including the median which is located in the center and the pavement of this street is very deteriorated asphalt material and most of the sidewalks are earth material.

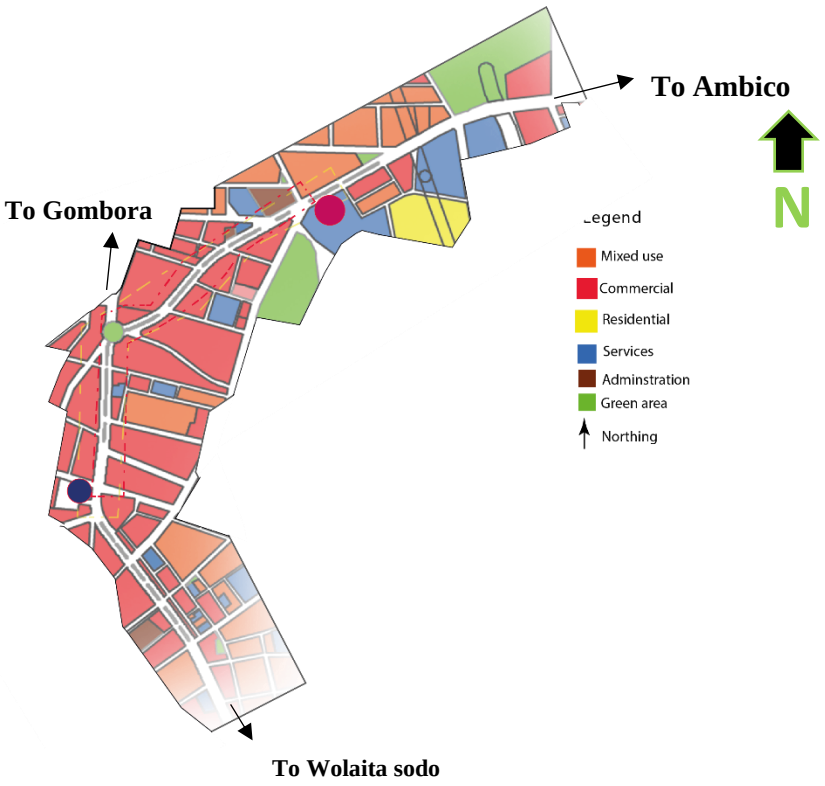

Figure 2: Existing land use

3.4 Research approach

This research adopted a deductive research approach. The deductive approach means reasoning from the general to the specific. This approach goes like the research has studied what is studied in the streetscape theme (Hyde , 2000). Beginning with a literature review and identification of literature gaps and other available resources, such as an empirical review in the area of street and streetscape with urban livability, and continuing to the projection of acquired knowledge into strategies and design principles based on previous scholastic works and findings. This research has attempted to deduct congruent strategies and assumptions in the study area from existing scholastic knowledge and experiences as well as from the existing conditions.

3.5 Research methods

3.5.1 Current condition of existing streetscape

A. Site observation method

Direct site observation in the means of photography and checklist observation was used as the main data collection methods for the first objective. The initial data collection approach was a direct and controlled observation, by taking site photos and by filling prepared checklists in which the physical qualities and characters of the collector streets from Hosanna Mariam Church to Hosanna bus stop were assessed and Using checklist the existing streetscape appearance were evaluated. The checklists were prepared based on general streetscape elements, urban utilities, and urban street transport amenities. The checklists were used on the observation date of March 10 and 11 for two consecutive days. Depending on those approaches the current physical character of the streets was documented. This method was applied and used in this research deeply understand the extent of urban physical changes or observed situations occurring in the selected street and the existing condition of the streetscape

B. Pedestrian level of services.

For this research, The Highway Capacity Manual (HCM) is used to determine the level of service of the sidewalks. As major part of streetscape the level of service in this study was applied to examine the existing status of sidewalk. This method is selected because it requires less time to obtain and analyze the data when compared to another method.it helped measure spatial characteristics, of the existing streetscape and its effect on user's.

i. Pedestrian Count

For this research specifically, the cordon counts and Manual field count techniques were used to obtain pedestrian numbers. It was implemented to observe pedestrian characteristics such as flow and speed in two selected survey sites. Pedestrians count within the selected sites based on pedestrian activity from the street was carried out in two different sites in 1.5 km within a 300-450-meter range. this count within two selected sites from the street were carried out on 3 weekdays and weekends. The selected days are Monday, Saturday, and Sunday the reason for selecting those days is Monday is a day from weekdays, Saturday is market day in the city and Sunday is a weekend this helps to understand pedestrian activities on different days. This is conducted on the day March 14, 19,20 2022 respectively from 8:30 am to 9:00 am in the morning and 6:30 to 7:00 in the night. The Counts were made on "typical" days, free from the distortions of weather. The fundamental relationships of flow – speed – density of pedestrians were investigated and analyzed in streets from Hosanna Mariam Church to the Hosanna Bus stop. (Refer to appendix G and H)

ii. Steps used to calculate Pedestrian level of service

The first step for calculating PLOS is Measurement of sidewalk width. The side walk width of the selected survey sidewalks was recorded and Estimation of the effective width of the sidewalk were determined by subtracting preempted distance which includes different obstacles found on the side walk. Observation of pedestrian flow in the selected site is recorded by using digital hand tally after that the maximum flow rate were found depending on the pedestrian flow and the side walk effective width finally determination of the pedestrian level of service(PLOS) based on the result were made. After calculating the pedestrian flow rate, the result is determined by refraining pedestrian level of service criteria (see table 1).

Table 1: Pedestrian level of service Criteria (HCM 2000)

	Space	**Flow Rate**	**Average Speed**	**v/c ratio**
LOS	**(m2/ped)**	**(ped/min/m)**	**(m/s)**	**v/c**
A	>5.6	<16	>1.3	0.21
B	3.7-5.6	16-23	1.27-1.30	0.21-0.3
C	2.2-3.7	23-33	1.22-1.27	0.31-0.44
D	1.4-2.2	33-49	1.14-1.22	0.44-0.65
E	0.75-1.4	49-75	0.75-1.14	0.65-1.0
F	<0.75	var.	<0.75	var.

iii. Equation used to determine level of service

The following equations used in the study for determining the level of service of selected two survey sites.

We = Wt - SAD (approximate preempted width) …… Equation 1

PF = No pedestrian/ min…… Equation 2

PFR = Ped flow/We…… Equation 3

Where,

We = Effective width of walkway PF = Pedestrian Flow (per/min)

Wt = total width of walkway PFR = Pedestrian Flow Rate (ped/m/min)

SAD = shy away from distance

During the site observation time, the study used it used different materials for recording the dates which are observed from the existing scenario. For recording physical status of the existing streetscape pictures were taken by using Samsung galaxy Note 10 phone and also Note book were used to write down the observed condition of the street futures. By printing the checklist prepared for controlled observation data were recorded on in 4 pieces of A4 sized white papers during the observation period. Map from google earth also used during observation period. When doing pedestrian level of services and when measuring the width of existing street and sidewalks 30 M handheld portable swing measuring taper is used.

This helped to get accurate measurement of the selected sites. During the time of pedestrian count the study has used Digital Standard hand tally recorders (Downloaded from Google play store) to accurately observer tallying passing pedestrians by recording the running totals for each time interval, for 15 minutes. For this count counting book were developed and used to recorded the number of pedestrians in three different days (refer appendices E). In the other hand the proposed land use and structural map of the hosanna town were used as secondary data source to understand the existing activities of the selected street. Arch Gis and Autodesk Auto Cad has used to delineate the study are from the land use and structural map and to illustrate the site observation, adobe illustrator (AI), Photoshop (PS) were used.

3.5.2 Understanding streetscape problems that affects the livability

A combination of data collection methods has been used in order to address the second objectives of the study. These data collection methods include questionnaires and interviews. In this method data was collected from pedestrians which are using the selected street at a time through questionnaires and interviews data from professionals (architects and urban designers and planners), and vehicular drivers. Totally 384 questionnaires were printed and deployed by using 6 data collectors for 384 questionnaires respondents. In this process, pedestrians were respondents for the questionnaires because they are direct and day-to-day relations with the streets and highly exposed and facing problems because of unconventional streets and streetscapes in the town. The series of questionnaires was made to get a better understanding of the current problems pedestrians are facing and what they do want to see for the future on the street of Hosanna Mariam church to Hosanna bus stop Street.

Semi-structured interviews were used in this study allowing for direct interaction between vehicular users and professionals on the street. In this study, 35 vehicle drivers and 3 professionals were interviewed to understand their perception on the existing streetscape. Recording, transcribing and examining recorded data from interviews and questionnaire encoding on SPSS V22 were conducted from March 19 and April 30, 2022. Various street users, vehicular drivers, and professionals have all responded to the data acquired through the questionnaire and interviews. In another hand data has been collected from published and conventional reports which include journals, articles, reports which helped to discusses the results found in questioner and interview results.

Printed questionnaire was the predominant material used in achieving second and third objective. This questionnaire consists of 19 questions, both open ended and close ended questions in combination. The total page of the questioners were 1 page and double faced and it take no longer than 5-10 minutes to complete the questionnaires. Cell Phone, Audio recorder, note books are materials used during interview and transcribing it into text. After collecting the valid questioners, its analysis was made by SPSS software and MS- Excel.

3.6 Sampling Techniques

This research adopted different methods of collecting data. To collect the questioner data from pedestrians the study used Random sampling techniques. While to get interview data from vehicular drivers, and experts (planners, architects, and urban designers) the study adopted judgment sampling techniques.

3.6.1. Sample size

The sample size is drawn for pedestrians which are questionnaires respondents. By using the Standard formula for an unknown population the sample size was determined as 384 sample size in total. Cochran formula unknown population is; -

Necessary sample size (n) = $\frac{z^2 Pq}{e^2}$

Where,

n = Sample size P = expected variances in the responses.

Z = z-score q = 1- q

This study used a 95 % of confidence level, the value of standard deviation is p = 5 and margin of error is +/- 5 % and the z score for a 95 % confidence level is will be 1.96.

Therefore; -

$n= (1.96)^2 \times 0.5 (1- 0.5) / (0.05)^2$

$= 9604/0.0025 = 384.16$

For Random sampling technique 384 sample size determined depending on the above calculation. The Questionnaires for 384 pedestrians was deployed and 253 valid responses coded and analyzed.

Additionally, Semi-structured interviews were used in this study allowing for direct interaction between vehicular users and professionals and the researcher on the street. In this study, 35 vehicle drivers and 3 professionals were interviewed judgmentally. This was significant because vehicular drivers were also a part of the street and streetscape and helped to understand their perspective towards the existing condition of the streetscape.

3.7 Data Analysis

3.7.1 Existing condition of streetscape

The processes of analysis are followed after site observation. Data were gathered carefully in forms of, photography, observation notes and filled checklists. In order to understand existing condition of the hosanna Mariam to hosanna bus stop street, site Visual content analysis was conducted. The first step was to visit the existing site and use photographs which are acquired through phone camera to create a series of images that illustrates relevant site condition including street activities, pedestrian density, streetscape elements, parking facilities, utility infrastructures to understand site characteristics. The existing physical character and function of the streetscape were explored by the analysis. The visual content analysis was started by identifying photos which have direct relation with streetscape element and qualities and physical future of the existing street, those photographs were grouped and organized in the form of explaining specific condition of existing streetscape to demonstrate this visual assessment was executed. Those photos were independently identified as which they can clearly explore and which have direct relation with the streetscape elements as well as streetscape aspects and explored each future. Pedestrian sidewalk condition analysis was also done in his research. After recording pedestrian count and sidewalk width data pedestrian level of service were determined by following HCM (2000) guideline and by comparative analysis the result of PLOS from two study areas compared with the pedestrian level of service criteria. Checklist analysis depending on streetscape standards and elements were also used in this specific research by this analysis the physical condition of the existing street was measured and by comparative analysis the streetscape standards and elements compared with each element listed in the checklist. In general, the result of the analysis was appraised by discussion and narration by images, tables, and maps.

3.7.2 Understanding streetscape problems that affect the livability of the town.

Descriptive data analysis was used to analyze user's perception towards the existing streetscape. Before analyzing collected questioner data, a reliability test is made to check the consistency of the data the result showed 0.81 which placed good reliability result this explained the collected data were consistent. After checking the consistency questionnaires, the data were analyzed by generating frequency of respondents for each questioners and by making percentages of each responses to each questions.

In this analysis frequencies and percentages were used to understand the perception of users on existing streetscape to its livability and those analyzed data have been evaluated and interpreted in numbers and percentages in tabular and graph forms. In addition to understand the relationship of two different variables Cross-Tabulation analysis was used in this study. Two variables which has direct relation with each other examined by placing them on row and column and interpreted in percent and frequency. The audiovisual data gathered through interview were analyzed by transcribing in to text form and relating them with the standards and streetscape aspects which are highly explain the specific incidence of the street and streetscape.

3.8 Ethical Consideration

The permission letter to do the research were shown for different participants before starting data collection. The study was considerably sensitive for respondent's feelings, opinions, dignity. The research objective was carefully addressed for the participants and explained them how the information gets from them used in this research. The study keep confidentiality of any personals participated in this research and addressed the information gather from the participants only used for this specific research

CHAPTER FOUR

RESULTS AND DISCUSSIONS

This chapter was organized according to the objectives and research questions, as well as the methods and approaches used to attain the specific goals specified in the preceding chapters. The existing streetscape conditions, streetscape problems that affect the livability, and most effective solutions for resolving the problems to enhance the livability of the Hosanna town, specifically the streetscape from Hosanna Mariam church to hosanna city bus stop and criteria for selecting the site, the background of the selected site were described in this chapter. Frequent street users, Professionals were examined and analyzed through questionnaires for pedestrians, and interviews with professionals and vehicular drivers and direct site observations were discussed.

4.1 Current physical characteristics and condition of existing streetscape

i. Existing street valuation based on observation checklist.

The initial data collection approach was a direct and controlled observation, in which the physical qualities and characters of the collector streets from Hosanna Mariam Church to Hosanna bus stop (See Figure 3) were assessed using different criteria that were compiled as a checklist below. Those checklists were prepared based on general streetscape elements, urban utilities, elements for street connectivity, and mobility. Depending on those criteria the physical character of the streets was documented.

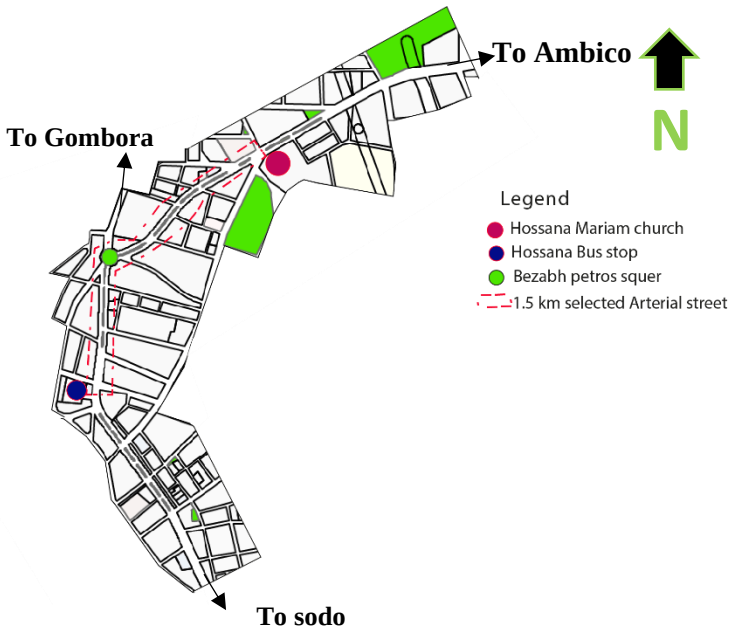

Figure 3: Map of selected street

Table 2 and 3 below elaborates the result of observation check list result of streetscape elements and existing street utilities. The result shows that All streetscape elements which are found on this street have been found below different standards (see Annex 1,2,3 and 4). Some elements which have explored in this street are found only in respected places as well as function they are not giving services 24 street lights are in both side of sidewalks but they are not working and giving function at all, 2 traffic signals and 5 traffic signs are there, 9 different types of trash cans, were found in the street. Public art, public toilets, street furniture's, bicycle facilities are not available on the site. This result explores that the street from hosanna Mariam church to hosanna Bus stop almost doesn't have proper streetscape elements and street utilities and services. There is one historic statue which is built recently and become the attraction point of the street and a good element of the streetscape (Bezabh Petros statue).

Table 2: Observation checklist of streetscape elements

	Count	Standard		
Check List for Streetscape Elements	Total number on the site	Above standard	Below standard	Remark
Street lights,	24	-	x	12 m high & 27-25 m apart
Trash cans	9	-	x	Not available
Public art	-	-	-	No available
Public toilets	0	-	x	Not available
Traffic signs and signals,	7	-	x	
Street trees and other	-	-	x	Placed very close to each other
street furniture	0	-	x	Not available
Bicycle facilities	0	-	x	Not available
Street vending	-	-	-	Very high

Available ones like street vending are found in the streets and they are disrupting the movement or the mobility of the people who have using this street. Especially on Bus stop streets a lot of street vending activities take place by blocking the pedestrian and vehicular ways. The volume of street vending activity in this area is different in different days. When it is market day the vending activity has high volumes while in the normal days this activity become low when compared to the market day but still there was high volumes of street vending activities (See Figure 4).

a b

Figure 4: Street vending activities along sidewalks

Table 3. Check List for street Utilities and services running for pedestrian activities

Check List for street Utilities	Physical quality/size	Materials	remark
Sidewalks/footpaths	1m- 2.5 m	90 % is Earthy martial	Have different obstacles
Pedestrian Pavements	Very poor	terrazzo, Earth material, stone	deteriorated
Ditches (M)	0.4 m	Masonry	Damaged ditches
Disability ways	-	-	Not available
Frontage cafes	_	_	Not available

Table 4 illustrated the result for checklist for, most urban transport utilities that helps to increase pedestrian as well as vehicular mobility and based on standards (refer Annex 4-7). The overall result checklist shows urban transport utilities are missing. As observed from the site the only public transportation options are Bajaj's and motorbikes without any defined vehicular stops. There are no other transportation options like buses, taxis, etc. Vehicular stops, waiting areas, and parking areas are completely missing characteristics of this street. This makes it difficult for society terms of getting appropriate services at appropriate places in this streetscape. There are no appropriate alleys, unmanaged street lanes, and there are 15 junctions without appropriate traffic signs are the characteristics of this street. There is one square along this street which is bezabh Petros square (statue of bezabh Petros) which is the new future or landmark for the city. This makes this street more attractive and usable by many users recently and the researcher also observed.

Table 4: Observation Checklist for Urban transport utilities

		Standard		
Check List for street connectivity and mobility utilities	Total number on the site / type/size	Above standard	Below standard	Remark
Transport options	Bajaj and motorbike	-	x	-
Vehicular stops	0	-	x	Not available
Waiting areas	0	-	x	Not available
Car parking	0		x	Not available
Appropriate alleys	-	-	-	No ,alleys
Junctions	16	-	x	-
Squares	1	-	x	-

i. Existing Street condition result and valuation based on direct observations

Observations were made on the selected street which is from Hosanna Mariam Church through Bezabh Petros Square to Hosanna Menharia or the bus stop. In this direct observation, the study noted the comportments, comfort, liveliness, and social engagements that took place in the streets during this observation. The usage and form of the street were also examined, as well as how it influenced the users' activities and livability. Observations within the street were carried in different days. During those days of observation and many students, commuters, and street sellers, merchants were visible. Within this Site observation of different areas, several people are walking in the street in the morning afternoon, and at the night. There were a lot of different activities occurring on this street, people are going to school, shopping malls, hotels, for picnic and market place individually as well as a group, elderly people were walking, using street-side coffee houses, commercial activities, and people going for walk. All most all people were moving at a slower speed because the walkways are not comfortable and very narrow (See figure 5)

There are several different types of commercial, and governmental buildings and utilities found within the street. a large proportion of commercial and mixed buildings with different activities there is a Hotels, some retail shops, cafes, clothing stores, shoe shiners, small food businesses, bakeries, supermarkets, groceries, and gas stations. There are also several hotels and governmental offices. Overall, there is a combination of commercial and economical activities are there for shoppers. The physical design of the street is not appealingly attractive, comfortable, and inclusive in terms of streetscape standards. The ditches are also very narrow and filled with a bunch of dirty things which are not pleasing to the eye and nose (See figure 5). This makes it difficult to live in that place. The frontage of buildings and sidewalks and the existing sidewalks are filled with cars, Bajaj’s, traditional carts, street vendors, and advertising signs which is making walking and interacting with the people difficult in those areas. Where others use the sidewalks to place benches and give services like coffee, tea, chat, and other activities illegally. Such kinds of activities are leading the pedestrians to go away from the walkways and use open ditches and vehicular streets to pass by. In this observation blocked walkways, advertising on walkways, high traffic conditions, narrow pedestrian lines, different construction materials on walkways and main street, utility poles on the sidewalks blocking activities, dirty and unmanaged ditches, high amount of vending activities, parking on the sidewalks were observed (See figure 5).

Figure 5:Overall status of street. Blocked sidewalks (a,b,d j,f),utility lines (e),vending (h,c) Congested sidewalk (g), damaged ditchs (i), transformer on side walk (l), elderly person (k)

4.2 Existing pedestrian sidewalk assessment results based PLOS.

i. Pedestrian count result of site one

Table 5 illustrated 15-minute pedestrian count result of site one on different days in morning and night. Average pedestrian count on Monday, Saturday and Sunday is 477,562 and 488 respectively. From this result the study observed there is high number of pedestrian movement on Saturday morning and night. The total width of the sidewalk on selected site one is 2.5 m in total to get effective width subtracting shy distances including curbs, trash bins, poles in the middle of the sidewalk and resulted 1 m in total. This shows the sidewalks are full of obstacles and narrowing the existing side walk

Table 5: Pedestrian count result on-site one

	Random count in 15 min			**Sidewalk width(m)**
	Morning	Night	Average	
Monday	450	504	477	
Saturday	601	524	562.5	**1 m**
Sunday	501	475	488	

ii. Pedestrian flow result of site one

Table 6 below illustrated the pedestrian flow result by dividing average number of pedestrian by time elapsed to pass the sidewalks in three different days. Pedestrian flow on Monday, Saturday and Sunday is 31.8, 37.46 and 32.53 pedestrian per 15 min. There was high pedestrian flow on Saturday. The result is necessary to determine pedestrian flow rate.

Table 6: Result of pedestrian flow (PF)

Monday	**Saturday**	**Sunday**
PF = No pedestrian/ min	PF = No pedestrian/ min	PF = No pedestrian/ min
477 ped /15 min	562 ped /15 min	488 ped /15 min
31.8 ped/min	37.46 ped/min	32.53 ped/min

iii. Pedestrian flow rate result of site one

Table 7 below illustrated the pedestrian flow rate result by dividing pedestrian flow of pedestrian by effective width of the side walk. The result of pedestrian flow rate on Monday, Saturday, and Sunday is 31.8, 37.46, and 32.53 ped /m/min respectively. The results for this site show that the pedestrian flow rate of the specified site near Mariam church on the west side is 31.8, 37.46, and 32.53 on the selected days. According to the LOS criteria table, the average pedestrian traffic rate is 33.93 ped/m/min, resulting in a pedestrian level of service D. According to HCM level of service criteria the LOS result shows us the sidewalks which are the major part of the streetscape are not convenient and comfortable to walk and individual walking speed and bypassing other pedestrians are restricted according to the criteria, therefore, these are sidewalks that need to upgrade their levels.

Table 7: Result of pedestrian flow Rate (PFR)

Monday	**Saturday**	**Sunday**
PFR = Pedestrian flow/ We	Pedestrian flow/ We	Pedestrian flow/ We
31.8 ped / 1m	37.46 ped/min / 1m	32.53 ped/min / 1m
31.8 ped/m/min	37.46 ped/m/min	32.53 ped/m/min

iv. Pedestrian count result of site Two

Table 8 showed 15-minute pedestrian count result of site one on different days in morning and night. Average pedestrian count on Monday, Saturday and Sunday is 528,612 and 465 respectively. The effective width of site two is 0.50 m after subtracting preempted width of street vendors, construction materials, trash bins. This shows the sidewalks are full of challenges and creating congestion.

Table 8: Pedestrian count result on-site two

	Random count in 15 min			**Sidewalk width**
	Morning	Night	Average	
Monday	487	568	528	**0.50 m**
Saturday	625	598	612	
Sunday	475	456	465	

v. Pedestrian flow result of site two

Table 9 below illustrated shows the pedestrian flow result by dividing average number of pedestrian by time elapsed to pass the sidewalks in three different days. Pedestrian flow on Monday, Saturday and Sunday is 35.2, 40.8 and 31 pedestrians per 15 min.

Table 9: Result of pedestrian flow on-site two

Monday	**Saturday**	**Sunday**
PF = No pedestrian/ min	PF = No pedestrian/ min	PF = No pedestrian/ min
528 ped /15 min	612 ped /15 min	465 ped /15 min
35.2 ped/min	40.8 ped/min	31 ped/min

vi. Pedestrian flow rate result of site one

Table 10 illustrated the result of pedestrian flow rates on Monday, Saturday, and Sunday is 75, 81, and 62 ped /m/min respectively. The outcome from the calculation for this site shows the pedestrian flow rate of the selected site around hosanna bus station on the east side as 75, 81, and 62 respectively on selected days and the average pedestrian flow rate is from those three days is 65.63 ped/m/min which results in the pedestrian level of service E according to HCM LOS criteria table (see table 1). This LOS result shows us the sidewalks which are the major part of the streetscape are not convenient and comfortable to walk and virtually all pedestrians restrict their normal walking speed, frequently adjusting their gait. At the lower range, forward movement is possible only by shuffling. Space is not sufficient for passing slower pedestrians according to the criteria, therefore, these are sidewalks that need to upgrade their levels by taking different measures.

Table 10: Pedestrian flow Rate on site two (PFR)

Monday	**Saturday**	**Sunday**
PFR = Pedestrian flow/ We	PFR = Pedestrian flow/ We	PFR = Pedestrian flow/ We
37.5 ped/min / 0.5m	40.8 ped/min / 0.5 m	31 ped/min / 0.5 m
75 ped/m/min	81 ped/m/min	62 ped/m/min

4.3 Discussion

Almost all Streetscape elements and street utilities are missing. streetscape elements are essential tools to determine the livability of the streetscape. This study has used checklist to observe the streetscape elements found on the hosanna Mariam to hosanna bus stop street. From the basic elements of streetscape like street lights for pedestrian and vehicular drivers are less obtainable on the study area. In other hand the existing street also lacks, street signage, pedestrian and traffic lighting, rush cans, public toilets, horticultural elements, bicycle facilities. Without this element we cannot create livable street as well towns The absence of traffic control devices, pedestrian circulation lane, and pedestrian crossing, and buffer between vehicle traffic and pedestrian lane contributes for traffic accident. Transport options, vehicular stops, waiting areas parking, pedestrian crossings, and traffic calming design is not located within the respected places. (Abass et al., 2020) stated the streetscape require to be well connected both physically and socially to its surrounding areas that include public transport, walking, and bicycling the street from hosanna Mariam to bus stop completely lost its connection with the society as well as the physically disconnected from its surrounding because there is no public transport option, convenient sidewalks and bicycling. There are no traffic signs, zebra crossings, or street amenities. Congestion is growing because of unmanaged physical activities which are occurring on this street and causing problems. Overall participants know and understand this street as a means of problems, not as a potential or something else.

Blockage of sidewalks with different materials is characteristics of the sidewalk. The absence of the above basic and defining elements on the street and streetscape contributes in creating difficulties for society which are using the street in terms of getting appropriate service at appropriate place in the streetscape. According to (Rehan, 2013) livability emphasizes on the convenience of the residents, welcoming characteristics of streetscapes, a reliable and most importantly, an enjoyable walk on the streets. In general, the physical appearance of the existing street is not appallingly attractive, comfortable and inclusive. Growing motorization has also lead to a dramatic increase in the number of pedestrian fatalities and accidents, and high levels of air pollution particularly exposing pedestrians who walk to work or access public transport to reach their destinations. The PLOS results from two sites clearly show that the existing sidewalks are not capable of accommodating all of its users and needs to upgraded in to higher levels. The PLOS result puts both sites PLOS D and PLOS E on the lowest level of criteria.

4.4 Streetscape problems perceived by users that affected livability

The Results for the second objective are presented below depending user's perception and problems they are facing

4.4.1 Demographic characteristics respondents

Table 11 below shows total number of the participants or respondents found on the streets at the time of data collection between hosanna Mariam to hosanna bus stop which includes pedestrians, vehicular drivers and professionals. most of them are males whereas females are lower than males. 64.6 % of respondents was males and 35.4 % of respondents was females

Table 11: Total participates in questionnaires and interview

Sex	Frequency	Percent
Male	188	64.6
Female	103	35.4
Total	291	100.0

Table 12 illustrated age categories of respondents. 13%, of the total respondents were under the age of <18, 73.5 % were between the age of 19 and 47, 9.5% in between 48 and 63, and finally, 4 % of respondents were 64 and above. The result clearly shows that starting from youth up to middle age societies are frequently uses the street.

Table 12: Age categories of questioner respondents

Age categories	Frequency	Percent
Under 18	33	13.0
19-47	186	73.5
48-63	24	9.5
64 and older	10	4.0
Total	**253**	**100.0**

Table 13 shows as most of the participants or respondents found on the streets at the time of data collection between hosanna Mariam to hosanna bus stop most of them are males whereas females are lower than males. When we see it in percentage 60.9 % of respondents were males and 39.1% of respondents are females. The result shows men are experiencing the street when compared to women's.

Table 13: Sex of questioner respondents

Gender	Frequency	Percent
Male	154	60.9
Female	99	39.1
Total	253	100.0

4.4.2 Pedestrians' experience and knowledge about the existing street.

Figure 6 illustrated the reason of respondents to be on the street. From total respondents 35.6 % were there because they reside around those areas 29.6 % of the respondents were on the street due to work, 17.0% of respondents were there for marketing purposes, 9.5 % of the total respondents were there because they are going to school and finally 8.3 % of the respondents were there for relaxing and to have fun. Due to different problems peoples does not use the streets for having fun that's why the percentage is lowered when compared to others. On the other hand, a high percentage of the residents of that area use the street highly.

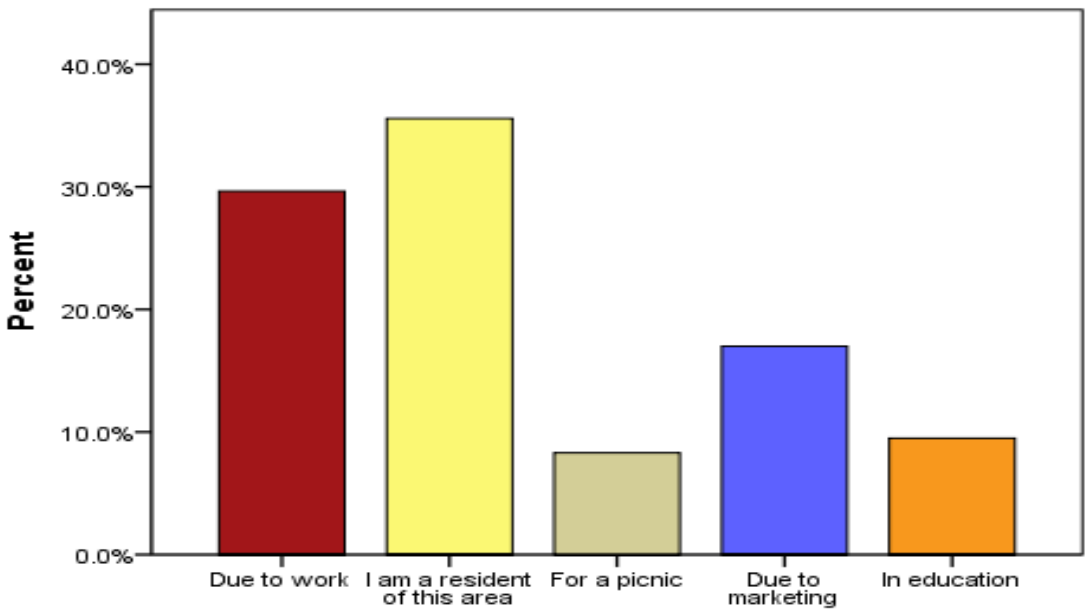

Figure 6: Respondents' reason to be on the street

Figure 7 elaborates time spends for relaxing, walking, working, going to school, and resting on the sidewalk from Hosanna Mariam Church to the hosanna bus stop. 52.57% of the street respondents use this street every day 26.01 % of respondents mentioned they use this street for 1 up to 4 days a week, 13.04% of respondents use 2 days a week and 8.3 % are on this street once every two weeks. From the above result, we find out that above half of respondents were every day using every sidewalk this shows us these sidewalks are very vibrant and most of the people use them for their different activities (see figure 7).

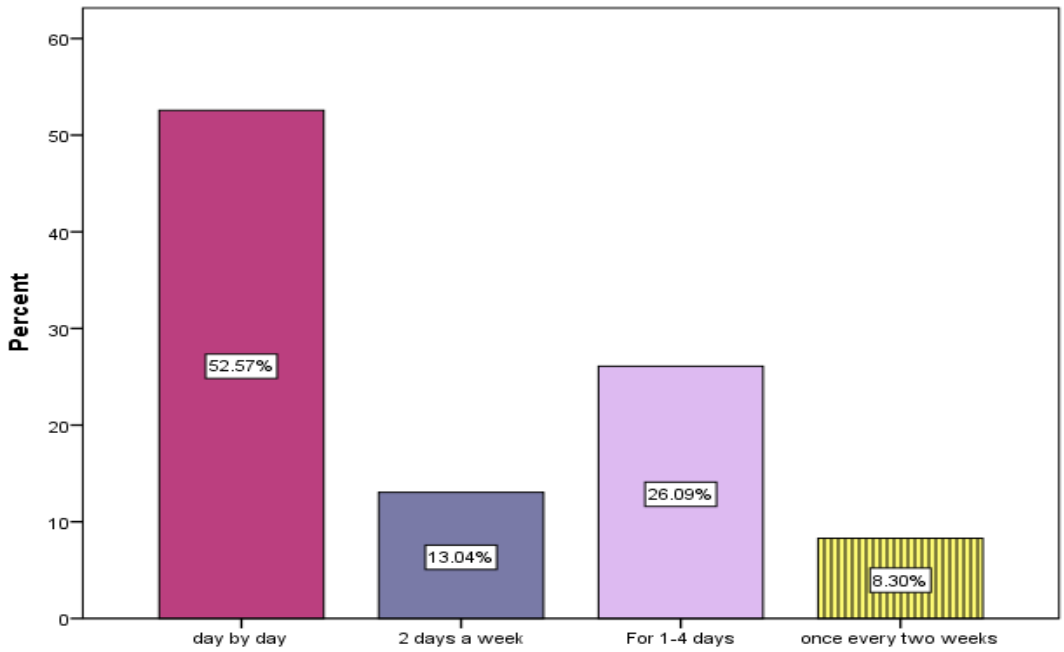

Figure 7 : Time spend for different activities

Table 14 below elaborates by cross-tabulating the respondent's reasons for the sidewalks and how often they use the sidewalk to clearly understand the relationship between those two variables. Totally 75 respondents use the street due to work, sidewalk, Daily, 2 days a week, 1-4 days a week, and ones every week. 87 respondents Residents around that area uses the sidewalk day to day, two days a week 1-4 days a week, and once every week. For a picnic and for schooling totally 48 respondents use the sidewalks in different days. Due to marketing purposes, 43 respondents use the sidewalk day to day, two days a week 1to 4 days a week, and once every week respectively. The highest number of respondents use because they reside around the selected street and they are highly related to the existing side this determines residents daily uses this sidewalk for different purposes the highest number of respondents in total. This lowest number indicates that existing streetscapes are not attractive for having fun, going to school and enjoying within them (See Table 14).

Table 14: Reason * Time spent on the street (cross-tabulation)

Reason	Time spend on the street for relaxing, walking, working, school. Day today	2 days a week	1 to 4 days	Every 2 weeks	Total
Due to work	46	8	16	5	75
Residents	40	9	30	8	87
For a picnic	9	12	0	3	24
Due Marketing	10	17	11	5	43
For schooling	11	3	6	4	24
Total	133	33	66	21	253

4.4.3 Perceived Indicators of the existing state of the streetscape by users

To understand better perception about observed indicators respondents asked if there perceive trees on the sidewalk. Majority of responders Perceived there wasn't enough tree or other shade for pedestrians along with the Hosanna Mariam Church in the public square to Hosanna bus stop street. According to the survey, only 2% of respondents believe that there is enough shade for pedestrians along the street, while the remaining 98% do not believe there is enough tree shade for pedestrians along the street. The study also observed that there are no street trees which used as a shade by pedestrians (See Table 15)

Table 15: Perceived tree shades by pedestrians

	Frequency	Percent
Yes	5	2.0
No	248	98.0
Total	253	100.0

Table 16 elaborates, 177 or 70 % of total respondents did perceive any sufficient street night lights. They believed and observed that there are street light lines but they did not work at all and specifically there is no pedestrian night light at all. where the rest of 30 % of respondents thinks that there is enough street light for pedestrians along the street they have given shop light, and car light as a source of night light for pedestrians still they did not want to say there is night light at all. Conventionally the light source where the respondents listed is not appropriate for the street while this street does not have any street lights specifically placed for pedestrians.

Table 16: Users Perception about night street lights

	Frequency	Percent
Yes	76	30.0
No, Never	177	70.0
Total	253	100.0

4.4.4 Problems encountered by users on the existing streetscape

To understand the perception towards the problems street users are facing, the study asked if they faced any problems because of streetscape. Table 16 shows, that the study asked about the problems pedestrians facing on the existing street scape. From the total respondents 1514 or 85.5% of respondents faced all or some of the options listed as a problem while 257 or 14.5 % of respondents doesn't observe some of the listed problems. The listed problems were identified (See Table 17).

Table 17: Problems encountered on the street

Problems encountered on the street	Frequency	Percent
Yes	1514	85.5%
No	257	14.5%
Total	1771	100.0%

Table 18 elaborates problems streetscape users are facing. There were different problems observed or encountered by users on the existing streets from those the researcher listed 7 problems to deeply understand what problems are the users facing because of the existing street. 233 or 15.4 % of respondents selected there are lack of essential street equipment's on the sidewalks,226 or 14.9 % of respondents faced pedestrian congestion,221 or 14.6 % of respondents encountered increased theft, 215 or 14.2 experienced unpaved sidewalks 208 or 13.7 % believes that poor pedestrian quality, 206 or 13.6 experienced narrow pedestrian line lastly 13.5 or 205 respondents observed in general almost all the mentioned problems were selected by respondents as it is shown in the table above (See Table 18) . In general, the results or the scores for each problem and in the total show there are enormous problems which the street users were experiencing when bypassing or using the street from hosanna Mariam church to hosanna bus stop specifically those pedestrians.

Table 18: Problems encountered by type

Problems encountered on the street	Frequency	Percent
Pedestrian congestion	226	14.9%
Essential street equipment	233	15.4%
Increased theft	221	14.6%
Unpaved sidewalk	215	14.2%
Narrow pedestrian line	206	13.6%
Lack of sidewalks	205	13.5%
Poor pedestrian quality	208	13.7%
Total	1514	100.0%

As pedestrian's vehicular driver's during interview identified problem was laid into negative impressions were in regards to the physical form and the perceived quality level of the street driver's impression of the existing street was negative 21 out of the 25 participants had a overall negative impression of the physical form and look of the street which is causing congestion, traffic accidents, longer time to travel.in general the existing street and streetscape is causing problems on both pedestrians and vehicular drivers they mentioned the same problems like pedestrians as physical form of the streetscape is problematic.

All professionals commented that having unconventional streets and streetscapes can cause a problem when they see from a professional angle. First of all, the street is functionally very poor, aesthetically unpleasing and their physical form is not convenient for users.

The respondents were asked about if they faced robbery when they use the street. Table19 explains the respondent's experience of being robbed day or night in the streets of Hosanna Mariam Church in the public square to Hosanna Bus stop. Of the total 253 respondents 55.3 or 140 the respondents, yes and have been challenged by the robbing in one and another way 113 or 44.7 respondents says No and they don't have such kinds of danger in this street. This result clearly shows us that there are robbing activities is highly increasing day and night on this street, therefore, taking safety measures is mandatory. Cross tabulating the sex of the respondents with the above result is presented below (see table 19).

Table 19: Incident being robed on the street

Being robed	Frequency	Percent
Yes	140	55.3%
No	113	44.7%
Total	253	100.0%

Table 20 below shows cross tabulation result of sex and robing activity. Of the total of 253 respondents, 80 female respondents answered yes which means Females are highly facing theft activity in this street so this street is not safe for a female to travel freely whereas males are only 60 of them faced these problems from 154 male respondents. This shows the street is not safe to walk and use every day.

Table 20: Sex of respondents * being robbed on the street (cross-tabulation)

Sex of respondents	Have you ever been in danger of being robbed day or night		
	Yes	No	Total
Male	60	94	154
Female	80	19	99
Total	140	113	253

4.4.5 The Convenience, Attractiveness, comfort, and safety of the existing streetscape.

To understand the convenience of the existing streetscape respondents asked to elaborates how convenient the existing street or sidewalk is to walk day or night. 32.0 % of respondents answered yes it's convenient to walk day or night without some problems while 68.0 % of respondents answered No it is not convenient to walk day or night. From the above result, the researcher observed that the existing street is not convenient because the majority of the total respondents agreed with that (See Table 21).

Table 21: Convenience to walking day and night

	Frequency	Percent
Yes	81	32.0
No	172	68.0
Total	253	100.0%

Table 22 below shows, 6.3 % of the respondents, of which the majorities are pedestrians, believed that the Street is convenient to sit, ride a bicycle and walk. whereas the highest number of respondents 93.7 % of them inconvenient to sit, ride a bicycle, and walk. Since most of the activities like sitting, walking, and riding a bicycle takes place sideways, it needs a good infrastructure to experience. lack of convenient sidewalks, bicycle lanes, unpaved walkways, and unavailability of street furniture was mentioned as common problems which are created in the convenient environment to sit, walk and ride a bicycle in the street. All most all of the respondents believe that the street is not convenient to take place basic street activities.

Table 22: Sidewalk quality to walk sit and ride a bicycle

	Frequency	Percent
Yes	16	6.3
No	237	93.7
Total	253	100.0%

Table 23 elaborates that the existing sidewalks invite to stay on them to stay for different reasons to determine its attractiveness. 13% of respondents believed and answered yes it invites me but the majority of respondents which are 87 % of respondents disagreed and they believe the existing sidewalk doesn't invite to stay and take place in different activities. Because of its quality and physical future, the existing street sidewalk is not inviting and attractive to look at, see and feel it.

Table 23: Invitation to stay on the sidewalks

	Frequency	Percent
Yes, it invites me	33	13.0
No, it doesn't	220	87.0
Total	253	100.0%

Table 24 below shows and elaborates on respondents' reasons on the street and how this street or sidewalk helps or invites them to stay there by cross tabulation. When they use it for those purposes the existing sidewalk does not invite them to stay and use the existing sidewalk. From 75 respondents, who were there using the street due to work 74 of them responded the existing sidewalk doesn't invite them to stay. 85, 20,38,18 of respondents of residents of this area, for a picnic, due to shopping and in education respectively believed that the existing street does not invite them to stay on this specified street and however the rest believed it invites them for different reasons.

Table 24: Reason x invites to stay (cross-tabulation)

	Does it invite to stay and use the side walks		
Reason	Yes, it invites me	No, it doesn't	Total
Due to work	1	74	75
I am a resident	5	85	90
For a picnic	1	20	21
Due to shopping	5	38	43
In education	6	18	24
Total	18	235	253

The perception of respondents towards the existing streetscape were asked if they use the street to have fun and meet with peoples. Depending on the survey Table 25 below gives details where, 18.6 % of the respondents believed and answered Yes, that meeting and having fun with other people in street or sidewalk is essential and they practiced at different times. But the majority of respondents which are 81.4% of them answered No and believed that the existing street structure is not inviting and comfortable for having fun and meeting the people

Table 25: Have fun and meet in the street

	Frequency	Percent
Yes	47	18.6
No	206	81.4
Total	253	100.0

To generalize the real perception of respondents about the existing quality of the streets they were asked to rate the quality on the Likert scale from very good to very bad which is shown by graph (See Figure 8). From the total respondents 42.29 %, 41.11 %, 9.09 %, 4.35 %, and 3.16 % rated the street quality as Very bad, Bad, Moderate, Good, or Very good respectively. As a major part of the streetscape, the quality of the sidewalks from Hosanna Mariam Church to the public square to the Hosanna bus stop is bad and very bad in total scoring 83.4 % from the total respondents. The existing streetscape feature like sidewalks quality bad and difficult to use, to see.

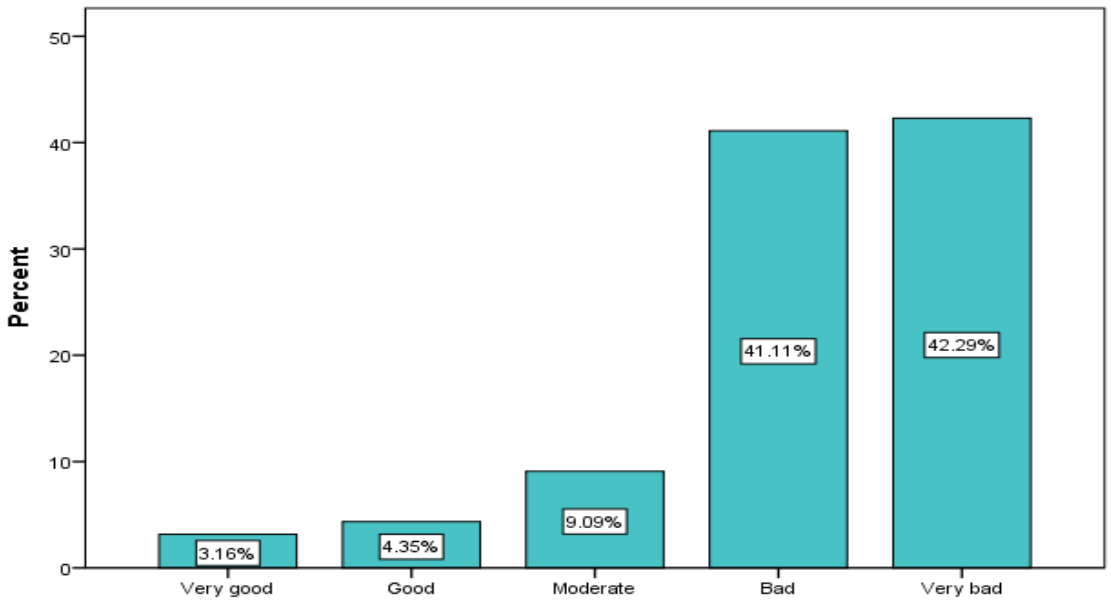

Figure 8: Quality rate of the sidewalk

Table 26 below shows, the suitability site for different peoples who needs special supports. 236 people (93.3%) feel that the existing Hosanna Mariam Church in the public plaza to the Hosanna Bus stop side is not suitable for the elderly, disabled, bicycles, and street vendors. whereas 17 (6.7) of respondents believed that it is important for the above group of peoples Hosanna Mariam Church in the public plaza to the Hosanna Bus stop.

Table 26: Suitable for the different kinds of peoples

	Frequency	Percent
Yes	17	6.9
No	236	93.1
Total	253	100.0

Table 27 shows the result of cross tabulation result of age categories and sidewalk suitability from user's perception. Depending on Table 25, 93.3 % of respondents believed that the current street and sidewalks are not inclusive and don't cope with elders, the disabled, street vendors, and bicyclists and that 6.7 % of the respondents think the existing street system is inclusive in terms of serving elders and disables street vendors and bicyclists. The majority of which are in the age categories of 64 and older highly believe that the existing street is not inclusive of them as elders from 10 of the respondents 9 of them believe and know the existing street is not suitable for them. 48-63 age range all of the respondents do not think the existing street and sidewalks are suitable and are not inclusive at all (See table 27).

Table 27: Age categories * Suitability for different peoples (Cross tabulation)

	Is suitable for the following people (Elderly, disabled, bicyclists, steer vendors)		
Age categories	Yes	No	Total
under 18	5	28	33
19-47	11	175	186
48-63	0	24	24
64 and older	1	9	10
Total	17	236	253

4.4.6 Respondent's interest toward the potential enhancement of the existing street.

To understand the perception of pedestrians about enhancement of the streetscape usefulness of comfortable sidewalk for city livability asked respondents (See table 28). According to the survey, 235 or 92.9 % of the respondents the majority of the number, understood that having a comfortable sidewalk is important for city livability. Most of the respondents elaborate that having a comfortable sidewalk decreases the risk of traffic accidents, good for mental health, to move freely from one place to another, decreases transport costs, it decreases lateness from work, increases town mobility and it is good to create healthy society this will enhance the livability of the town. Less number of total respondents which they hold 7.1 % of total respondents thinks it's not useful having a comfortable sidewalk is important and a majority of them do not explain why and they just only answered it's not useful for town livability.

Table 28: Usefulness of the sidewalk

		Frequency	Percent
Valid	Yes, it's useful	235	**92.9**
	It is not useful	18	**7.1**
Total		**253**	**100.0%**

According to Table 29, 96.4% feel that walkways, road services, and equipment should be visible from Hosanna Mariam Church in the public plaza to the Hosanna Bus stop. From Hosanna Mariam Church in the public plaza to Hosanna Bus stop, the remaining 3.6 % or 9 pedestrian respondents did not believe in or desire to see any of the following sidewalks, road services, or equipment.

Table 29: Need for sidewalks, road service, and equipment

		Frequency	Percent
Valid	Yes	244	96.4
	No	9	3.6
	Total	253	100.0%

In general, all respondents in this study acknowledged that the existing street and street facility is very poor they explained that the look of what we see today in the built environment is not planned and follows rules and regulations which makes the place more attractive and livable. They noted that Not only a professional a user perceives very deteriorated streets in all of the towns especially this street most problematic is a common characteristic of current streets which are located in the city.

Overall the study founds out the listed problems by pedestrian's drivers were also observed by the study majority of people's knowledge about the street is very low. The listed issues by drivers which are behaviors of pedestrians, behaviors of drivers, a high number of cars, and low street quality are seen in the time of observation and are more likely very true. For this matter potential enhancement streetscape is mandatory.

4.5 Discussion

The street physical layout is not appealingly attractive, convenient comfortable, safe and inclusive for both pedestrians and vehicular drivers. Respondents in general determined that the existing cities' street is more problematic than their usefulness. It explained that built environment like street, street facilities are highly poor and not convenient to use this is because they are not built as planned or they don't have planned ways to implement them into the ground. Almost all of responses from the pedestrians, vehicular drivers and professionals shows the Street was found in poor condition and making livability difficult in the town. Unconventional streetscape quality drawback respondents to not discover, and delight in the street. The analysis and result discovered that the current street does not account for the elderly and other pedestrians. Due to those major problems they are losing economically, socially and physical wellbeing

Perception of the problems users observe explained that the street from hosanna Mariam church to the hosanna bus stop is very deteriorated or poor in terms of function aesthetic, physical form. This study also identified those listed problems in different meanness and the study understands that such loss of those urban elements made the street not convenient for users, like pedestrians and vehicular drivers. From the results the study clearly understands the Lack of comfortable sidewalks or streets caused them so many problems. Respondents explained the problems they were experiencing because of uncomfortable sidewalks.

Traffic accidents, becoming less productive, preferred using transport instead of walking, high transport costs, mental stress, movement, access confusion, and health problems are the major problems they encountered because of uncomfortable sidewalks. In the other way respondents encountered different problems respectively. In general, the unavailability of comfortable sidewalks, as well as street, is causing so many problems for the existing users of the streets this leads to a decrease in the interest to live in the city therefore the livability of the city is affected by such consequences created by uncomfortable streets. Pedestrian and vehicular drivers demanded better streets for the future Uncomfortable driving, walking, and sitting situations are among the issues stated bay majority of respondents.

Most of the respondents elaborate that having a comfortable sidewalk decreases the risk of traffic accidents, good for mental health, to move freely from one place to another, decreases transport costs, it decreases lateness from work, increases town mobility and it is good to create healthy society this will enhance the livability of the town. Overall participants know and perceives this street as a means of problems, not as a potential or something else. Majority of respondents believe useful to have improved street and streetscape. Pedestrian and vehicular drivers demanded better streets for the future Uncomfortable driving, walking, and sitting situations are among the issues stated bay majority of respondents.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

In conclusion, this study was set out to examine the user's perception of streetscape for its livability in the case of hosanna town. By examining the current condition of the existing street and streetscape, analyzing streetscape problems that affect the livability. Examining the existing condition of the street helps the study to see what the current issues are related to the livability of the city as well the users' preferences and expectations of what elements contribute to increased levels of enhancing urban livability of hosanna town streetscapes. The outputs of the observed analysis are very clear that the current street is not convenient for its users because it lacks basic street amenities, streetscape elements and its physical form (width of the street and sidewalks), the built environment, compatibility of land use and the street are below urban design and planning standard. It has provided major understanding for this study about the existing street and has also informed that how it is playing an avital role in determining the livability of the town as well as the livability of the street. Streetscape problems that affect the livability of the town were analyzed and discussed very carefully. This second objective aimed to get an insight into the real problems that are affecting users of the specified street and analyze those street and streetscape elements that are directly affecting the livability by asking about users' perceptions and attitudes on the street. The result of feedback obtained from the respondents who are street users as pedestrians and drivers provided a perspective that the existing structure of the street is causing a problem in their lives. Through these different analyses, it was once again established that the existing street is problematic for its users. Especially the street from hosanna Mariam church to the hosanna Bus stop is not an aesthetically beautiful, functionally useful, and uninviting environment in general for users. The result of this analysis identified that the street from hosanna Mariam church to the hosanna Bus stop was the perfect example of a street that does conform that how unconventional streets affect the livability of the city. Through this analysis, it has become more clear that the existing street is conventionally not correct and they do not fully meet the needs of street users and has a great influence in distorting the livability of the town.

5.2 Recommendations

I. Overall recommendation

As per the findings of the research, the current street has numerous negative issues. The following General recommendations have been made to overcome the stated problems through various mechanisms:

- When planning and designing a street the traditional ways which are deadly practiced for centuries must be changed and more conventional practices must be applied when rebuilding and designing a new street.
- Community involvement during the planning, design, and implementation processes is critical for a successful program. It can also foster a sense of belonging and current existing street must be considered as a potential for the cites development and growth and they have to get attention in different ways.
- To create a more livable and enhance the public realm and social, and economic change a good, convenient, and well-planned streetscape design developments must be applied or executed in the existing street
- Making a street has the potential for cities' economic development by taking different approaches which enhances the street as a source of income for a lot of low-income societies. This will help to eradicate urban poverty and creates a more livable city for everyone
- Creating and Applying a more humanized environment rather than creating a more car-oriented street which helps only to increase the number of cars and plays role in urban pollution in one and another way.
- Rebuilding the existing infrastructures which are in direct relationship with the street, like street utilities, street lights, and ditches street, with low or minimum cost is possible rather than demolishing the existing structures at all and building a new one.
- Parking provision for vehicles by using different mechanisms. For this building, owners have to consider parking spaces while designing the buildings. Governmental officials have to take some measures and generate rules and regulations that prohibit parking on the sidewalk as well as the street.

II. Recommendations for the design of basic streetscape elements

Sidewalks

- All unnecessary blockages from the existing sidewalks like construction materials, advertisements, shop materials, and other kinds of stuff should be removed from the existing sidewalks.
- Apply permeable and semi-permeable pavements and materials which will increase the amount of groundwater.
- Reduce life-cycle environmental consequences by using locally produced paving materials made with sustainable processes.
- Street and sidewalks must be separated by using a green buffer as a mechanism and Sidewalks must incorporate wider street functions rather than only walking ways.
- When designing and planning the sidewalks they have to be interactive with the adjacent land use

Street furniture.

- The placement and arrangement of street furniture must be well organized and coordinated to create visually attractive and functionally vibrant.
- Street seating's must be providing multifunction purposes for users not only a seating and resting place
- Trash bins and appropriate street signage must be located in every necessary place on the sidewalks as well as in the street.
- Providing more accessible, inclusive, and sustainable waiting shelters for Bajaj and moto bike passengers and this study suggests that each shelter should have a green roof.

Trees and landscaping

- When Selecting trees and landscaping elements we have to consider the availability of the species, and type of environment they want to grow effectively and they have to be more than aesthetically beautiful and rather has to be edible as well.
- Understanding and placing where different types and shapes of trees are used in their respective areas.
- Street trees and landscaping elements should be resistant to pollution, heat glare, and other urban environments.

Bicycle services

- When planning and designing the street provision of well-defined bicycle way along with its amenities like bicycle parking, well defined by attractive color
- The width of the bicycle lane must not be less than 1.5 meters in total.

Medians

- Medians should be well designed and must be considered as a part of the streetscape which plays a vital role in beautification and aesthetically attractive streets.
- Plant paced in those medians should have to be carefully selected and they should not destruct the pedestrians when crossing the road as well they don't have to block visuals of the drivers
- Medians should use self-dripping mechanisms for their plants located in the ground.

crosswalks

- Provide a crosswalk that is visually clear and near to pedestrians' access areas.
- Using appropriate color and design for the crossing areas (zebras)
- Placing digital waiting and crossing technologies which will accelerate and encourages pedestrians to use the crosswalks.

III. Design recommendation

Depending on the result and discussion the following Design recommendation was made. the development of the design is based on the hosanna town administration's proposed land use. Depending on the land use 40-meter-wide street and streetscape design is proposed between the hosanna Mariam church and the hosanna bus stop.

Design strategies

Initiation of design strategies are made depending on urban design principles which will help for the creation of a livable environment in hosanna town and it is will help enable the town to meet its needs which are presented in the findings and improve the quality of the existing streetscape and improve quality of life. These strategies are: -

LANDSCAPE AND VIEW

Green dominant ecological and water sensitive sidewalks allow a better spatial experience while providing service and visually attractive streets

ACCESSIBILITY

Wider and active walkways to avoid and decrease physical contact and smooth the high density of pedestrian flow additional transport options for better mobility

PLACE OF DESTINATION AND INTERACTION

Making space comfortable and safe by using different streetscape elements which create desire on people to live and visit the street and make attraction space Streetscape furniture as a friendly gesture that attracts the pedestrian

Major design programs

Table 30 Design programs

No	Programs	Size in meter (m)
1	8 *3 vehicular transit lane	24
2	Building frontage zone	1.5 (each side)
3	Pedestrian clear zone	2.5 (each side)
4	Landscape and furniture zone	2 (each side)
5	Bike lane	1.5 (each side)
6	Median	2
7	Buffer	0.5 (each side)
8	Flex zone	2.5 (specific areas)
	Total	42 m

Streetscape elements

Table 31: Basic streetscape elements suggested on the site

• Street lights, • Trash cans • Singe • Public toilets • Traffic signs and signals, • Street trees and other horticultural elements, • General public furniture, • Advertising signs, and decorations • Bicycle facilities (bikeway, racks) • Waiting areas • Marked crosswalks • Special paving's	

Proposed Design (prototype)

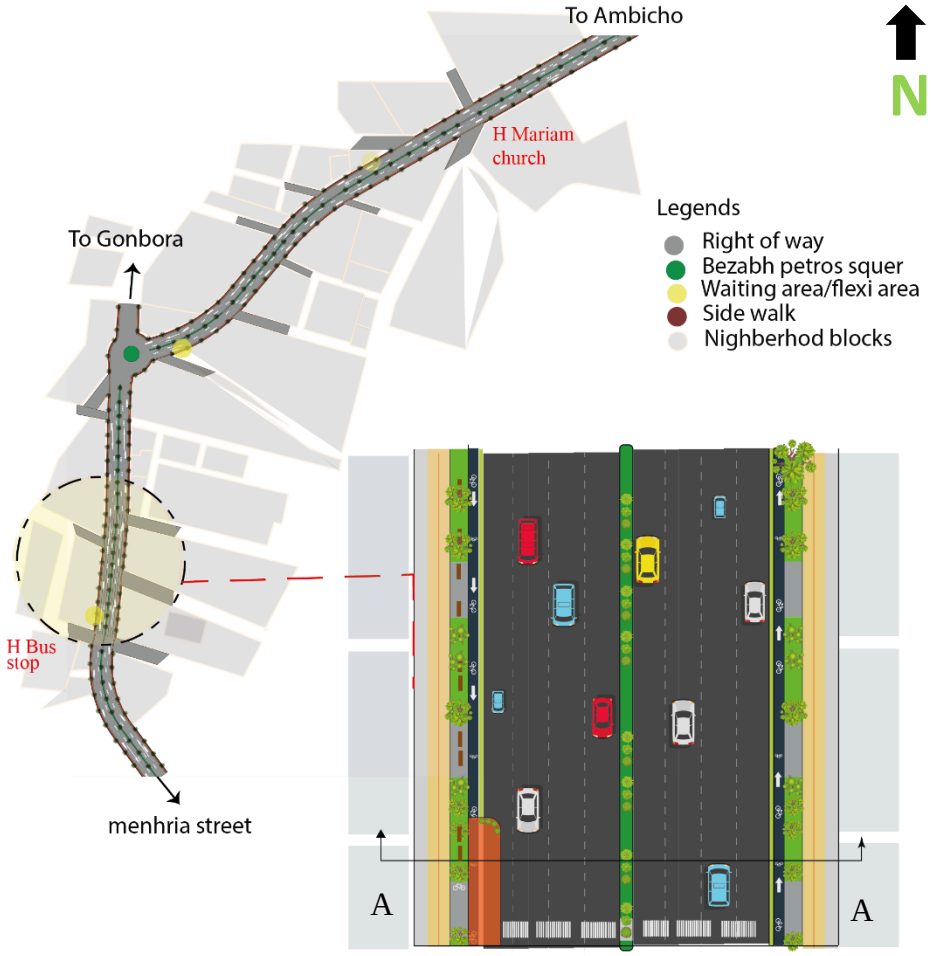

Figure 9: Plan of street A

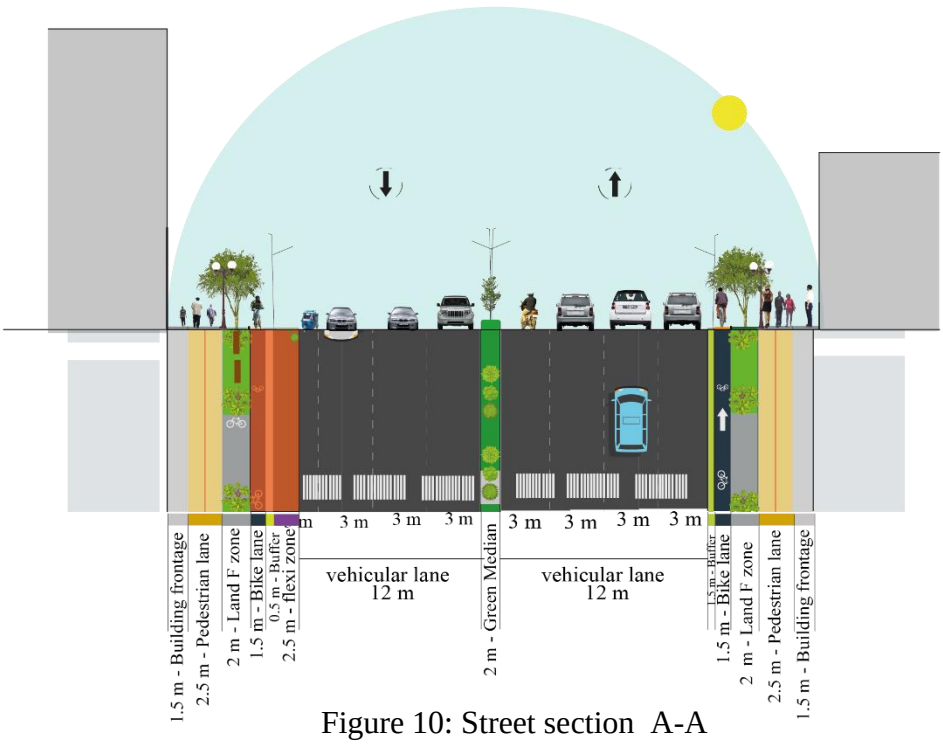

Figure 10: Street section A-A

IV. Recommendation for Future Research

- Motivating and Preparing studies in urban designers and planners for developing good streetscape-related design research.
- The base for examining and analyzing all over the country streetscape and street-related design implementation studies.
- Use this study for Broadening the eyes of urban planners, designers, architects, and other stakeholders which has a direct relation to street and streetscape for better and solution-based design development.

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Annex 1. Street light installation standard

No	**Type of streets**	**Location of street light**	**Maximum spacing**	**Height of street lamps (m)**
1	Principal Arterial Street	Two sides and double sided at the middle	30	9-12
2	Sub-Arterial Street	Two sides	25	6-9
3	Collector Street	Two sides or at medians	20	6-9
4	Local Street	One side could be steel pipes	15	4-6

Annex 2. Typical bus stops spacing standard

Environment	Spacing range (m)	Typical spacing
CBD areas	90-310	180
Urban Areas	150-365	230
Suburban Areas	180-760	300
Ruler areas	200-800	380

Annex 3. Standard for litter receptacle or trash cans

	Aspect of trash cans or litter receptacle	quality
1	Size	40cmx40cm,Hight 60-90 cm
2	Construction	Fixed
3	Emptying type	Fixed on posts, with the box above the ground on rotating hinges or other easy mechanism for removing waste
4	location	At each pedestrian crossing or at maximum of 150m. spacing in non-industrial land use areas or 250m maximum in industrial areas

Annex 4. Standard for public toilets

	Public toilets	Quality
1	Distance	500-1000m distance from each other
2	size	1-1.5m X 1.2-5 m, Height 2.6 m
3	Construction	Movable
4	Emptying type	Be movable with built-in storage tank in areas where there are no sewerage network or fixed and connected to sewerage networks where they are available.
5	location	At public transport stations, pedestrian crossings in mid-blocks in the (furnishing zone)

Annex 5. Standard for Bicycle Ways

No	**Item**	**Standard**
1	Design speed (maximum)	20km/hr
2	Width (minimum one way)	1.5m
3	Width (minimum one way)	2.5m
4	Height clearance (minimum)	2.25 m
5	Gradient (maximum)	5%
6	Colour	Light orang

Annex 6. Standards for Street signs and signals

	Street signs and signals	Quality
1	Distance	At 50-150m interval and shall be located near street intersections and junctions, with priority given to traffic signs that give warning.
2	size	hanged and minimum height of 4.5m shall be seen from at least150m, pole height of 2.2m and 2.5m height including the plate
4	Material	signals shall be glossy and have uniform size, height and shape.
5	location	Traffic signs and signals must be placed in a convenient position clearly visible to all users

Annex 7. Standard for public transportation stations

	Public transportation stations	Description
1	Distance and location	Be placed at 500-1000m distance along public transport routes, each serving an area with a catchment radius of 250-500m.
2	size	0.8-1.2 m width, stations shall have minimum height clearance of 2.2m.
4	Material	Have fixed seat made of hardened wood, plastic, fiber glass or appropriate materials as applicable.

APPENDIX

APPENDIX A- QUESTIONERS FOR PEDESTRIANS

Adama science and technology university

Department of Architecture
School of Civil Engineering and Architecture

Questionnaires for selected Pedestrians

My name is **Nathnael Samuel**, I'm an Assistant lecturer at Wachemo university in the department of Architecture and I am currently studying for a master's in urban planning and design at Adama science and technology university. I am researching **"The importance of streetscape in enhancing urban livability: in case of hosanna town".** The study area covers Arterial Road from hosanna Mariam church up to hosanna Bus stop through Bezabeh Petros avenue which is a total of 1.5 km**.** The questionnaire consists of 19 questions and it will take no longer than 5-10 minutes to complete. All responses will be kept anonymous and no one will be identifiable in the research.

Personal information of respondents

I. Age?

……..

II. Gender

Male ☐ Female ☐

Questioner's

1. Why are you here?
    a) Due to work
    b) Because I am a resident of this area
    c) For a picnic
    d) Due to marketing
    e) In education

2. How do you rate the quality of the sidewalk from Hosanna Mariam Church to the public square to the Hosanna Bus stop.

A. Very good B. Good C. Moderate D. Weak E. Very weak

3. What serious problems were observed along the sidewalk from Hosanna Mariam Church to Hosanna Bus stop?

a) Pedestrian congestion
b) Lack of essential road equipment (lights, seat, garbage can, road signs)
c) Increased theft
d) There is no paved sidewalk
e) Narrow pedestrian line
f) Lack of sidewalks
g) Poor pedestrian quality

4. Do you think it is convenient to walk day and night on the sidewalk from Hosanna Mariam Church to Hosanna Bus stop?

☐ Yes ☐ No

5. Do you think it is convenient to walk, sit, and ride a bicycle from Hosanna Mariam Church in the public square to the Hosanna Bus stop?

☐ Yes ☐ No

6. Does it invite you to stay on the sidewalk from Hosanna Mariam Church to the Hosanna Bus stop?

☐ Yes, it invites me ☐ No, it doesn't

7. Do you meet and have fun with other people on the sidewalk from Hosanna Mariam Church to the hosanna Bus stop?

☐ Yes ☐ No

8. Having a comfortable sidewalk, how much do you think is important for city livability?

a) It's useful
b) It is not useful

If your answer is useful, please explain

……..……..……..……
……..……..……

9. How much time do you spend relaxing, walking, working, going to school, and resting on the sidewalk from Hosanna Mariam Church to the hosanna Bus stop?

a) Day by day
b) Days a week
c) For 1-4 days
d) Once every two weeks

10. Does the lack of comfortable sidewalks cause you problems?

☐ Yes ☐ No

If your answer is yes, please list 3 problems

……..……..……..……
……..……..……

11. How much do you think it is important to implement an improved street system from the Hosanna Mariam Church to Hosanna Bus stop? (Bicycle lane, convenient sidewalk. etc)

a) It is very important
b) It is important
c) It is not necessary

12. Do you think is there a need for sidewalks, road services, and equipment from Hosanna Mariam Church in the public square to Hosanna Bus stop? (Pedestrian and car signs, pavement, sidewalk, parking, etc.)

☐ Yes ☐ No

13. Is there Any tree shade on the sidewalk from Hosanna Mariam Church in the public square to the Hosanna Bus stop?

☐ Yes ☐ No

14. Have you observed any night lights on the sidewalk from Hosanna Mariam Church in the public square to the Hosanna Bus stop?

☐ Yes ☐ No

15. Have you ever been in danger of being robbed day or night in the streets of Hosanna Mariam Church in the public square to Hosanna Bus stop?

☐ Yes ☐ No

16. Are there obstacles on the sidewalk from Hosanna Mariam Church in the public square to the Hosanna Bus stop?

☐ Yes ☐ No

If your answer is yes, list the obstacles...

……..……..……

…….

17. Do you think the sidewalk from Hosanna Mariam Church in public to Hosanna Bus stop is suitable for the following people? (Elderly, disabled, bicyclists, steer vendors)

☐ Yes ☐ No

18. What good things do you observe when you use the sidewalk from Hosanna Mariam Church in the public square to the Hosanna bus stop?

……

…….

19. What are the three (3) basic changes you want to see as a pedestrian?

1……

2……...

3…….

APPENDIX B – INTERVIEW QUESTIONS FOR DRIVERS

1. What do u think about this street (hosanna Mariam church to hosanna bus stop)
2. What are common problems you are observed when using this street? What are they?
3. Is the existing street comfortable to drive? Explain why?
4. What are the common causes of traffic accidents on this street?
5. What do u demand the future of this street?

APPENDIX C – INTERVIEW QUESTIONS FOR PROFESSIONALS

1. What is your educational background?
2. What is your perspective about hosanna city's streets as a whole?
3. What basic problems do you observe from your professional angle?
4. What kinds of urban facilities will help hosanna to become a better and livable city
5. To make the specified street more attractive pole what kinds of street improvements do you suggest?

APPENDIX D – SITE OBSERVATION CHECKLISTS 1

Site Observation checklist	Availability		
Check List for Streetscape Elements	Available on selected site	Less available	Not available at all
• Street lights,			
• Trash cans			
• Public art			
• Public toilets			
• Traffic signs and signals,			
• Street trees and other horticultural elements,			
• General public furniture,			
• Advertising signs, and decorations			
• Bicycle facilities(bikeway, racks)			
• Iconic buildings and heritage values			
• public transport infrastructure			
Check List for street Utilities and services running for pedestrian activities			
• sidewalks/footpaths			
Pedestrian Pavements			
Ditches (M)			
Crossings			
Disability ways			

APPENDIX E – SITE OBSERVATION CHECKLISTS TWO

Check List for street connectivity and mobility	**Highly obtainable**	**Less obtainable**	**No at all**
• Transport options (Bajaj, bus, motorbike, taxi),			
• Vehicular stops			
• Waiting areas			
• Existing flex zone use			
• Car parking			
• Appropriate alleys			
• The lanes,			
• The junctions			
• Squares			

APPENDIX F – PEDESTRIANS COUNTING TABLE

Monday		**Saturday**		**Sunday**	
Mor.	Night	Mor.	Night	Mor.	Night

APPENDIX H – PROPOSED DESIGN