Planning Interventions for Social infrastructure in Small Towns: A focus on Health and Public Spaces

MASTER OF PLANNING

(Urban Planning)

by

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Abstract

Rapid urbanization in India has placed significant pressure on cities and towns to provide equitable and adequate social infrastructure. Among all components of social infrastructure, public health facilities and public open spaces play a crucial role because they directly influence the quality of life, well-being, and overall livability of urban residents. Yet, small and medium towns often struggle to deliver these essential services due to limited financial capacity, weak institutional structures, and uneven service distribution, resulting in gaps in accessibility and quality.

This study aims to develop a structured planning and evaluation framework for assessing social infrastructure in small towns, with a specific focus on health facilities and public open spaces. The research is divided into two phases. Phase I includes a detailed literature review, mapping of national and international policies, and identification of indicators related to accessibility, adequacy, quality, and institutional performance. Phase II applies this framework to a selected town through spatial analysis, secondary data assessment, and-if feasible-field-based evaluations to understand the actual ground conditions.

National and international case studies show that data-driven planning, community participation, and integrated urban development strategies significantly improve service delivery and urban livability. Based on these insights, the study concludes that a systematic, measurable, and people-centred assessment approach can help small towns advance toward more inclusive, health-supportive, and sustainable urban planning practices.

सारांश

भारत में तेज़ी से हो रहे शहरीकरण ने शहरों और कस्बों पर समान और पर्याप्त सामाजिक बुनियादी ढाँचा उपलब्ध कराने का काफ़ी दबाव डाला है। सामाजिक बुनियादी ढाँचे के सभी घटकों में, सार्वजनिक स्वास्थ्य सुविधाएँ और सार्वजनिक खुले स्थान एक अहम भूमिका निभाते हैं, क्योंकि वे शहरी निवासियों के जीवन की गुणवत्ता, खुशहाली और रहने लायक माहौल पर सीधे तौर पर असर डालते हैं। फिर भी, छोटे और मध्यम आकार के कस्बे अक्सर सीमित वित्तीय क्षमता, कमज़ोर संस्थागत ढाँचे और सेवाओं के असमान वितरण के कारण इन ज़रूरी सेवाओं को उपलब्ध कराने में संघर्ष करते हैं, जिसके परिणामस्वरूप पहुँच और गुणवत्ता में कमियाँ रह जाती हैं।

इस अध्ययन का मकसद छोटे कस्बों में सामाजिक बुनियादी ढाँचे का आकलन करने के लिए एक व्यवस्थित योजना और मूल्यांकन ढाँचा तैयार करना है, जिसमें विशेष रूप से स्वास्थ्य सुविधाओं और सार्वजनिक खुले स्थानों पर ध्यान केंद्रित किया गया है। यह शोध दो चरणों में बँटा हुआ है। पहले चरण में साहित्य की विस्तृत समीक्षा, राष्ट्रीय और अंतर्राष्ट्रीय नीतियों की मैपिंग, और पहुँच, पर्याप्तता, गुणवत्ता तथा संस्थागत प्रदर्शन से जुड़े संकेतकों की पहचान शामिल है। दूसरे चरण में, इस ढाँचे को एक चुने हुए कस्बे पर लागू किया जाता है; इसके लिए स्थानिक विश्लेषण, द्वितीयक डेटा का आकलन, और—यदि संभव हो तो—ज़मीनी हकीकत को समझने के लिए क्षेत्र-आधारित मूल्यांकन का सहारा लिया जाता है।

राष्ट्रीय और अंतर्राष्ट्रीय केस स्टडीज़ से पता चलता है कि डेटा-आधारित योजना, सामुदायिक भागीदारी और एकीकृत शहरी विकास रणनीतियाँ सेवाओं की आपूर्ति और शहरी जीवन की गुणवत्ता में काफ़ी सुधार लाती हैं। इन निष्कर्षों के आधार पर, यह अध्ययन इस नतीजे पर पहुँचता है कि एक व्यवस्थित, मापने योग्य और जन-केंद्रित मूल्यांकन दृष्टिकोण छोटे कस्बों को अधिक समावेशी, स्वास्थ्य-अनुकूल और टिकाऊ शहरी नियोजन पद्धतियों की ओर आगे बढ़ने में मदद कर सकता है।

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LIST OF ABBREVIATIONS

Abbreviation	Full Form
AMRUT	Atal Mission for Rejuvenation and Urban Transformation
CHC	Community Health Centre
DCR	Development Control Regulations
DP	Development Plan
GIS	Geographic Information System
GPS	Global Positioning System
ICT	Information and Communication Technology
IPHS	Indian Public Health Standards
km	Kilometre
m	Metre
MoHUA	Ministry of Housing and Urban Affairs
NHM	National Health Mission
NITI	National Institution for Transforming India
NMT	Non-Motorized Transport
NUHM	National Urban Health Mission
PHC	Primary Health Centre
SDG	Sustainable Development Goal
sq. m	Square Metre
ULB	Urban Local Body
UN	United Nations
UN-Habitat	United Nations Human Settlements Programme
URDPFI	Urban and Regional Development Plans Formulation and Implementation
WHO	World Health Organization
UPHC	Urban Primary Health Centre

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Chapter 1

INTRODUCTION

1.1 Background

Cities are not only made of buildings, roads and services. They are places where people live, work, learn, meet each other and spend their daily life. For this reason, a good city must not only develop physical infrastructure, but also provide facilities that improve people's well-being and happiness. In recent years, planners and governments have realized that a city's success is not measured only by growth, economy or development, but also by how comfortable, healthy and safe its residents feel (Madan, 2019). This idea brings importance to social infrastructure. Social infrastructure includes hospitals, clinics, health centres, schools, parks, playgrounds, libraries, community halls and other public facilities. These services are necessary for basic needs like education and healthcare, but they also help people stay active, relaxed, socially connected and emotionally strong (Patel, 2021). A city with good parks and health services gives people more opportunities to walk, exercise, take their children to play, and meet neighbours. This helps in creating a friendly and supportive community.

At the global level, international organizations also support the idea of improving social infrastructure. The United Nations Sustainable Development Goals (SDGs) suggest that cities should be inclusive, healthy and sustainable (especially SDG3 and SDG11). The World Health Organization also recommends that cities should provide accessible healthcare and public spaces that encourage physical activity and reduce stress (WHO, 2018). Studies have shown that cities with better social services have healthier people, stronger social relationships and greater ability to handle crises (Sen, 2020).

In India, rapid urbanization has increased the pressure on existing services. Many towns are growing quickly, but their hospitals, public parks and community services are not growing at the same speed. This leads to overcrowded health centres, shortage of parks and uneven access to public services.

As a result, residents often experience considerable difficulty in accessing essential social infrastructure. Many households are required to travel long distances to reach healthcare facilities, while several neighbourhoods lack adequate public parks and recreational

spaces. Children frequently do not have access to nearby playgrounds, elderly residents face a shortage of shaded resting areas, and women often perceive public spaces as unsafe due to inadequate lighting and surveillance. In addition, people with disabilities encounter barriers while accessing both healthcare facilities and public open spaces because of insufficient universal accessibility measures.

These problems show that along with physical development, cities must plan social infrastructure carefully. These challenges raise several important planning considerations regarding the adequacy and spatial distribution of social infrastructure. It is essential to assess whether healthcare facilities and public open spaces are located in close proximity to residential neighbourhoods, whether the existing facilities adequately serve the population, and whether residents are required to travel excessive distances to access essential services. Equally important is the evaluation of whether public spaces are safe, comfortable and inclusive for women, children and elderly persons, and whether social infrastructure is equitably distributed across different parts of the city. Addressing these aspects is fundamental for achieving balanced and inclusive urban development. These questions require proper assessment, mapping and evaluation. Today, many planners use tools such as GIS, service area analysis and population distribution studies to understand whether facilities are reaching people properly. This approach helps cities make better decisions based on real conditions instead of assumptions.

In this context, studying social infrastructure becomes very important. As Indian towns continue to grow, their future development will depend not only on how many buildings they construct, but on how well they support the everyday needs of their residents.

Therefore, the assessment of social infrastructure-especially health services and public open spaces- is necessary to improve quality of life and create more livable cities.

1.2 Need for study

There is a strong need for this study because Indian towns are growing rapidly, but their social infrastructure is not developing at the same speed. As population increases, new residential areas, commercial spaces, and transport networks are being built, but essential public services such as health facilities and public open spaces are often left behind. This directly affects daily life and the overall quality of living in urban areas.

In many small and medium towns, the development of hospitals, clinics, parks and recreational spaces has not followed a proper scientific planning process. Facilities are usually provided based on availability of land or old planning standards, not on present demand or accessibility.

The unequal spatial distribution of social infrastructure has resulted in significant service disparities across neighbourhoods. While certain parts of the town possess relatively better access to health and recreational facilities, other areas remain inadequately served. Consequently, residents are often required to travel long distances to access basic services, placing excessive pressure on centrally located facilities and increasing travel time and inconvenience.

This uneven distribution increases inequality. Groups such as the elderly, women, children, lower-income families, and persons with disabilities face more problems because they may not have the resources or physical ability to travel far for healthcare or recreation. Thus, lack of equitable service distribution directly affects quality of life and social well-being (Sharma, 2020).

Another major reason for this study is the limited availability of scientific, spatial analysis in small towns. Many Urban Local Bodies continue to function without comprehensive spatial databases and analytical tools. Updated GIS-based maps, ward-level demographic information, accessibility assessments, catchment analyses, and infrastructure quality audits are often unavailable. The absence of such information limits evidence-based planning and makes infrastructure investment decisions largely dependent on conventional standards and assumptions rather than actual service demand. Without this information, planning becomes dependent on assumptions.

Consequently, planners often lack the information required to identify underserved areas, determine locations where service demand is increasing, assess which facilities require expansion or upgradation, and evaluate whether healthcare facilities and public open spaces are equitably distributed across the town.
This shows a need for a systematic and measurable assessment method that can help understand the actual ground situation and guide improvement.

The study is also important because social infrastructure strongly influences health and lifestyle. Research shows that when residents do not have access to nearby parks,

playgrounds, community spaces, footpaths and public health facilities. Reduced access to nearby parks, playgrounds, community spaces, pedestrian facilities and public health services often leads to lower levels of physical activity, increased dependence on private modes of transport, a higher prevalence of chronic diseases such as diabetes, obesity and hypertension, and increased mental stress and social isolation due to the lack of recreational and community spaces (Kapoor, 2018). Thus, planning of social infrastructure is not just about providing land and buildings, but also about improving the physical, psychological and social well-being of the community.

For example, planning standards commonly recommend one health centre for every 30,000 population and one neighbourhood park for every 1,000 people. However, these standards do not indicate whether people can easily access the facility, whether it is adequately maintained and equipped with the necessary amenities, whether it effectively serves different age groups, or whether it provides a safe and inclusive environment for all users. A comprehensive evaluation framework should therefore assess the quantity of facilities, the quality of public spaces, their spatial distribution across the town, accessibility in terms of travel distance, and the degree of inclusiveness for different user groups. With the rapid advancement of digital and spatial tools like GIS, network analysis, accessibility modelling and simple field audits, it is now possible to carry out this assessment in a more accurate and scientific way. However, very few small towns have utilized these tools so far, creating a clear research and planning gap.

Accordingly, the present study aims to assess the existing condition of social infrastructure, identify underserved and overburdened areas, examine how spatial planning influences everyday life, develop a structured assessment model that can be replicated in similar towns, support evidence-based planning and policymaking, and ultimately improve urban livability while reducing spatial inequalities In summary, the study is required because rapid urbanization has not been accompanied by a proportional expansion of public services. Unequal access to healthcare facilities and public open spaces, limited use of data-driven planning approaches in small towns, and the resulting impacts on public health and social well-being collectively highlight the need for a structured and evidence-based assessment framework to address existing planning gaps.

1.3 Existing Urban Scenario

Urbanization in India is increasing at a very fast pace. As per the Census of India, the urban share of population has been rising steadily over the last few decades, and many small and medium towns are now transforming into emerging urban centres. These settlements are acting as regional hubs for trade, services, employment and education. However, the pace of infrastructure development has not kept up with these changes, creating visible pressure on basic services (Census of India, 2011; MoHUA, 2020).

In many Indian towns, urban growth is occurring in a linear or outward direction, where new housing and commercial areas develop along highways, transport corridors and peri-urban land. But essential facilities such as health centres, parks, playgrounds, community halls, anganwadis and senior citizen spaces are still concentrated near the historical town core. This imbalance places considerable pressure on the urban system. As a result, the town centre becomes increasingly overcrowded and congested, while newly developed residential neighbourhoods often lack essential public infrastructure. Residents of these peripheral areas are required to travel longer distances to access basic services such as healthcare, recreation, and community facilities. Consequently, dependence on private modes of transport increases, placing additional pressure on the existing public transport system. The increased travel distance and time also impose a greater financial burden on low-income households, thereby reducing equitable access to essential social infrastructure. This situation affects social equity, because households that cannot afford private vehicles face more struggle in accessing services. Urban planning guidelines suggest thatbasichealthandsocialfacilitiesshouldideallybereachablewithin 10–15minutes walking distance, especially for vulnerable groups like children, elderly, differently-abled persons and women (URDPFI, 2014). However, in reality, this remains difficult in many growing towns.

Another challenge is that planning and development in many small towns often remains plot-based rather than city-wide. New developments are generally approved on an individual basis without comprehensively assessing whether the surrounding neighbourhood already has adequate public amenities or whether additional social infrastructure is required. As a result, factors such as the distance to the nearest hospital, park, or educational facility, the existing population density, future population growth, and the need to reserve land for public facilities are frequently overlooked during the

planning process. This fragmented approach leads to an uneven distribution of services, limits long-term infrastructure planning, and reduces the ability of urban local bodies to provide equitable access to essential social infrastructure.

Because of this, social services become scattered and uncoordinated. Some neighbourhoods have surplus facilities, while new areas develop with almost none. This creates uneven development and reduces livability in new growth areas.

Additionally, increasing land pressure and the privatization of urban land have significantly reduced the availability of public open spaces in many towns. Areas that were previously used as playgrounds and community recreation grounds have often been converted into parking areas or other built-up developments, while several open spaces have been encroached upon over time. Existing parks frequently suffer from inadequate maintenance, poor landscaping, insufficient amenities, and limited accessibility. Consequently, opportunities for walking, outdoor recreation, physical activity, and informal social interaction have gradually declined, reducing the overall quality and livability of the urban environment. This has a direct impact on physical and mental health, social bonding and community life. Open and green spaces are necessary not only for recreation, but also for environmental benefits such as air quality improvement, micro-climate regulation and stormwater absorption.

The absence of digital spatial information systems is another significant challenge affecting urban planning in many small towns. Several Urban Local Bodies continue to function without updated Geographic Information System (GIS) base maps, comprehensive databases of social infrastructure facilities, ward-level population layers, or digitally mapped road and pedestrian networks. The lack of such spatial information restricts the ability of planners to accurately assess service coverage, identify underserved neighbourhoods, evaluate accessibility, and forecast future infrastructure requirements. Consequently, planning decisions are often based on conventional standards and assumptions rather than evidence-based spatial analysis, leading to inefficient allocation of public resources and persistent inequalities in service distribution.

This means that planning decisions are rarely evidence-based or spatially analysed. Instead, they rely on conventional standards, manual surveys or general observation, which may not reflect current realities.

The post-pandemic period has further reinforced the importance of resilient and

accessible social infrastructure within urban areas. The COVID-19 pandemic demonstrated the need for hospitals, primary healthcare centres and community clinics to be located in close proximity to residential neighbourhoods to ensure timely access to healthcare services during emergencies. At the same time, parks and public open spaces emerged as essential urban assets that support physical activity, mental well-being and social interaction. The pandemic also emphasized the need for safe, inclusive and universally accessible public spaces that cater to the needs of children, women, elderly persons and people with disabilities, thereby strengthening the overall resilience and livability of cities.

Changing lifestyle patterns, increased digital exposure, reduced outdoor activity and growing health risks make public space and healthcare planning more critical than before (NITI Aayog, 2021). In many small towns, lack of these facilities forces residents to travel to larger cities for even basic healthcare needs, adding financial and time burdens. Thus, the existing urban condition in many Indian towns is characterized by rapid physical expansion accompanied by an uneven distribution of social infrastructure. The concentration of essential facilities within the urban core has placed considerable pressure on central healthcare and public services, while newly developed growth areas continue to experience inadequate provision of neighbourhood-level infrastructure. Furthermore, the limited application of spatial analysis in planning, increasing dependence on private vehicles, reduced accessibility for vulnerable population groups, and changing public health and lifestyle requirements have collectively created significant challenges for achieving equitable and sustainable urban development. These issues highlight the need for integrated, evidence-based planning approaches that ensure balanced distribution of social infrastructure and improve the overall livability of urban settlements.

This situation highlights the need for scientific mapping, accessibility assessment and evaluation of social infrastructure, so that growing towns can plan for development that is balanced, inclusive and supportive of community well-being.

1.4 Significance of the Study

The study holds strong significance in the context of rapidly growing Indian towns, where the quality of life of residents is shaped directly by the availability, distribution

and accessibility of social infrastructure. Health facilities, public open spaces and small neighbourhood amenities form the core of everyday living. Their presence, quality and reach influence how people experience safety, comfort, convenience and emotional well-being.

This study is significant because traditional planning approaches often focus only on supplying infrastructure, without evaluating how well it actually supports people's daily needs. Many towns may have hospitals, clinics, parks or community spaces on paper, yet residents still experience long travel distances, overcrowded services or poor-quality surroundings. This shows that the gap is not only in quantity, but in accessibility, distribution and usability.

By examining social infrastructure from a social-support perspective, the study demonstrates how well-planned infrastructure can reduce everyday challenges experienced by urban residents while promoting equitable access to essential services. It emphasizes the importance of supporting vulnerable population groups, including children, women, elderly persons and persons with disabilities, through inclusive and accessible infrastructure. Furthermore, improved mobility, enhanced walkability, healthier lifestyles, stronger community interaction and social cohesion collectively contribute towards creating more livable, resilient and inclusive urban environments.

The study also becomes important because small and medium towns, despite their fast growth, lack detailed assessment frameworks. Unlike metropolitan cities, small towns rarely use spatial tools, accessibility studies or quality audits. This study attempts to address this gap by identifying key indicators that can help measure the performance of social infrastructure in a more meaningful way.

Another important aspect of significance is that the study can serve as a reference model for similar towns that face comparable challenges. It contributes towards building a more people-centric understanding of urban planning, where infrastructure is evaluated not only as physical assets but as elements that support people's daily life, health, comfort and social well-being.

In essence, this study is significant because it shifts attention toward equity, inclusiveness and human experience, which are central to creating sustainable and supportive urban environments.

1.5 Rationale of the Study

The rationale of this study lies in the need to bridge the gap between what is planned and what people actually experience in growing towns. Urban planning documents often provide population-based standards for health facilities, open spaces and community amenities, but these standards do not always consider how people access these services or whether the services are adequate and useful in real-life conditions.

Many towns continue to expand outward, while essential services remain concentrated in older core areas. This creates areas with limited access to healthcare and recreational spaces, which directly affects residents' physical and mental well-being. The study is therefore necessary to understand how well social infrastructure is distributed and whether it addresses the needs of present and future populations.

The rationale also stems from the growing importance of livability in Indian cities. Livability is influenced by basic comfort, safety, convenience and the presence of supportive environments. Health facilities and public spaces form a major part of this lived experience. Evaluating them using appropriate indicators can help identify shortcomings and opportunities for improvement.

Another basis for the study is that planning practices in many small towns still rely heavily on conventional standards and physical expansion without adequate evaluation. There is a need to adopt planning approaches that evaluate social infrastructure beyond its mere availability. Such approaches should examine the accessibility of facilities, assess their quality and functionality, consider the everyday travel patterns of residents, recognize the requirements of vulnerable population groups, and integrate both spatial and social dimensions of urban planning. Adopting this comprehensive perspective enables planners to develop more inclusive, equitable and evidence-based planning interventions that respond effectively to the diverse needs of urban communities.
This forms the core rationale for selecting health infrastructure and public open spaces as the two main components of social infrastructure.

Additionally, the study is rational because infrastructure investments are often limited in small towns. Correctly identifying problem areas helps ensure that resources are used

efficiently and reach the communities that need them the most. The rationale strengthens further when recognizing that small towns will host a major portion of India's future urban population, meaning that improving social-support infrastructure now will have long-term benefits.

Overall, the rationale is rooted in the need for an approach that combines spatial planning, human behaviour, social needs and environmental quality—creating an understanding that supports more balanced, inclusive and humane urban development.

1.6 Aim

To develop planning interventions that enhance the accessibility, adequacy, and quality of health infrastructure and public spaces in small towns, thereby improving overall urban livability and social equity.

1.7 Objectives

The objectives are divided into two phases

Phase 1:

1. To study the key concepts and definitions related to social infrastructure, public health facilities, public open spaces, and urban livability.
2. To review literature, reports, and policy guidelines related to social infrastructure, with focus on health facilities and public spaces.
3. To identify important parameters and indicators that define accessibility, adequacy, and quality of social infrastructure.
4. To evaluate the accessibility and adequacy of health facilities and public open spaces through case studies, and questionnaire.

Phase 2:

1. To select a representative small town as the study area based on defined criteria such as population size, growth pattern, and data availability.
2. To collect primary and secondary data on health and public space infrastructure within the selected town.
3. To analyze the accessibility, adequacy, and user perception of these facilities

using the framework developed in Phase I.

4. To propose planning interventions and policy recommendations for improving social infrastructure and overall livability in the selected town.

1.8 Methodology

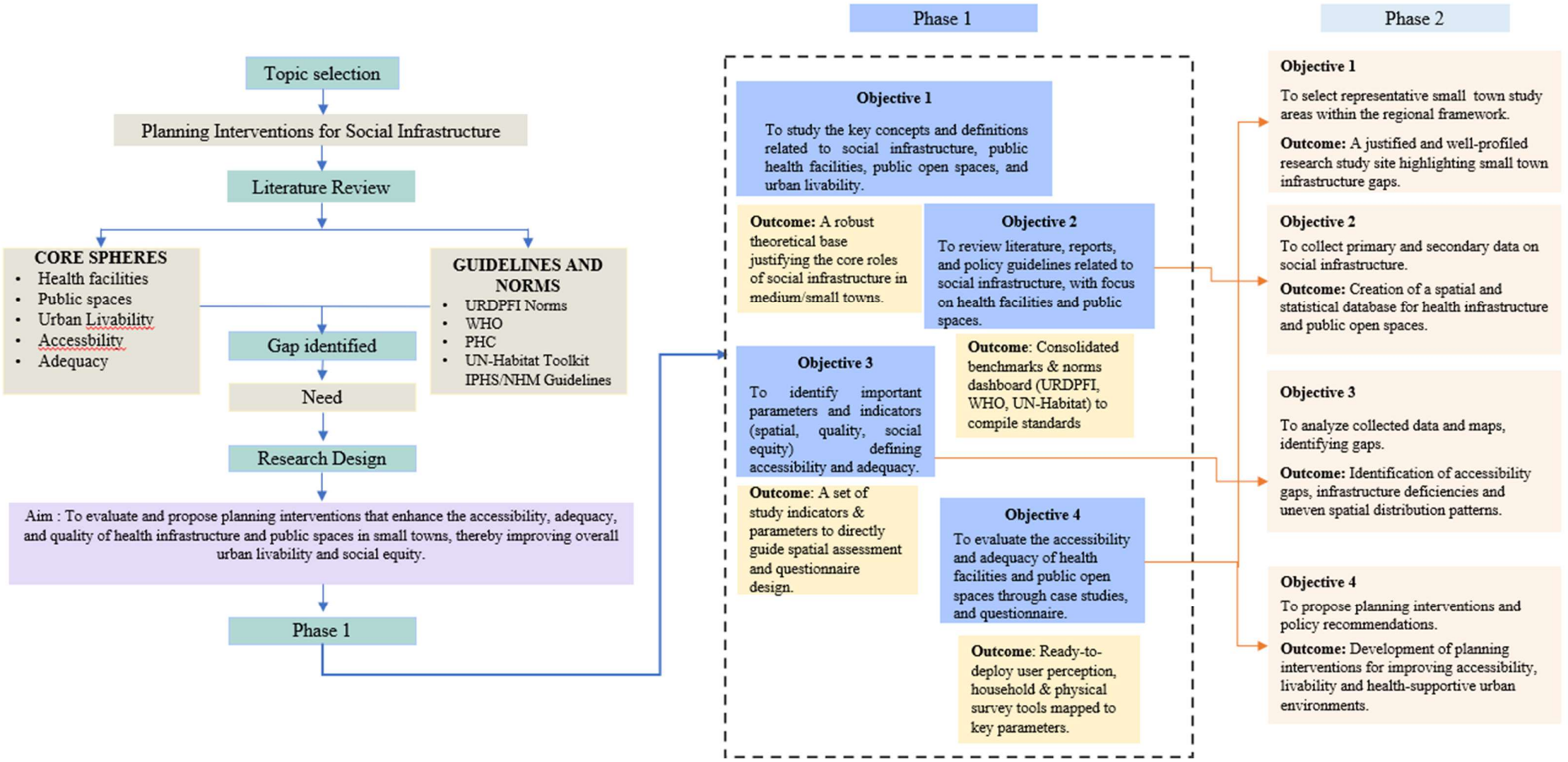

Figure 1: Methodology *Source: Author*

The methodology is structured into two phases to ensure a systematic assessment of social infrastructure in small towns. Phase 1 focuses on establishing the theoretical and conceptual foundation through literature review, policy review and identification of key indicators related to health infrastructure, public spaces, accessibility and adequacy. This phase also supports the development of assessment parameters and survey tools. As shown in Figure 1 Phase 2 includes study area selection, collection of primary and secondary data, spatial and statistical analysis, identification of infrastructure gaps and formulation of planning interventions. The outcomes of both phases contribute to the development of planning recommendations aimed at improving social infrastructure accessibility, adequacy and urban livability in Jamner.

Chapter 2

LITERATURE REVIEW

2.1 Definitions and Conceptual Understanding

2.1.1 Social Infrastructure

Social infrastructure refers to the collection of public facilities and services that support human development, daily life and community well-being. According to UN-Habitat (2020), social infrastructure includes educational institutions, health centres, community facilities, recreational amenities and public spaces that collectively strengthen the social fabric of cities and towns.

In academic literature, social infrastructure is considered a critical component of urban livability because it supports learning, healthcare, cultural participation, public safety and social interaction (Colantonio & Dixon, 2011). It generally comprises a wide range of facilities, including educational institutions such as schools, colleges and training centres; healthcare facilities including Primary Health Centres (PHCs), hospitals and clinics; recreational and public open spaces such as parks, playgrounds and open grounds; and community-based services including community halls, libraries and Anganwadi centres. Together, these facilities contribute to improving the quality of life, promoting social inclusion and supporting the overall well-being of urban residents.

The presence, quality and distribution of these facilities influence people's daily experiences and opportunities for growth. In smaller towns, social infrastructure often acts as the primary support system due to fewer private alternatives (Pradhan & Mohanty, 2019).

2.1.2 Health Infrastructure

Health infrastructure is a key subset of social infrastructure and includes all buildings, equipment, services and human resources required to deliver healthcare. The World Health Organization (WHO, 2017) defines health infrastructure as the "combination of physical structures and service systems necessary to provide preventive, promotive and curative health services."

Health infrastructure contributes directly to the well-being, productivity and overall quality of life of the population by ensuring access to preventive, promotive and curative healthcare services. In the Indian context, the healthcare delivery system comprises a hierarchical network of sub-centres, Primary Health Centres (PHCs), Community Health Centres (CHCs), district hospitals, maternity homes and urban health posts. These facilities are further supported by community-based healthcare initiatives, including Accredited Social Health Activist (ASHA) service networks, which play a vital role in improving healthcare outreach, promoting public health awareness and strengthening primary healthcare services at the community level.

Study emphasizes that the distribution of health facilities is often uneven across settlements, with small towns showing larger disparities in facility availability and service quality (Rao et al., 2011). This makes health infrastructure a crucial element when assessing the livability and functional capacity of non-metropolitan settlements.

2.1.3 Educational Infrastructure

Educational infrastructure includes all physical, environmental and institutional components that support teaching and learning. UNESCO (2021) describes educational infrastructure as the system of facilities required to ensure access to learning, including school buildings, playgrounds, libraries, laboratories, ICT facilities and safe transportation routes.

The quality and adequacy of educational infrastructure are strongly associated with learning outcomes, student performance and social equity (Barrettetal, 2019). In small towns, educational institutions often act as community hubs, providing not just formal learning but also recreational spaces, cultural activities and public gatherings.

Educational infrastructure comprises three interrelated components that collectively support effective teaching and learning. The first component is the physical environment, which includes classrooms, school buildings and playgrounds that provide the basic infrastructure for educational activities. The second is the learning environment, consisting of laboratories, libraries and digital infrastructure that facilitate academic development and skill enhancement. The third component is the support environment, which includes essential amenities such as sanitation facilities, safe drinking water, boundary walls and other safety measures that ensure a secure and conducive learning

atmosphere. However, due to limited financial and human resources, many small towns continue to face challenges such as overcrowded classrooms, inadequate playgrounds and insufficient educational facilities, thereby affecting the quality and accessibility of education (Ghosh, 2018).

2.1.4 Public Spaces

Public spaces are shared open or built areas that are accessible to every individual without restriction. UN-Habitat (2015) defines public spaces as "publicly accessible, publicly used and publicly valued" places including parks, streets, plazas, playgrounds, community open spaces and green areas.

Scholars have identified public spaces as multifunctional urban assets that contribute significantly to the social, environmental, economic and recreational development of cities. Public spaces provide opportunities for recreation and physical activity, thereby promoting both physical and mental well-being (Mitchell & Popham, 2008). They also facilitate social interaction, cultural exchange and community bonding by serving as common gathering spaces for people of different age groups and backgrounds (Whyte, 1980). From an environmental perspective, public open spaces contribute to improved air quality, mitigation of urban heat island effects and the conservation of urban biodiversity (Kabisch et al., 2017). In addition, they generate economic benefits by attracting visitors, supporting local markets, encouraging tourism and creating opportunities for community events and commercial activities.

In small towns, public spaces are even more important because residents rely on them for daily social life, informal gatherings and recreational activities, unlike big cities where private facilities are more available (Mehta, 2014). Poor maintenance or unequal distribution of public spaces affects community well-being significantly.

2.1.5 Small Towns

Small towns are urban settlements with limited population size, modest economic activities and constrained municipal capacity. The Census of India (2011) classifies small towns as those having a population below 50,000, typically falling under Class III and Class IV towns. The URDPFI Guidelines (2015) follow a similar classification, treating towns below one lakh population as small or medium.

Small towns possess a distinct urban character that differentiates them from larger metropolitan cities. They generally operate with limited financial resources and fewer administrative personnel, which often constrains the planning, development and maintenance of urban infrastructure. Their urban structure is typically characterized by mixed land-use patterns, where residential, commercial and institutional activities coexist within the same areas. Small towns also depend on nearby district centres for higher-order services such as specialized healthcare, higher education and administrative functions. Furthermore, they often experience a shortage of institutional facilities and rely heavily on publicly provided infrastructure for meeting the daily needs of residents. The limited availability of parks, playgrounds, community centres and other social infrastructure further affects the quality of life and overall urban livability in these settlements.

Research notes that small towns represent the most neglected layer of the urban hierarchy, receiving less investment and planning attention despite forming nearly half of India's urban settlements (Kundu,2011). This makes them crucial for studies related to infrastructure availability, distribution and service equity.

2.2 Conceptual breakdown of key terms

2.2.1 Concept of Social Infrastructure

Social infrastructure is a broad umbrella term that covers facilities and services that support social well-being, community needs and everyday life activities. According to UN-Habitat (2020), social infrastructure includes education, healthcare, recreation, community services and all public facilities that contribute to human development.

Scholars emphasize that social infrastructure ensures access to essential services and creates opportunities for learning, safety, physical activity, cultural participation and social connection (Colantonio & Dixon, 2011).

In the context of small towns, social infrastructure becomes even more important because people depend heavily on publicly provided facilities due to fewer private services (Pradhan & Mohanty, 2019).

2.2.2 Concept of Health Infrastructure

Health infrastructure refers to the system of physical facilities, equipment, services and human resources that enable delivery of healthcare. WHO (2017) defines health infrastructure as the network of medical buildings, laboratories, emergency facilities, and support systems needed for preventive and curative services.

Health infrastructure plays a fundamental role in improving the overall well-being of communities by ensuring timely access to preventive, promotive and curative healthcare services. It is closely associated with improved maternal and child health outcomes, effective disease prevention and control, and the enhancement of overall quality of life. An efficient and accessible healthcare system not only reduces morbidity and mortality but also contributes to healthier, more productive and resilient communities by addressing the healthcare needs of diverse population groups.

In small towns, the healthcare system generally comprises a network of sub-centres, Primary Health Centres (PHCs), Community Health Centres (CHCs), maternity homes and small private clinics that together provide essential healthcare services to the local population. However, the limited number of healthcare facilities and their uneven spatial distribution often restrict residents' access to timely medical care. As a result, accessibility becomes a major planning concern, particularly for vulnerable population groups residing in peripheral or underserved areas, who frequently need to travel longer distances to obtain basic healthcare services (Rao et al., 2011).

2.2.3 Concept of Educational Infrastructure

In small towns, educational institutions perform functions that extend beyond formal teaching and learning. Schools often serve as community centres where social and cultural activities are organized, provide recreational and play areas for children, function as venues for public meetings and community events, and offer safe and secure environments for children's development. Consequently, educational infrastructure plays an important role in strengthening community interaction and supporting neighbourhood-level social infrastructure.

Despite their importance, educational facilities in smaller settlements frequently experience several infrastructural deficiencies. Many schools operate with inadequate

classroom capacity, limited playgrounds and insufficient open spaces, while poor road connectivity and inadequate pedestrian access further restrict students' accessibility to educational institutions. These limitations adversely affect the quality of the learning environment and highlight the need for comprehensive planning interventions to improve educational infrastructure in small towns (Ghosh, 2018).

2.2.4 Concept of Public Spaces

Public spaces perform multiple functions that contribute to the overall livability of urban settlements. They promote physical activity and encourage healthier lifestyles (Mitchell & Popham, 2008), improve walkability and local mobility, facilitate social interaction and community engagement (Whyte, 1980), support mental well-being by providing opportunities for recreation and relaxation, and strengthen community identity by creating inclusive spaces for cultural and social activities (Mehta, 2014). Consequently, public spaces are regarded as an essential component of social infrastructure that enhances both individual well-being and collective urban life.

In small towns, however, public spaces are generally limited in number and unevenly distributed across different neighbourhoods. The available open spaces often perform multiple functions by accommodating recreational activities, local markets, community gatherings and public events. Despite their limited availability, these spaces play a particularly important role in supporting children and elderly residents by providing opportunities for outdoor recreation, physical activity and social interaction. Therefore, the provision and equitable distribution of public open spaces are essential for improving accessibility, social inclusion and the overall quality of life in small-town settlements.

2.2.5 Concept of Livability

Livability refers to the overall quality of life experienced by people in a settlement. According to UN-Habitat (2020), livability includes access to services, safety, environmental quality, mobility, recreation and social interaction.

Livability frameworks generally evaluate urban quality based on multiple dimensions that influence the daily lives of residents. These dimensions include equitable access to educational institutions, healthcare facilities and public open spaces, along with the

availability of safe and efficient walking environments, basic urban services and a healthy natural environment (Shaw, 2021). Together, these components contribute to creating inclusive, sustainable and resilient urban settlements by improving accessibility, enhancing quality of life and supporting the overall well-being of the community.
Educational and public spaces are considered crucial indicators of livability because they influence health, learning, recreation and community bonding.

2.2.6 Concept of Small Towns

Small towns form the backbone of India's urban system. Census of India (2011) identifies small towns as settlements with population less than 50,000, usually falling under Class III and Class IV towns.

URDPFI (2014) similarly identifies settlements up to 1 lakh population as small and medium towns.

Small towns possess several distinctive characteristics that influence the planning and provision of social infrastructure. They generally operate with limited municipal capacity in terms of financial resources, technical expertise and administrative personnel, while also depending on nearby district cities for higher-order services such as specialized healthcare, higher education and administrative functions. Compared to larger urban centres, investment in social infrastructure is often lower, resulting in inadequate healthcare facilities and an uneven distribution of public spaces. Although many small towns retain a relatively walkable urban form due to their compact spatial structure, deficiencies in social infrastructure and service accessibility continue to pose significant challenges to achieving equitable and sustainable urban development (Kundu, 2011).

Because of these constraints, small towns show stronger in equality in accessibility and adequacy, making them ideal contexts for studying public infrastructure.

2.3 Planning context of small towns

Understanding the planning context of small towns is essential because the study focuses on public and health-related infrastructure in a small-town setting. Small towns function very differently from big cities: they grow differently, they manage services differently,

and they face unique challenges in infrastructure planning.

This section examines the planning context of small towns by discussing their classification within the Indian urban system, their distinctive demographic, economic and spatial characteristics, and the factors contributing to gaps in the provision of social infrastructure. It also explains why issues related to accessibility and infrastructure adequacy are more pronounced in small towns compared to larger urban centres, thereby highlighting the academic and planning significance of studying social infrastructure in these settlements.

2.3.1 Social Infrastructure

India does not have a single universal definition of "small towns." Instead, different agencies classify them using population, functions, density and governance characteristics.

A. Census of India Classification

The Census of India (2011) classifies towns according to population size:

Table 1: Urban Settlement Classification (Census of India)

Class	Population Range	Category
Class I	100,000 and above	Large/ Major City
Class II	50,000 – 99,999	Medium Town
Class III	**20,000 – 49,999**	**Small Town**
Class IV	10,000 – 19,999	Smaller Town
Class V	5,000 – 9,999	Transition Settlements
Class VI	<5,000	Rural/ Very Small

Source: Census of India (2011)

B. URDPFI Guidelines (2014) Classification

The Urban and Regional Development Plans Formulation and Implementation (URDPFI) Guidelines classify settlements based on their planning needs:

Table 2: Settlement Classification as per URDPFI Guidelines

Settlement Type	Population
Small Town	**Up to 50,000**
Medium Town	50,000 – 100,000
Large City	>100,000

Source: URDPFI

URDPFI specifically mentions that small towns usually depend heavily on public infrastructure and require basic-level amenities, not specialized facilities.

C. UN-Habitat (2018) View

According to UN-Habitat, small towns perform a significant role within the urban hierarchy by functioning as local service centres for surrounding rural hinterlands and as intermediate nodes connecting villages with larger urban centres. They act as important catalysts for regional economic and social development by facilitating the provision of essential services, employment opportunities and market linkages. However, these settlements often operate with limited administrative and financial resources, which constrains their capacity to adequately plan, develop and maintain social infrastructure. As a result, small towns face persistent challenges in achieving balanced and equitable urban development.

2.3.2 How do we identify a small town?

A town is considered "small" when it meets the following planning characteristics:

1. Population Size

A town is generally classified as a small town when its population is below 50,000, as suggested in the URDPFI Guidelines (2014). According to the Census of India (2011), such settlements commonly fall under Class III or Class IV towns. Although population size is one of the primary criteria for classification, planning characteristics and functional roles are equally important in distinguishing small towns from larger urban centres.

2. Morphology (Urban Form)

Small towns are typically characterized by a compact and walkable urban form comprising a dense core area with a centrally located market or commercial centre. Land use is generally mixed, with residential, commercial and institutional activities coexisting within close proximity. Peripheral areas often merge with surrounding agricultural land, while the internal road network consists of relatively narrow streets. Owing to their compact spatial structure, the average urban radius generally ranges between 2 and 3 kilometres, making walking an important mode of transportation.

3. Governance Capacity

The governance capacity of small towns is often constrained by limited financial resources, a smaller municipal workforce and inadequate technical expertise. Consequently, Urban Local Bodies frequently depend on district-level departments for planning, implementation and management of infrastructure projects, which can delay decision-making and limit the effectiveness of service delivery (Shaw, 2021).

4. Infrastructure Capacity

Social infrastructure provision in small towns is generally limited, with relatively few Primary Health Centres (PHCs), clinics, playgrounds and public open spaces. Educational facilities are often overcrowded, while commercial activities remain concentrated within a single major market area. The uneven spatial distribution of these facilities further contributes to disparities in accessibility and service provision across different neighbourhoods.

5. Service Dependency

Small towns frequently depend on nearby district headquarters and larger urban centres for higher-order services that are not available locally. Residents often travel to district hospitals for specialized medical treatment, larger towns for higher education, and regional markets for specialized goods and services. This dependence reflects the functional relationship between small towns and higher-order urban centres within the regional settlement hierarchy (Kundu, 2011).

2.3.3 How Importance of small towns in India's urban system

Although small towns are often overlooked in the planning process, they constitute the majority of urban settlements in India. According to Kundu (2011), more than half of India's urban settlements are classified as small towns, highlighting their significant contribution to the country's urban system. These settlements play a vital role in supporting balanced regional development and reducing the development gap between rural and urban areas.

Small towns also function as important service centres for surrounding rural hinterlands by providing access to education, healthcare, markets and government services. They cater to the everyday needs of neighbouring villages and act as intermediate nodes connecting rural settlements with larger urban centres (UN-Habitat, 2018).

In recent years, many small towns have experienced rapid but largely unplanned urban growth. This expansion has been driven by rural-to-urban migration for education and employment opportunities, the availability of comparatively affordable land and the outward spread of urbanization from larger cities (Shaw, 2021). As a result, these towns are increasingly facing pressure on their existing infrastructure and public services.

Unlike metropolitan cities, small towns rely predominantly on publicly provided social infrastructure, as the availability of private hospitals, educational institutions and recreational facilities is generally limited. Consequently, the accessibility and quality of public healthcare facilities, parks and community spaces directly influence the well-being, social inclusion and quality of life of local residents.

2.3.4 Why infrastructure planning is harder in small towns

Infrastructure planning in small towns is particularly challenging due to limited institutional capacity, financial constraints and uneven urban development. Most Urban Local Bodies operate with inadequate staffing, limited revenue sources and insufficient technical expertise, restricting their ability to expand and maintain essential infrastructure services (Pradhan & Mohanty, 2019).

Another major challenge is the uneven spatial distribution of social infrastructure. Public facilities are commonly concentrated around the historic market or town centre, whereas newly developed residential neighbourhoods and fringe areas frequently lack adequate

healthcare facilities, public open spaces and other essential amenities.

The road network in many small towns further limits accessibility. Narrow streets, unpaved internal roads, inadequate pedestrian infrastructure and the absence of dedicated routes for school children reduce safe and convenient access to schools, health centres and public parks.

Planning is also constrained by fragmented land ownership and the gradual encroachment of public land. Open spaces and playgrounds are often converted to temporary or incompatible land uses, reducing the availability of recreational areas for local communities. Furthermore, many small towns continue to function without updated Master Plans or Development Plans, limiting their ability to anticipate future infrastructure requirements and implement coordinated urban growth strategies (NIUA, 2015).

2.4 Planning benchmarks and standards for social infrastructure

Planning benchmarks provide a systematic framework for assessing whether public infrastructure within a settlement, particularly in small towns, is adequate, equitable and consistent with national and international planning standards. These benchmarks assist planners in determining the required number of facilities, their appropriate spatial distribution in relation to residential areas, the land area required for each facility, the population that each facility is expected to serve, and the minimum quality standards necessary to ensure efficient and accessible service delivery. Consequently, planning benchmarks serve as an important tool for evaluating existing infrastructure, identifying service deficiencies and guiding evidence-based planning interventions.

2.4.1 URDPFI Guidelines (2014)

The Urban and Regional Development Plans Formulation and Implementation (URDPFI) Guidelines serve as the primary planning framework for infrastructure development in India by prescribing quantitative standards for the provision of social infrastructure. These guidelines establish norms for the planning and distribution of healthcare facilities, educational institutions, parks and public open spaces, as well as community facilities based on population size and service requirements. Widely adopted

by urban planners, State Town Planning Departments, Urban Local Bodies and other government agencies, the URDPFI Guidelines provide a standardized basis for assessing infrastructure adequacy, identifying service gaps and preparing evidence-based development plans that promote balanced and sustainable urban growth.

A. URDPFI Standards for health infrastructure

Table 3: Health Infrastructure Norms as per URDPFI Guidelines

Facility Type	Population Served	Land Requirement	Suggested Distance
Sub-Centre	3,000–5,000	0.1–0.2 ha	Within 2 km
Primary Health Centre (PHC)	20,000–30,000	0.4–0.6 ha	Within 5 km/ 30 min
Community Health Centre (CHC)	80,000–1,20,000	2–3 ha	Located at sub-district centre
District Hospital	~5lakh population	10–20 ha	Regional access

Source: URDPFI

The URDPFI Guidelines emphasize that healthcare facilities should be equitably distributed across the urban area to ensure balanced service provision and reduce disparities in accessibility. Primary Health Centres (PHCs) are recommended to be located in close proximity to residential neighbourhoods so that residents can conveniently access primary healthcare services. Community Health Centres (CHCs) function as the first referral units within the healthcare hierarchy, providing specialized services beyond the capacity of PHCs. Furthermore, the guidelines recommend that all healthcare facilities should be well connected through the road network and public transport system to facilitate easy access. They also stress the importance of providing barrier-free infrastructure to ensure safe and convenient access for elderly persons, children and persons with disabilities.

A. URDPFI Standards for Public/ Open Spaces

Table 4: URDPFI Standards for Public/ Open Spaces

Type of Open Space	Area Norm	Service Radius
Neighbourhood Park	1 ha per 5,000 population	500 m
Community Park	5 ha per 10,000 population	1–1.5 km
City Park	25–50 ha	5 km
Playgrounds	1.2 ha per 1,000 children	Local level
Green Belt/ Buffer	Variable	City-level

Source: URDPFI

The URDPFI Guidelines recommend that public open spaces should be provided at a minimum standard of 10–12 square metres per person to ensure adequate recreational opportunities and environmental quality. These spaces should be uniformly distributed across the urban area so that all residents have equitable access irrespective of their location. The guidelines also emphasize that playgrounds should be located in close proximity to schools to support children's recreational and educational needs, while neighbourhood parks should be planned with safe pedestrian access, adequate connectivity and user-friendly design. Such planning principles contribute to improving accessibility, promoting active lifestyles and enhancing the overall livability of urban settlements.

2.4.2 WHO Standards for Health Facilities

The World Health Organization provides standards focusing on accessibility, quality, capacity, and service readiness.

A. WHO Access Standards

The World Health Organization recommends that every individual should have access to a primary healthcare facility within 30 minutes of travel to ensure timely and equitable healthcare services (WHO, 2016). In urban areas, healthcare facilities should be planned to support convenient and walkable access for basic health needs, thereby reducing travel

time and improving service utilization. The guidelines further emphasize that healthcare facilities should be designed using universal accessibility principles, ensuring safe and convenient access for elderly persons, children, pregnant women and persons with disabilities.

B. WHO Quality Standards

In addition to accessibility, the World Health Organization emphasizes the quality and operational capacity of healthcare facilities. The recommended standards include maintaining an adequate doctor-to-population ratio of 1:1,000 and a nurse-to-population ratio of 3:1,000 to ensure efficient healthcare delivery. Healthcare facilities should also provide reliable sanitation and safe water supply to maintain hygiene and patient safety. Furthermore, the WHO recommends a minimum availability of four hospital beds per 1,000 population as a global benchmark for ensuring adequate healthcare capacity and strengthening the resilience of health systems (WHO, 2017; WHO Health Systems Strengthening Framework).

2.4.3 UN-Habitat Standards for Public Spaces

UN-Habitat considers public spaces to be essential urban assets that contribute significantly to sustainable, inclusive and livable cities. The organization has established a set of global principles that guide the planning, design and management of public open spaces.

A. Public Space Accessibility

UN-Habitat recommends that every resident should have access to a public open space within a 5–10 minute walking distance to promote equitable access and encourage regular use of recreational facilities. Streets and public spaces should be designed to be safe, well-lit, inclusive and barrier-free so that they are accessible to people of all ages and abilities. The guidelines further recommend that towns allocate approximately 15–20% of the total urban land to streets and public open spaces combined in order to create a balanced and functional urban environment (UN-Habitat, 2015).

B. Quality Indicators

UN-Habitat also emphasizes that the quality of public spaces should be assessed using multiple indicators rather than area alone. Important evaluation criteria include safety, user comfort, inclusiveness, connectivity with surrounding neighbourhoods, multifunctionality to support diverse activities, regular maintenance and adequate green cover. Together, these indicators help determine the effectiveness of public spaces in meeting the recreational, social and environmental needs of urban residents.

C. Spatial Standards

In terms of spatial provision, UN-Habitat recommends a minimum of 9 sq. m of public open space per capita as the global benchmark, while 15 sq. m per capita is considered the ideal standard for promoting healthy, inclusive and sustainable urban development. These standards provide an important reference for assessing the adequacy of public open spaces and identifying infrastructure deficiencies in urban settlements.

2.5 Indicators and Parameters for Evaluating Social Infrastructure

Indicators are measurable elements that help assess the condition, distribution, accessibility, adequacy and performance of infrastructure. Indicators and parameters help measure the current status of social infrastructure and evaluate how well it supports community needs. For this study, indicators help examine how well health infrastructure and public spaces serve people in a small town.

Parameters give more detailed, qualitative and quantitative criteria to judge each indicator.

For a small-town context, indicators provide a structured way to assess infrastructure

availability, distribution, accessibility, adequacy, quality, and functionality.
This section builds a strong analytical foundation for evaluating small-town health and public-space infrastructure using global and national standards.

2.5.1 Concept of Indicators in Planning

Indicators are widely used in urban planning to evaluate the performance and adequacy

of infrastructure in a systematic and measurable manner. They provide an objective basis for assessing the availability of facilities, their spatial distribution across different parts of a city, the accessibility experienced by users, the quality of infrastructure in terms of condition, safety and usability, and its functionality in effectively meeting the needs of the population. According to UN-Habitat (2018), the use of indicators enables cities to assess service equity, identify underserved populations and support more inclusive urban development. Similarly, the Ministry of Housing and Urban Affairs (MoHUA, 2019) incorporates indicators related to healthcare services, access to public open spaces and other urban amenities within its livability assessment framework. Therefore, indicators play a crucial role in facilitating systematic, objective and evidence-based analysis, making them an essential component of urban planning research and infrastructure evaluation.

2.5.2 Purpose of Indicators in Urban Infrastructure Assessment

Indicators assist urban planners in systematically evaluating the adequacy and performance of social infrastructure by identifying deficiencies in essential services and comparing existing infrastructure with established planning standards. They also facilitate the assessment of spatial equity across different neighbourhoods, enabling planners to determine whether facilities are distributed fairly and are accessible to all sections of the population. In the context of small towns, indicators provide a structured approach for evaluating infrastructure performance and identifying areas requiring improvement. Furthermore, they support evidence-based decision-making by providing measurable information for planning, prioritization and resource allocation. UN-Habitat (2018) and the Ministry of Housing and Urban Affairs (MoHUA, 2019) emphasize that the use of planning indicators enhances transparency, improves infrastructure prioritization and contributes to more equitable and sustainable urban development.

2.5.3 Indicators of health Infrastructure

Health infrastructure must be evaluated not only by how many facilities exist, but also by how well they serve people.

Table 5: Indicators for Assessing Health Infrastructure

Indicator Category	Specific Indicators	Description	Source
Availability	Number of PHCs, Sub-centres	Compares supply with national standards	URDPFI Guidelines, 2014
	Bed–population ratio	WHO standard: 4 beds/ 1000 pop	WHO, 2017
	Doctor–population ratio	WHO standard:1 doctor/ 1000 pop	WHO, 2017
Spatial Distribution	Health facilities per ward	Measures geographic equity	Kundu, 2011
	Distance to nearest PHC	Identifies underserved pockets	URDPFI, 2014
	Ward-level deficit mapping	Helps identify spatial gaps	Pradhan & Mohanty, 2019
Service Area/ Catchment	PHC catchment radius	URDPFI= 5 km	URDPFI, 2014
	Network-based catchment	Travel time & road accessibility	WHO Health Access Framework
Quality / Functionality	Staff availability	Doctors, nurses, support staff	WHO, 2016
	Equipment availability	Diagnostics & lab readiness	WHO, 2016
	Maintenance conditions	Cleanliness, water, sanitation	NUHM, 2013
	Operating hours	Availability of services	NUHM, 2013

2.5.4 Indicators of Public Space

Public spaces (parks, playgrounds, maidans, green belts) play a major role in social well-being, especially in small towns. Their performance is evaluated through the

following indicators.

Table 6: Indicators of Public Space

Indicator Category	Indicators	Description	Source
Availability	Open space per capita	UN-Habitat:9–15 sq. m/ person	UN-Habitat, 2015
	Number of parks/playgrounds	Total supply of spaces	URDPFI,2014
	Green cover area	Total vegetated area	MoHUA, 2019
Spatial Distribution	Parks per ward	Checks equity	URDPFI,2014
	Distance to park	Ideal: 400–500 m	UN-Habitat, 2015
	Spatial clustering	Identifies concentration	Mehta, 2014
Accessibility	Walking distance	5–10 min walkability	UN-Habitat, 2015
	Safe street connectivity	Pedestrian network quality	WHO Age-Friendly Cities, 2018
Quality/ Usability	Lighting, seating, pathways	Physical comfort level	Whyte, 1980
	Cleanliness & maintenance	Usability & safety	MoHUA Swachh Bharat Urban
	Inclusiveness	Women/ elderly/ child safety	UN-Women, 2018
	Multifunctionality	Parks used for events, sports	Mehta, 2014

2.6 Bibliometric analysis

I searched Scopus using targeted Boolean strings for two domains: (i) public/open spaces + urban planning; and (ii) health infrastructure + urban health/social support. Results

were exported as CSV and analyzed with VOS viewer (van Eck & Waltman, 2010) to create keyword co-occurrence and density maps. Thresholds: minimum occurrences=3; counting method = fractional counting. Cluster labels were interpreted by reading top keywords per cluster and review in representative highly-cited papers in each cluster.

In the public-space dataset (Scopus), the most frequent keywords were *urban planning, public space, walkability, green infrastructure,* and *social inclusion* (top 5). The health dataset showed most occurrences for *accessibility, primary health care, social support,* and *health services*. Cluster analysis identified 4 main themes in the public-space literature (planning/ design; green/eco-infrastructure; social inclusion & community use; governance & policy). In the health literature, clusters centred on (a) access & service delivery, (b) social determinants & social support, (c) methods & surveys. Overall, cross-domain overlap was modest, indicating an interdisciplinary gap."

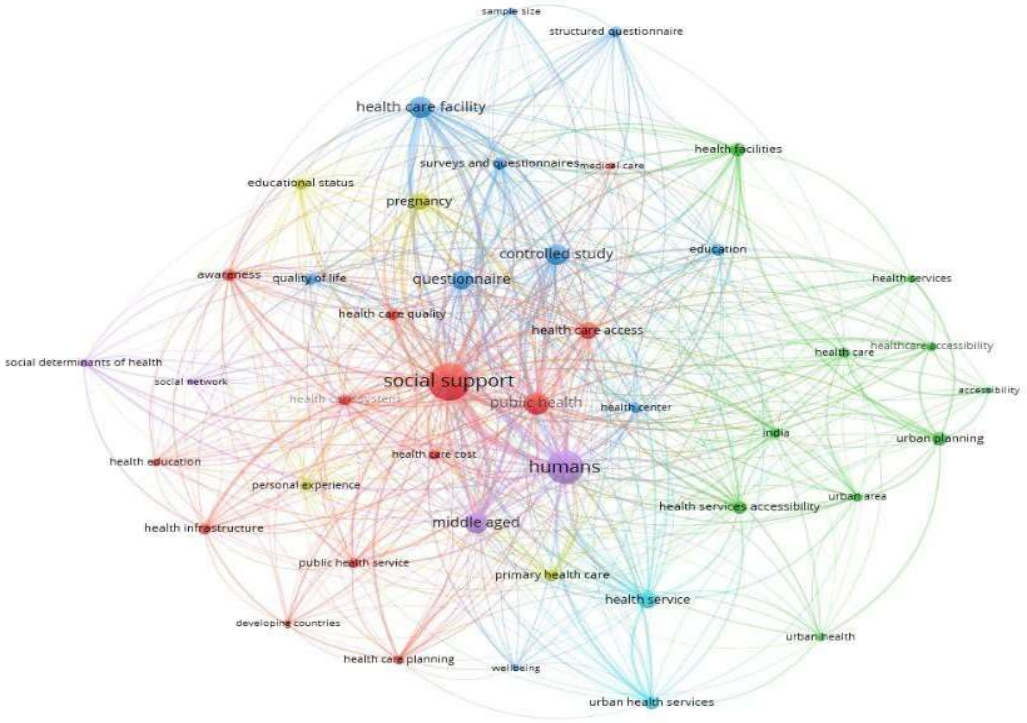

Figure 2: Network Visualization for Health domain *(Source: Vos viewer)*

Figure 2 shows The VOS viewer network analysis with 43 keywords grouped into six clusters, indicating that existing research mainly focuses on themes like *public health*, *social support*, *health care access*, *health education*, and *health care facilities*. These concepts appear as the largest and most interconnected nodes, which means they receive

the highest attention in current literature. The clusters highlight different dimensions-social behaviour, accessibility, urban planning, survey-based studies, socio-demographic factors, and well-being.

However, when we look closely at the map, certain areas show weak link strength, smaller node sizes, and fewer connections. Keywords such as *urban planning*, *urban health services*, *accessibility*, and *India* appear on the network but are not as strongly connected as the core public health terms. This indicates that while health services and public health have been widely studied, the integrated relationship between health infrastructure, accessibility, and urban planning is still not deeply researched-especially in the context of Indian cities.

This limited representation in the existing literature highlights a significant research gap. Very few studies have adopted an integrated approach that combines spatial planning, the distribution of healthcare facilities, accessibility challenges and urban-level health inequalities within a single analytical framework. Consequently, there is limited understanding of how the spatial distribution of health infrastructure influences accessibility, equity and the overall quality of life, particularly in the context of small towns. Addressing this gap can contribute to more comprehensive and evidence-based planning strategies for improving social infrastructure. Most existing studies are either medical, survey-based, or social-science driven, but urban-planning-focused assessments of health infrastructure are missing or insufficient.

Because the VOS viewer map itself shows that this intersection-*health infrastructure + accessibility + urban planning (India)*—is an area where comparatively very less research has been done, and there is a strong need for deeper investigation.

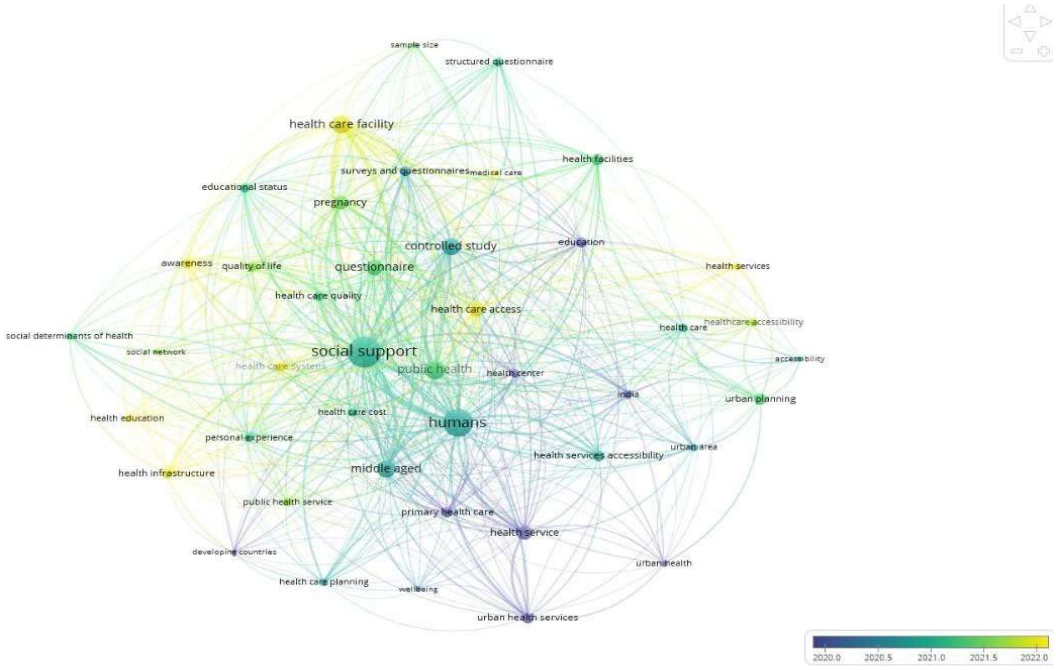

Figure 3: Overlay Visualization for Health domain *(Source: Vos viewer)*

The overlay visualization shows how the focus of existing literature has shifted over time. The blue–green colored keywords such as *public health*, *social support*, *health care access*, *health care facility*, and *health education* represent older studies (around 2020–2021), indicating that these themes have been widely explored in earlier research. In contrast, the yellow-colored keywords such as *urban planning*, *healthcare accessibility*, *urban health*, *accessibility*, and *urban area* reflect more recent studies (2022–2023). This demonstrates a clear movement in the literature from general public health themes towards newer urban, spatial, and accessibility-related perspectives.

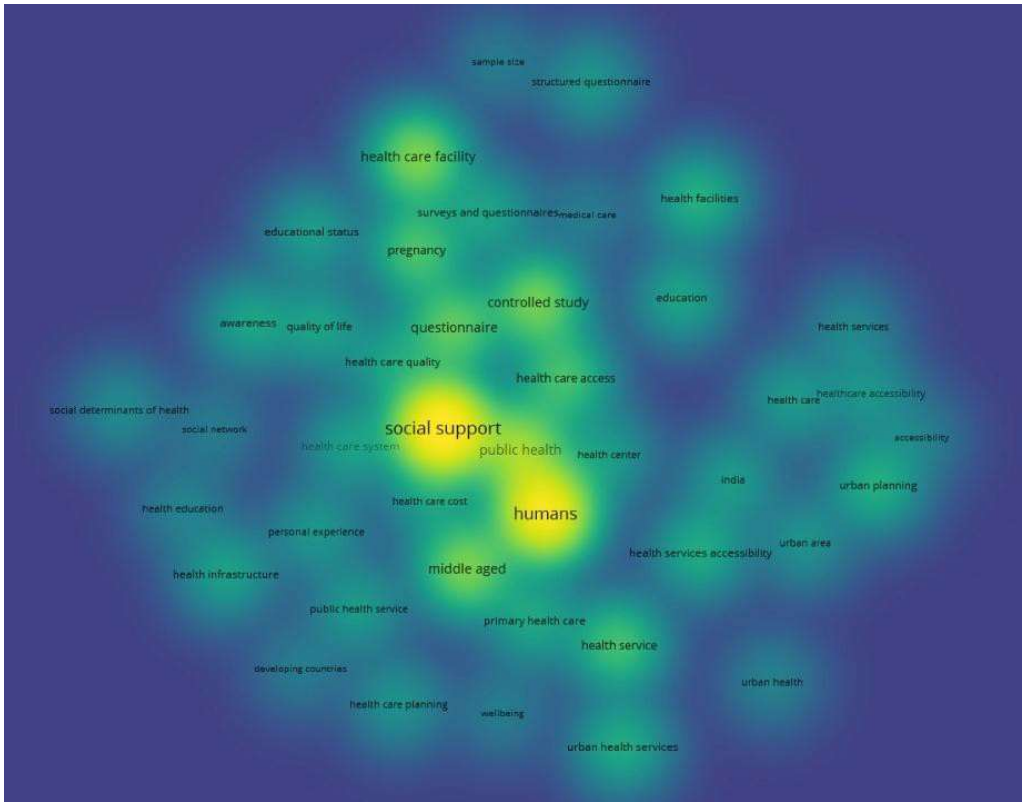

Figure 4: Density Visualization for Health domain *(Source: Vos viewer)*

The density visualization highlights the most frequently occurring and strongly connected keywords in the literature. The bright yellow areas represent the highest concentration of studies, where terms such as *social support*, *public health*, *humans*, and *health care access* appear prominently. These are the core themes that dominate existing research. Surrounding them, the green regions indicate moderately explored keywords like *health care facility*, *questionnaire*, *health education*, and *quality of life*.

The blue areas show lower-density topics such as *urban planning*, *urban health services*, *accessibility*, and *health infrastructure*, which appear less frequently in the literature. Overall, the visualization shows that current studies are heavily concentrated on general public health and social factors, while topics related to urban and spatial health dimensions appear with comparatively lower intensity.

Figure 2 (Network Visualization) shows the overall structure of the literature, where *public health*, *social support*, *health care access*, and *health care facility* appear as the largest and most interconnected keywords, indicating the main thematic focus of existing studies. Figure 3 (Overlay Visualization) presents the publication timeline, where blue–

green colors represent older research themes such as *public health*, *social support*, and *health care access*, while yellow highlights newer areas like *urban planning*, *healthcare accessibility*, and *urban health*, showing a recent shift toward urban and spatial health topics. Figure 4 (Density Visualization) further illustrates the concentration of research, with bright yellow areas indicating the most studied concepts such as *social support*, *public health*, and *humans*, whereas green and blue regions show moderately and less explored keywords like *health care facility*, *health education*, *urban planning*, and *urban health services*. Together, these visualizations provide a clear understanding of the distribution, evolution, and intensity of themes within the existing literature.

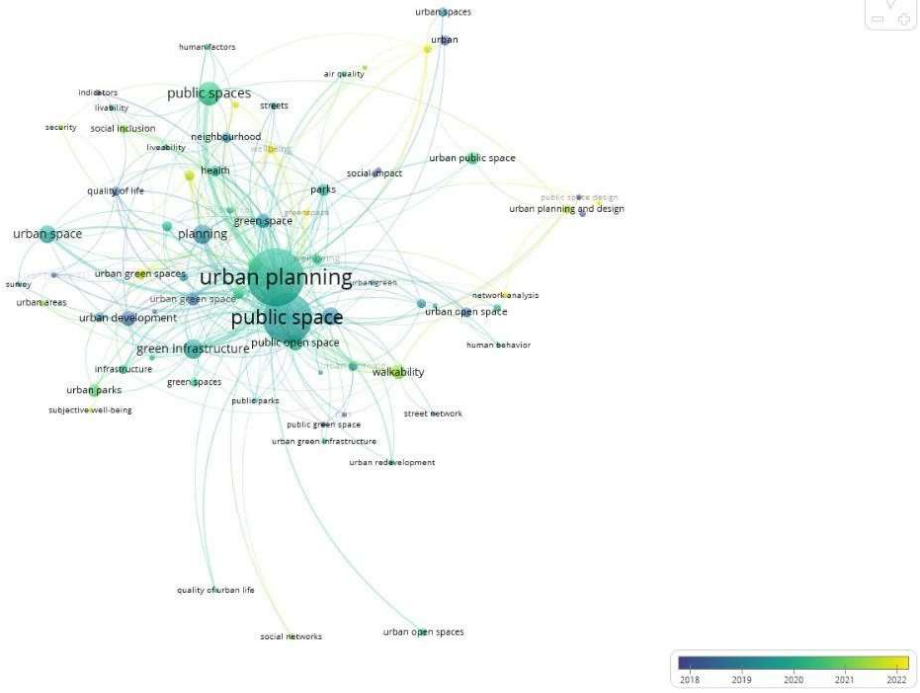

Figure 5: Network Visualization for public space domain *(Source: Vos viewer)*

Figure 5 illustrates the network visualization for the keywords related to urban planning and public space. The largest and most central nodes—*urban planning*, *public space*, *urban space*, and *green infrastructure*—show that these are the dominant themes in the literature. Surrounding them, moderately connected terms like *livability*, *quality of life*, *urban green space*, *walkability*, *public parks*, and *urban development* form clear clusters, indicating their close association with planning and public-space research.

Overall, the figure shows a highly interconnected structure, where planning, green infrastructure, and public spaces form the core of existing studies.

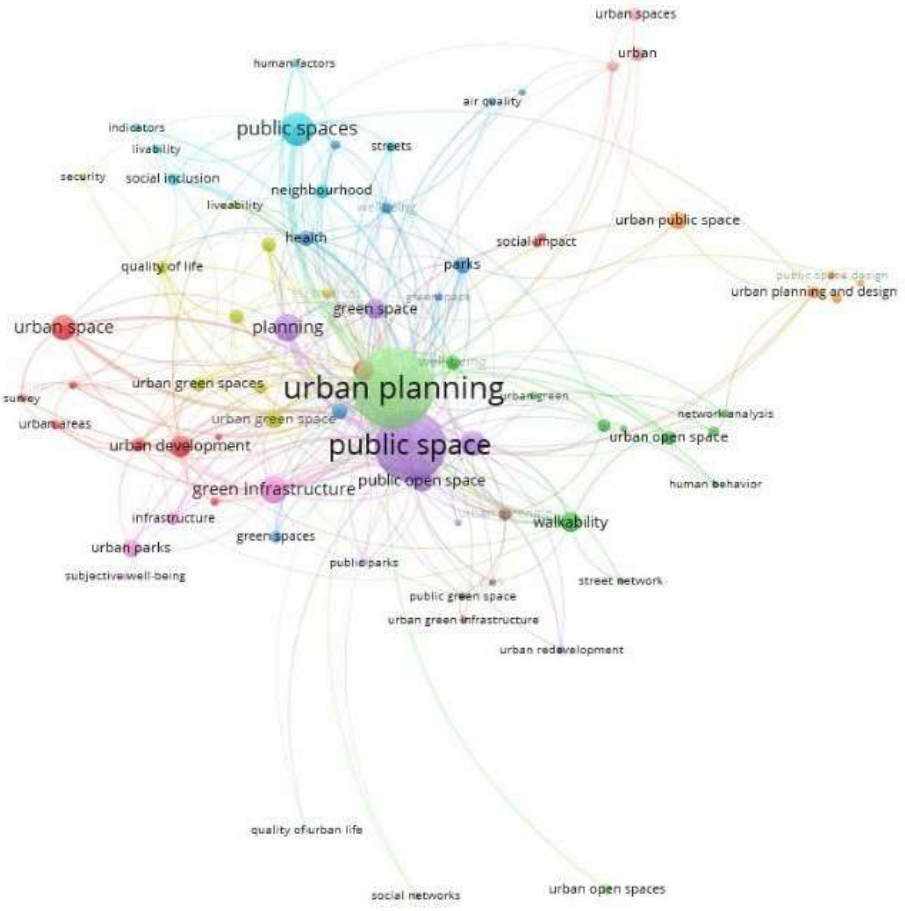

Figure 6: Overlay Visualization for public space domain *(Source: Vos viewer)*

Figure 6 presents the overlay visualization, showing the timeline of publication trends through colors ranging from blue to yellow. Blue–green areas represent older studies focused on *public spaces*, *urban development*, *green space*, and *livability*. Yellow nodes highlight newer studies related to *urban public space*, *urban open spaces*, *network analysis*, and *walkability*, suggesting a recent shift in research interest toward design-oriented and mobility-focused aspects of public space. This visual clearly indicates how the field has evolved over time from general urban planning themes toward more specific and experiential dimensions.

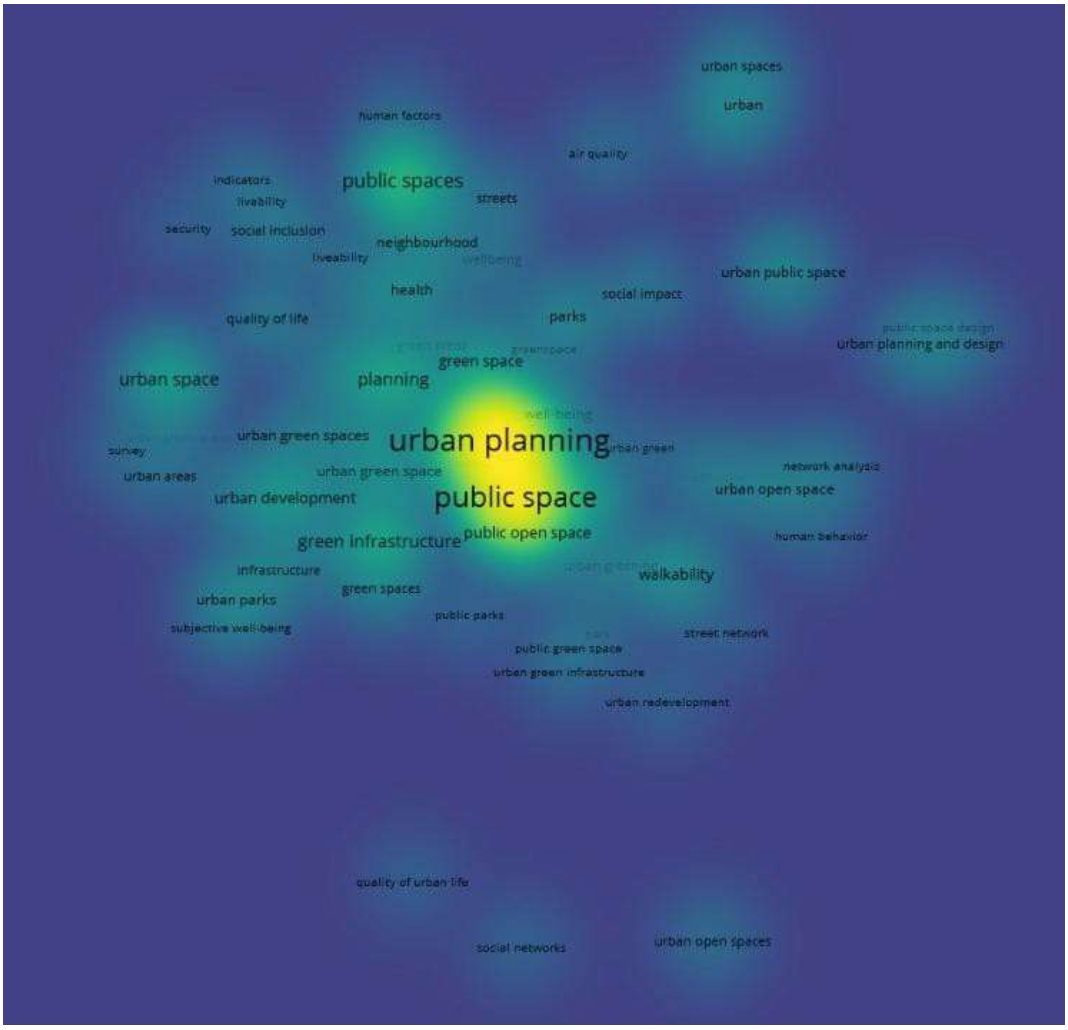

Figure 7: Density Visualization for public space domain *(Source: Vos viewer)*

Figure 7 displays the density visualization, identifying the most concentrated areas of research. The bright yellow zone around *urban planning* and *public space* marks these as the most frequently occurring and central concepts in the literature. Surrounding green areas show moderately explored themes such as *urban green space*, *public parks*, *quality of life*, *green infrastructure*, *livability*, and *walkability*. Blue regions, representing lower density, include terms like *urban open spaces* and *street networks*. This visualization highlights the strong focus of existing research on planning and public spaces, with related themes forming supportive but less frequent clusters.

Figure 5 (Network Visualization) shows that *urban planning*, *public space*, *urban space*, and *green infrastructure* are the most prominent and interconnected keywords, indicating

that existing literature strongly links public spaces with broader urban planning processes. Surrounding themes such as *livability*, *quality of life*, *walkability*, *urban green space*, and *public parks* form dense clusters, suggesting their close association with planning and design-related studies. Figure 6 (Overlay Visualization) highlights the timeline of research, where blue–green nodes represent older studies focused on *public spaces*, *urban development*, and *green space*, while yellow nodes indicate newer work related to *urban public space*, *urban open spaces*, *network analysis*, and *walkability*, showing a recent shift toward design and mobility-oriented perspectives. Figure 7 (Density Visualization) further emphasizes that *urban planning* and *public space* form the brightest, highest-density region, reflecting their dominance in academic discussions, while surrounding green–blue areas such as *urban green space*, *livability*, *streets*, *public parks*, and *walkability* show moderate occurrence.

Together, these visuals illustrate how the literature clusters tightly around planning and public spaces, with related concepts like green infrastructure, livability, and mobility forming interconnected supporting themes.

2.6.1 Summary

The selection of both domains- health infrastructure and accessibility, and urban planning and public space- was based on the patterns observed in the VOS viewer visualizations. Even though the analysis uses studies mainly from the recent few years, this approach is appropriate because research gaps and emerging themes are always identified through the most current literature. The purpose of the visualization was to understand what topics are being discussed today and which areas still require more detailed study.

In the health domain, the network visualization (Figure 2) showed that the most common and strongly linked keywords are *public health*, *social support*, *healthcare access*, and *health care facility*. These themes form the core of existing research.

However, terms related to *urban planning*, *urban health*, *healthcare accessibility*, and *accessibility* appeared with fewer connections and smaller nodes, indicating that these topics have received less attention in recent studies. The overlay visualization (Figure 3) also showed that older studies focused mainly on public health and social factors, while keywords related to planning and accessibility only appear in the newer years. The density

map (Figure 4) confirms that the highest concentration of research is around general public-health topics, while planning-related health themes appear in lower-density areas.

Similarly, in the public-space domain, the network visualization (Figure 5) highlighted *urban planning*, *public space*, *urban space*, and *green infrastructure* as major nodes, surrounded by related themes such as *livability*, *quality of life*, and *walkability*. The overlay visualization (Figure 6) showed that earlier studies focused on basic planning and green-space concepts, whereas newer studies explore *street networks*, *urban open spaces*, and *walkability*. The density visualization (Figure 7) also revealed that although planning and public space form the central focus, several related ideas appear in lighter or moderate density areas, showing that there is still room for deeper exploration.

Because of these patterns, it became clear that in both domains, some important themes are well covered, but other crucial topics—especially those that connect health, accessibility, planning, and public spaces—have fewer connections and lower intensity in recent literature. This means that even in the last few years, there is still limited work available on these combined areas. Therefore, these domains were chosen for the study because the visualizations clearly show that, while some research exists, many important links are still underexplored, making these topics relevant and meaningful to investigate further.

2.7 Conceptual Foundations- Why study Public Spaces and Health Infrastructure together?

Public or open spaces include streets, parks, playgrounds, plazas, maidans and community spaces that people use freely. According to UN-Habitat and the *Global Public Space Toolkit*, public space should be accessible, inclusive, safe and open for everyone (UN-Habitat, 2015).

Primary-level health infrastructure refers to PHCs, Sub-Centres, UPHCs and basic public health facilities, including staff, equipment, medicines and essential services. These standards are defined under the National Health Mission (NHM) through the *Indian Public Health Standards (IPHS)* Guidelines.

Why connect the two?

International literature and global planning guidelines recognize a strong relationship between public spaces and health infrastructure, highlighting the need to plan these two components in an integrated manner. Public spaces contribute indirectly to improved health outcomes by encouraging physical activity, enhancing mental well-being, strengthening social support networks and promoting community interaction, all of which contribute to healthier urban environments (UN-Habitat; WHO). In addition to these indirect benefits, public spaces also have a direct role in supporting healthcare delivery. Parks, community open spaces and public streets are frequently utilized for health camps, immunization programmes, health awareness campaigns and other community outreach activities.

The effectiveness of healthcare facilities is also closely linked to accessibility. Health services are more likely to be utilized when residents can safely walk to nearby Primary Health Centres (PHCs) and other healthcare facilities through well-connected pedestrian networks. Features such as shaded walkways, adequate seating, barrier-free pathways and safe streets enhance accessibility, particularly for elderly persons, children, pregnant women and persons with disabilities. Furthermore, both public spaces and health infrastructure are influenced by broader urban planning decisions, including land-use planning, neighbourhood design, street connectivity and pedestrian infrastructure. Recognizing these interrelationships, both UN-Habitat and the World Health Organization advocate an integrated planning approach in which healthcare services and public open spaces are planned together to improve accessibility, promote public health and enhance overall urban livability.

2.8 Policies

2.8.1 International Policies

International frameworks strongly emphasize the importance of public spaces, walkability, and primary-level health care as foundations of healthy cities.

TheUN-Habitat Global Public Space Toolkit defines public spaces as *safe, inclusive, accessible, and open to all*, and encourages cities to map their open spaces, evaluate accessibility, and ensure universal design (UN-Habitat, 2015). The toolkit highlights that

public spaces should support daily physical activity, social interaction, and environmental comfort, especially for women, children and elderly persons.

The World Health Organization's Primary Health Care (PHC) Framework stresses that primary care must be *equitable, accessible, people-centred,* and supported by strong local infrastructure (WHO,2018). WHO identifies travel time, walkability, and physical access as key determinants of service utilization, especially for preventive services.

The Sustainable Development Goal (SDG) 11.7.1 provides a global benchmark for public space planning by requiring cities to measure the *proportion of open/ public spaces accessible to all* (United Nations, 2016). This indicator promotes improving the distribution, safety and usability of public spaces.

Together, these frameworks show that international policy supports the idea that public spaces and primary health care need to be planned together, since accessibility, inclusiveness and safety are shared priorities.

2.8.2 National Policies

India has several national-level policies that guide public space planning and primary health infrastructure.

The Urban and Regional Development Plans Formulation and Implementation (URDPFI) Guidelines provide standards for open spaces, recommending 10–12 m² of open space per person and defining neighbourhood-level access norms for parks and

Recreational spaces (MoHUA, 2014). URDPFI also emphasizes integrating health and social infrastructure in master plans and Local Area Plans.

Primary health infrastructure is governed by the Indian Public Health Standards (IPHS) under the National Health Mission (NHM). IPHS specifies population coverage norms for PHCs (generally 20,000–30,000 people), required staffing (medical officer, ANMs, support staff), availability of essential medicines, basic laboratory services, and building infrastructure (NHM/IPHS, 2022). These standards are used to evaluate adequacy and service readiness of PHCs across India.

National programmes like AMRUT and the Smart Cities Mission further promote

accessible green spaces, walkable neighbourhoods, safe public areas, and improved service delivery for local health needs (MoHUA, 2015; MoHUA, 2016). These policies encourage cities to adopt inclusive design, universal access, and people-friendly streets.

Together, these national documents provide clear standards against which a small town's public space supply, PHC adequacy, and accessibility can be assessed.

2.8.3 Empirical findings from India

Indian studies highlight several consistent patterns related to public spaces and primary health care.

Research shows that parks and open spaces are unevenly distributed, with many neighbourhoods lacking accessible green areas within walkable distances (Bharadwaj & Jain, 2020; MoHUA, 2019). Studies also note problems of maintenance, poor lighting, limited seating, and lack of inclusive design, reducing the usability of public spaces for women and elderly citizens (UN-Habitat India, 2018).

On the health side, multiple evaluations report significant gaps in PHC infrastructure, staff availability, medicine supply, and basic amenities, especially in small towns and peri-urban areas (NHM, 2022; Kapoor etal., 2019). Travel distance and poor pedestrian conditions around PHCs remain major barriers to service utilization.

Walkability studies in Indian cities show that footpaths are often discontinuous, encroached, or unsafe, which directly affects access to schools, parks and health centres (Singh & Tiwari, 2018). This supports the idea that street design and pedestrian safety influence both public-space use and health-facility access.

Overall, empirical studies conducted in the Indian context consistently highlight several challenges in the planning and provision of social infrastructure. These include the uneven spatial distribution of public open spaces and Primary Health Centres (PHCs), deficiencies in the quality and maintenance of existing facilities, and limited integration between urban planning practices and local healthcare requirements. Collectively, these findings demonstrate the need for a comprehensive assessment of infrastructure accessibility and adequacy, particularly in the context of small towns where resource constraints and uneven service distribution are more pronounced. These observations

provide the foundation for the present study, which examines the accessibility and adequacy of health infrastructure and public open spaces within a small-town planning framework.

Chapter 3

DATA COLLECTION AND DATA ANALYSIS

3.1 Introduction

This chapter focuses on the study area profile, data collection methods and spatial analysis conducted for evaluating health infrastructure and public spaces within Jamner town. The chapter includes study area selection, demographic analysis, land-use assessment, road network analysis, infrastructure mapping, accessibility analysis and identification of infrastructure gaps.

Both primary and secondary data sources were used for the study. GIS-based mapping and spatial analysis were carried out to understand the distribution and accessibility of social infrastructure facilities.

3.2 Study Area Selection

Jamner town, located in Jalgaon district of Maharashtra, was selected as the study area for the present research. The town functions as an important regional service and commercial centre for the surrounding rural settlements and exhibits the characteristics of a rapidly growing small town. The selection of Jamner was based on its emerging urban growth and spatial expansion, which have increased the demand for social infrastructure and public services. At the same time, the town is experiencing growing pressure on its existing infrastructure, accompanied by an uneven distribution of healthcare facilities and other public amenities. The limited availability of organized public open spaces and the need for neighbourhood-level planning interventions further justify its selection as an appropriate case study. Moreover, the availability of spatial data and the potential for Geographic Information System (GIS)-based analysis provide an opportunity to systematically assess infrastructure accessibility, identify service gaps and develop evidence-based planning proposals. The town demonstrates typical small-town planning challenges such as fragmented public spaces, infrastructure imbalance and accessibility issues, making it suitable for the study. Jamner was selected as the study area due to its classification as a small town experiencing gradual urban growth and increasing demand for social infrastructure. The town has witnessed expansion of residential areas while the distribution

of healthcare facilities and public open spaces remains concentrated within selected locations. The limited availability of neighbourhood-level recreational spaces and uneven accessibility to social infrastructure make Jamner an appropriate case for assessing infrastructure adequacy and identifying planning interventions. Furthermore, the town represents the challenges commonly observed in small towns, including resource constraints, uneven service distribution and emerging infrastructure gaps.

3.3 Location and Regional Context

Jamner is situated in Jalgaon district within the northern region of Maharashtra. The town is well connected through regional road networks and acts as a service centre for nearby rural settlements.

Regional Characteristics

Jamner is located in Jalgaon district of Maharashtra and occupies a strategic position within the regional settlement hierarchy. The town is well connected to neighbouring settlements through regional road networks, facilitating the movement of people, goods and services. It functions as an important administrative, commercial and service centre for the surrounding rural hinterland, providing essential facilities such as healthcare, education, markets and government services. The town is predominantly surrounded by agricultural land, reflecting its strong rural–urban linkages and dependence on the surrounding villages. Owing to continuous population growth, expanding residential development and increasing demand for public services, Jamner is emerging as a rapidly developing urban settlement with growing infrastructure requirements, making it an appropriate case for assessing the adequacy and accessibility of social infrastructure.



Figure 8: Location of Jamner in Jalgaon District, Maharashtra *(Source: Author)*

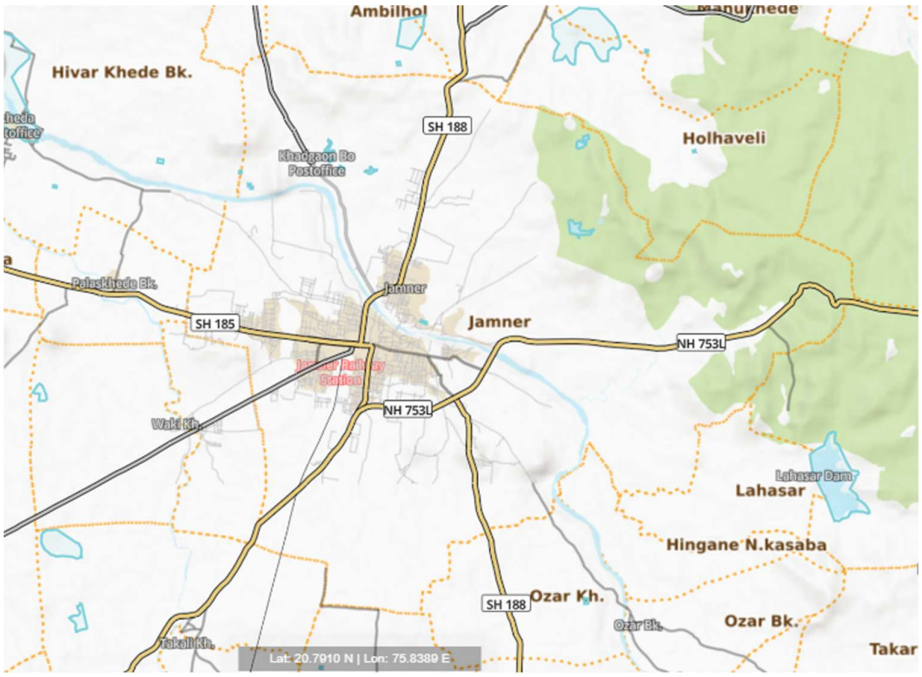

Figure 9: Regional Connectivity of Jamner *(Source: Google maps)*

3.4 Demographic Profile

The demographic profile helps in understanding population characteristics and infrastructure demand within the town.

3.4.1 Demographic Characteristics

Jamner is an important administrative and commercial town located in Jalgaon district of Maharashtra. According to the Census of India (2011), the town had a population of 46,762, which increased from 36,320 in Census 2001, indicating continuous urban growth over the decade. The increasing population has resulted in a rising demand for social infrastructure, particularly healthcare facilities, recreational spaces and neighbourhood-level public amenities.

The demographic growth of Jamner reflects the expansion of residential areas towards the peripheral parts of the town. This growth has increased pressure on the existing social infrastructure network, resulting in uneven accessibility to healthcare facilities and public open spaces. Therefore, understanding the demographic trend is essential for estimating future infrastructure demand and preparing appropriate planning interventions.

Table 7: Demographic Profile of Jamner Town

Parameter	Data
Population (Census 2011)	46,762
Area	40.74 sq. km
Literacy Rate	83.05%
Sex Ratio	927
Urban Local Body	Municipal Council

(Source: Census of India (2011); Jamner Municipal Council.)

3.4.2 Historical Population Trend

The historical population trend indicates continuous population growth in Jamner over the last decade. The increase in population has resulted in greater demand for healthcare facilities, neighbourhood parks and other public amenities. The historical population data also provides the basis for projecting the future planning population.

Table 8: Historical Population

Census Year	Population
1991	Not available
2001	36,320
2011	46,762

(Source: Census of India)

3.4.3 Need for Population Projection

Population projection is an important component of urban planning as it helps estimate future population and assess the demand for infrastructure and public services. The projected population forms the basis for determining the adequacy of healthcare facilities, public open spaces and other social infrastructure. As recommended in the URDPFI

Guidelines (2015), future population estimation is necessary for infrastructure planning and service provision.

3.4.2 Population Growth Analysis

Between 2001 and 2011, Jamner recorded an increase of 10,442 persons, representing a decadal growth of approximately 28.75%. The observed increase indicates moderate urban growth driven by expansion of residential areas, commercial activities and administrative functions. Such demographic changes directly influence the demand for neighbourhood-level healthcare facilities, recreational infrastructure and other public services.

Understanding the population growth trend is necessary for estimating future planning requirements and assessing the adequacy of existing social infrastructure.

Calculation

Population Increase

= 46,762 − 36,320

= 10,442 persons

Percentage Growth

= 10442/ 36320 x 100

= 28.75%

3.4.3 Population Projection Methods

Three commonly used methods for population projection were examined:

- Arithmetic Increase Method
- Geometric Increase Method
- Incremental Increase Method

Since the availability of historical population data influences the selection of projection techniques, each method was evaluated before selecting the most appropriate method for the study.

3.4.4 Arithmetic Increase Method

Formula

Pn=P0+nIP_n=P_0+nIPn=P0+nI

Where

Pn = Projected Population

P_0 = Base Population

I = Average Annual Increase

n = Number of Years

Calculation Population (2011)

= 46,762

Population (2001)

= 35,375

Increase

=46,762−35,375

= 11,387

Average Annual Increase

=11,387÷10

= 1,138.7 persons/year

Projection Period

=15 years

Population Increase

=1,138.7×15

= 17,080.5

Projected Population

=46,762+17,080.5

= 63,842.5 ≈ 63,843

3.4.5 Geometric Increase Method

The Geometric Increase Method assumes that the population grows at a constant percentage rate.

Formula

Pn=P0(1+r)nP_n=P_0(1+r)^nPn=P0(1+r)n

Where

Pn = Future Population

P_0 = Base Population

r = Annual Growth Rate

n = Number of Years

Formula

$$P_n = P_0(1 + r)^n$$

Growth Rate

$$r = \left(\frac{46762}{35375}\right)^{1/10} - 1$$

%2.83=

Projected Population

=46762×(1.0283)^15

=**71040**

Inference

The Geometric Increase Method assumes exponential population growth and therefore produces a comparatively higher projected population. Such assumptions are generally more suitable for rapidly growing urban centres. Since Jamner exhibits moderate urban growth, this method was not adopted for the present study.

3.4.6 Incremental Increase Method

The Incremental Increase Method considers the trend of increasing annual increments over successive census periods. The method requires at least **three consecutive census observations** to calculate both the average increase and the average incremental increase. Since comparable municipal population data for **1991** was not available, the Incremental Increase Method could not be applied for Jamner.

3.4.7 Selection of Projection Method

Among the three methods examined, the Arithmetic Increase Method was selected for estimating the planning population of Jamner.

The selection was based on the following reasons:

- Only two official Census observations (2001 and 2011) were available.
- Arithmetic Increase Method is appropriate for towns exhibiting moderate and stable growth.
- Incremental Increase Method could not be applied due to the unavailability of 1991

municipal population data.

- Geometric Increase Method assumes exponential growth and may overestimate future population.

Accordingly, the projected planning population for the year 2026 was estimated as 63,843 persons, which has been adopted for assessing healthcare facilities, public open spaces and neighbourhood-level social infrastructure.

3.5 Data Collection

The study used both primary and secondary data sources.

3.5.1 Secondary Data Collection

Secondary data for the study was collected from a variety of reliable sources, including the Census of India, municipal records, Development Plan (DP) maps, Google Earth Pro, GIS base maps, and relevant government reports and policy documents. These datasets provided comprehensive information on the demographic profile, existing infrastructure, land use, transportation network and spatial characteristics of the study area. The collected secondary data served as the foundation for demographic analysis, infrastructure mapping, road network analysis and the overall spatial assessment of social infrastructure, enabling an evidence-based evaluation of accessibility and service adequacy within Jamner.

3.5.2 Primary Data Collection

Primary surveys and field observations were conducted to understand user perception and infrastructure conditions.

Table 9: Primary Survey Details

Parameter	Details
Survey Type	Questionnaire Survey
Sample Size	50 respondents
Method	Random Sampling

Parameter	Details
Stakeholders	Residents and users

(Source: Author)

The primary survey focused on understanding residents' experiences and perceptions regarding the accessibility and adequacy of social infrastructure within the study area. Particular emphasis was placed on identifying accessibility issues related to healthcare facilities and public open spaces, examining the pattern of public-space usage, evaluating the ease of access to healthcare services, and documenting existing infrastructure deficiencies. The information collected through the survey complemented the secondary data and provided valuable insights into the functional performance of social infrastructure from the users' perspective.

3.6 Existing Land Use Analysis

Land-use analysis helps in understanding the spatial organization and functional distribution of urban activities within the town.

The analysis revealed that residential land use forms the dominant land-use category within Jamner. Commercial and institutional activities are mainly concentrated around the central urban core and major transportation corridors.

Healthcare facilities, schools and public institutions are largely clustered near central areas, while peripheral residential areas demonstrate lower infrastructure accessibility.

Public open spaces are limited and fragmented, with very few organized neighbourhood-level recreational spaces available.

Key Observations

The existing land use analysis indicates that residential land use constitutes the dominant component of the urban structure in Jamner, reflecting the town's predominantly residential character. Commercial activities are primarily concentrated along the major roads and within the central market area, resulting in higher levels of accessibility and economic activity in the town core. Institutional land uses, including educational and healthcare facilities, are also largely clustered within the central areas, while peripheral

neighbourhoods exhibit comparatively lower levels of infrastructure provision. The analysis further reveals that organized public open spaces are limited in number and unevenly distributed across the town, restricting recreational opportunities in several residential areas. In addition, mixed land-use development is prominently observed around the central market and adjoining corridors, where residential, commercial and institutional activities coexist within close proximity.

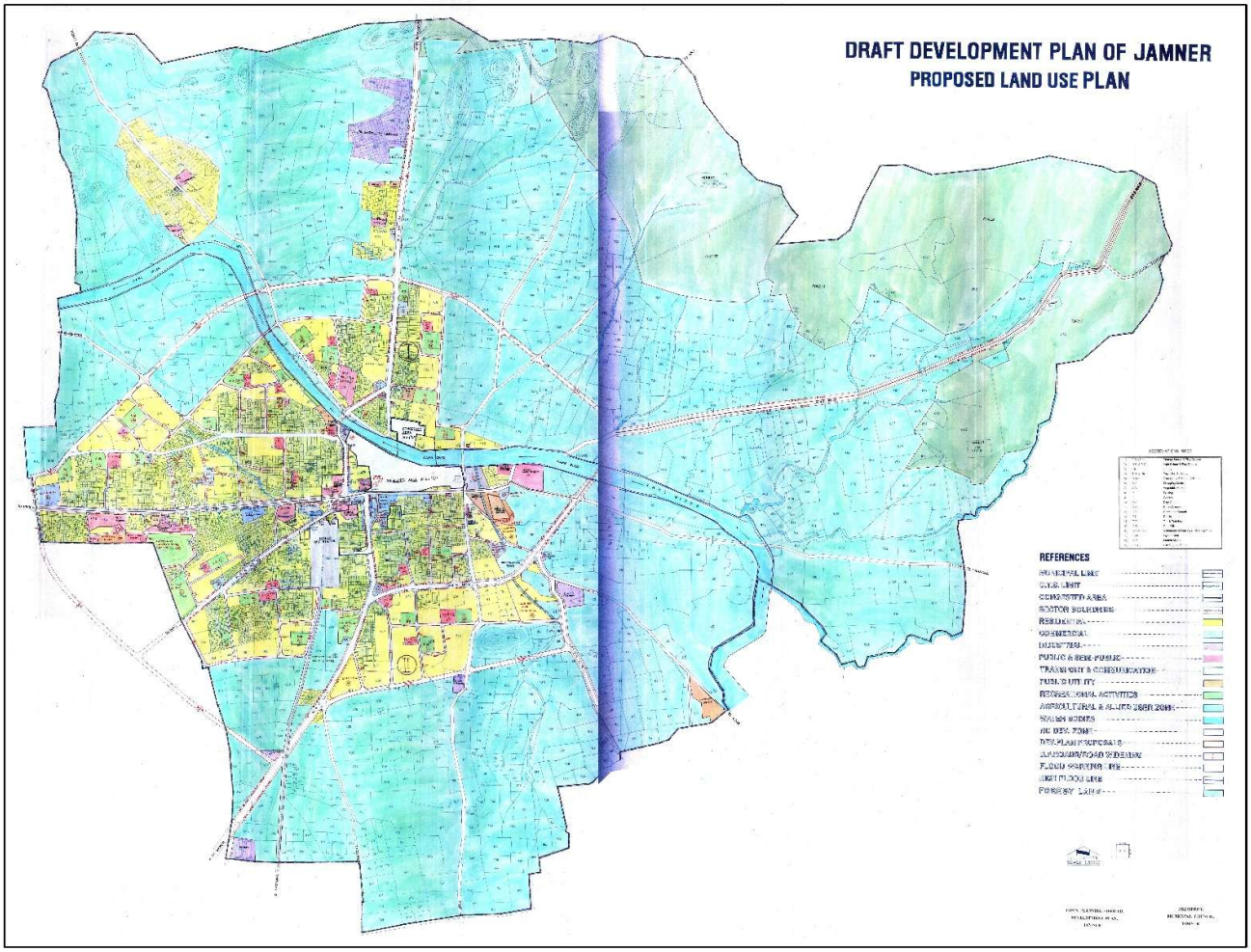

Figure10: Draft development plan of Jamner *(Source: Jamner Municipal Council)*

3.7 Road Network Analysis

The road network analysis was conducted to understand connectivity, accessibility and movement structure within the town.

The analysis revealed that major roads and transportation corridors provide regional connectivity; however, internal neighbourhood roads often lack pedestrian infrastructure and organized walkability systems.

Peripheral residential areas demonstrate lower connectivity and reduced pedestrian accessibility compared to central urban areas.

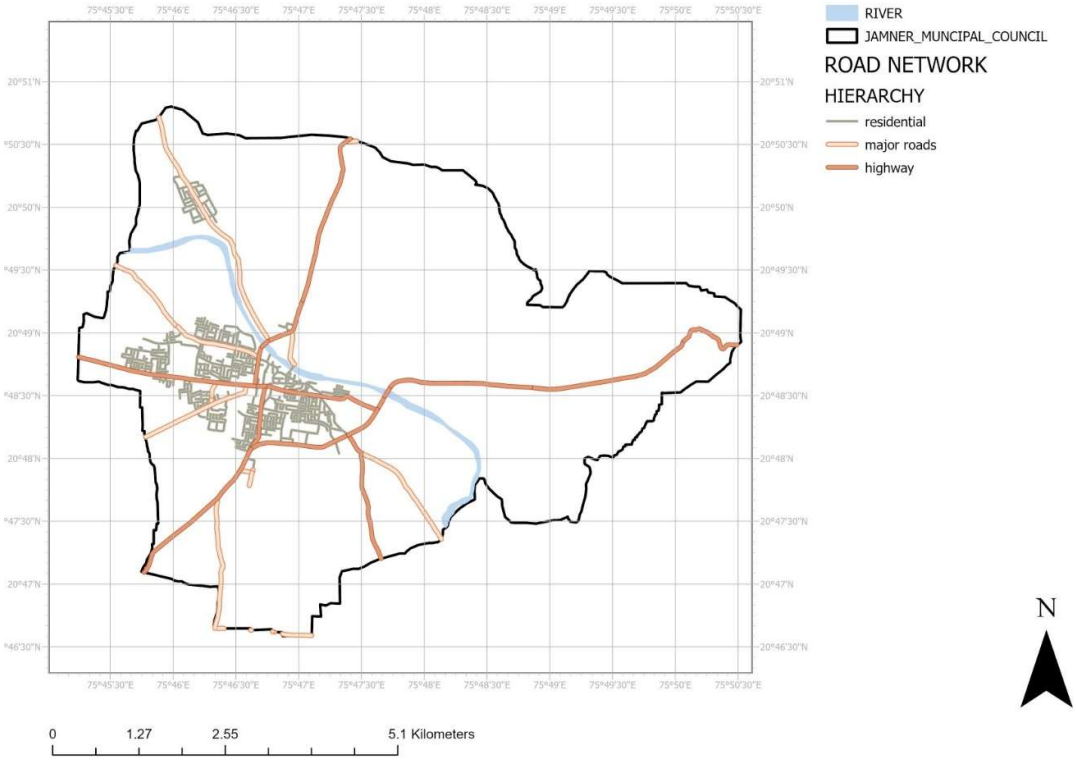

Figure 11: Existing Road Network Hierarchy of Jamner *(Source; Author)*

Key Observations

The road network analysis indicates that the major roads are predominantly concentrated within the central part of the town, providing better connectivity to commercial, institutional and administrative areas. In contrast, the internal road network in many residential neighbourhoods consists of relatively narrow and fragmented streets, which restrict efficient movement and accessibility. The assessment also reveals a noticeable lack of dedicated pedestrian infrastructure, with footpaths being absent along several road stretches. These conditions reduce the safety and convenience of pedestrian movement, particularly for vulnerable groups such as children, elderly persons and persons with

disabilities. Consequently, peripheral areas experience comparatively lower levels of accessibility, highlighting the need for improvements in road connectivity and pedestrian infrastructure to achieve a more balanced and inclusive urban transport network.

3.8 Health Infrastructure Distribution

The spatial distribution of health infrastructure was analysed using GIS mapping techniques.

The analysis revealed that hospitals, clinics and healthcare facilities are mainly concentrated within the urban core. Peripheral residential areas have limited healthcare accessibility and fewer neighbourhood-level health facilities.

The concentration of healthcare infrastructure within central areas increases travel distance and dependency on transportation for residents living in outer neighbourhoods.

Key Observations

The spatial analysis of healthcare facilities indicates that the majority of hospitals, clinics and primary healthcare centres are concentrated within the urban core of Jamner. This concentration provides comparatively better accessibility to residents living in central neighbourhoods, while peripheral areas experience lower levels of access to essential healthcare services. The distribution of health infrastructure is therefore uneven, resulting in a greater dependence on centrally located healthcare facilities for routine and emergency medical care. Furthermore, the absence of neighbourhood-level health infrastructure in the expanding residential areas increases travel distances and places additional pressure on the existing facilities within the town centre. These findings highlight the need for a more balanced distribution of healthcare services to improve accessibility and promote equitable service provision across the town.

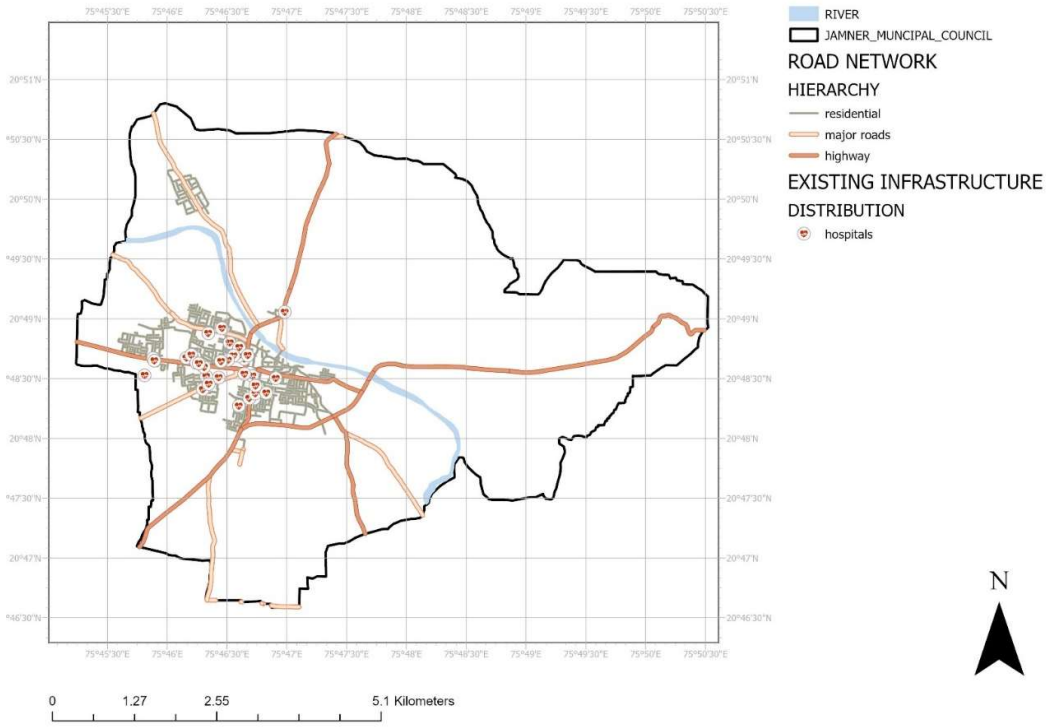

Figure 12: existing health infrastructure distribution *(Source; Author)*

3.9 Public Space Distribution

Public-space analysis was conducted to understand the availability and accessibility of recreational infrastructure within Jamner town.

The analysis revealed that organized public spaces are limited and fragmented. Most recreational spaces are concentrated near selected institutional or central urban areas, while many residential neighbourhoods lack accessible parks and open spaces.

The absence of neighbourhood-level public spaces affects recreation, walkability and social interaction opportunities.

Key Observations

The analysis of public open spaces reveals that Jamner has a limited number of organized parks and recreational areas, which are insufficient to meet the needs of the growing urban population. The existing public spaces are unevenly distributed across the town, with a greater concentration in the central areas and comparatively fewer facilities in peripheral

neighbourhoods. Many of the available open spaces are fragmented in nature and remain underutilized due to inadequate amenities, poor maintenance or limited accessibility. Consequently, residents in the outer residential areas experience reduced access to recreational facilities, highlighting the need for additional neighbourhood-level public spaces and improved spatial distribution to ensure equitable recreational opportunities and enhance the overall quality of urban life.

3.10 Accessibility Analysis

Accessibility analysis was conducted to evaluate how easily residents can access healthcare facilities and public spaces.

The analysis demonstrated that accessibility levels are significantly higher near the urban core, whereas peripheral areas experience lower accessibility and longer travel distances.

The lack of organized pedestrian infrastructure and neighbourhood-level facilities further reduces walkability and convenience for residents.

Key Observations

The accessibility analysis indicates that central areas of Jamner enjoy comparatively higher levels of access to healthcare facilities, public open spaces and other essential services owing to the concentration of infrastructure within the urban core. In contrast, peripheral neighbourhoods remain underserved, requiring residents to travel longer distances to access basic social infrastructure. The assessment also reveals inadequate walkability conditions resulting from discontinuous pedestrian pathways, the absence of dedicated footpaths and limited pedestrian-friendly infrastructure. Consequently, poor pedestrian connectivity has created noticeable accessibility imbalances across different neighbourhoods, emphasizing the need for integrated planning interventions that improve walkability, strengthen neighbourhood-level connectivity and ensure equitable access to essential urban services throughout the town.

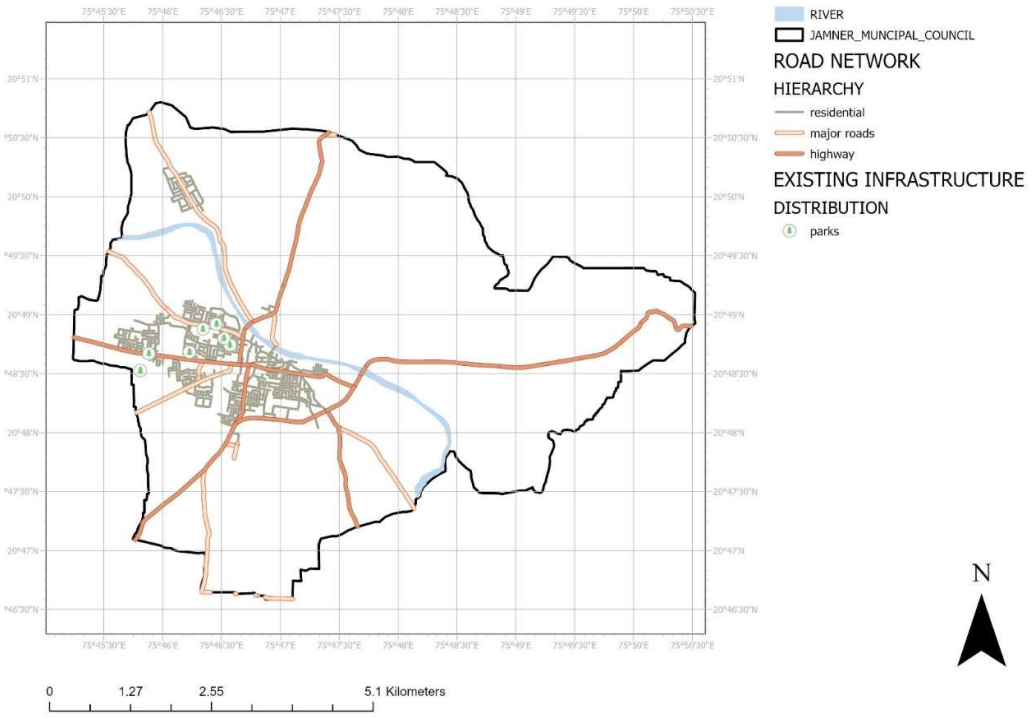

Figure 13: existing park infrastructure distribution *(Source; Author)*

For detailed assessment, the study area was examined at the neighbourhood level based on the spatial distribution of residential development and social infrastructure facilities. Three broad neighbourhood zones were identified: the central urban core, western residential area and eastern growth area.

The central urban core exhibits a higher concentration of healthcare facilities and relatively better access to public spaces. The western residential area demonstrates moderate infrastructure availability, while the eastern growth area shows comparatively lower access to both healthcare facilities and public open spaces. The neighbourhood-level assessment helps identify spatial inequalities in infrastructure provision and highlights areas requiring planning intervention.

3.10.2 Population and Infrastructure Coverage Assessment

Table 10: Population and Infrastructure Coverage Assessment

Neighbourhood Zone	Residential Characteristics	Infrastructure Coverage
Central Urban Core	Dense built-up area	Well served
Western Residential Area	Medium density residential area	Moderately served
Eastern Growth Area	Emerging residential development	Underserved

(Source:: Author)

Due to the unavailability of ward-wise population data, the assessment was undertaken using neighbourhood-based spatial analysis. Infrastructure coverage was evaluated based on the distribution and accessibility of healthcare facilities and public open spaces in relation to residential development patterns.

3.11 Gap Analysis

The combined spatial analysis identified several infrastructure gaps within Jamner town, highlighting significant disparities in the provision and accessibility of social infrastructure. The assessment revealed an uneven spatial distribution of healthcare facilities, with the majority of services concentrated in the urban core while peripheral neighbourhoods remained comparatively underserved. Similarly, the town lacks an adequate network of organized neighbourhood parks, limiting residents' access to recreational spaces and opportunities for social interaction. The analysis also identified deficiencies in pedestrian infrastructure, including discontinuous walkways and inadequate pedestrian connectivity, which adversely affect walkability and accessibility. Furthermore, the fragmented distribution of public open spaces, coupled with the dependence on centrally located urban facilities, has resulted in unequal service accessibility across different parts of the town. The limited availability of inclusive and universally accessible public environments further restricts the effective use of social infrastructure by vulnerable population groups. Overall, these findings emphasize the

need for integrated, neighbourhood-level planning interventions that enhance accessibility, strengthen pedestrian connectivity, improve the distribution of healthcare facilities and public open spaces, and promote equitable access to social infrastructure throughout Jamner.

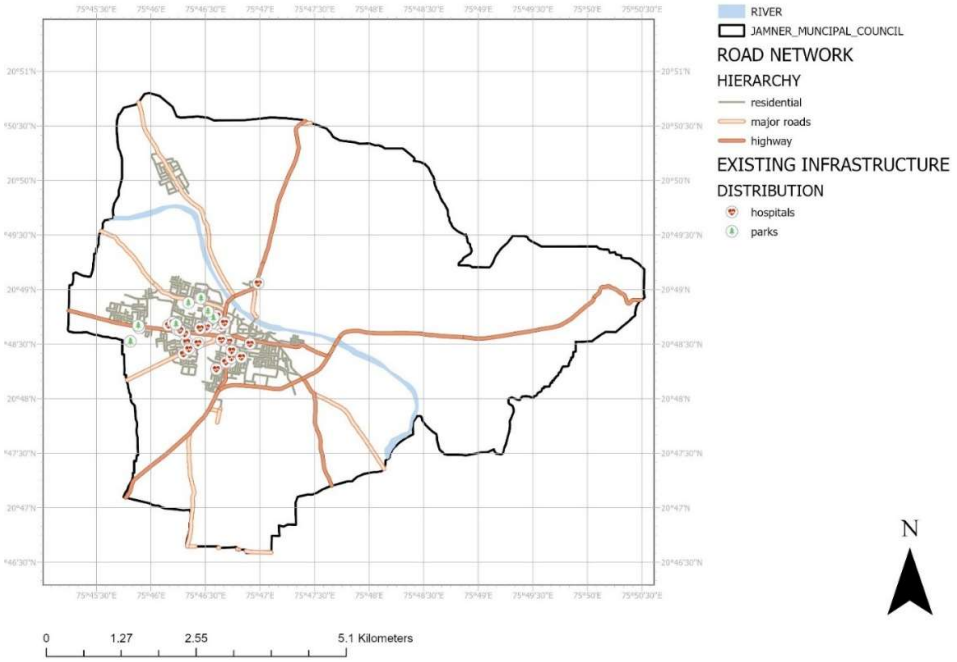

Figure14: existing health & park infrastructure distribution *(Source: Author)*

Table 11: Identification of Infrastructure Deficiency Areas

Deficiency Area	Identified Issue
Eastern Growth Area	Limited healthcare access and lack of public spaces
South-Eastern Area	Low social infrastructure coverage
Peripheral Residential Areas	Reduced accessibility and recreational opportunities

(Source: Author)

3.12 User Perception Analysis

The primary survey highlighted several concerns expressed by residents regarding the accessibility and quality of social infrastructure within Jamner. Respondents reported a shortage of nearby recreational spaces, limiting opportunities for leisure, physical activity and community interaction. Existing public spaces were also perceived to be inadequately maintained, reducing their usability and attractiveness. In addition, residents identified limited pedestrian comfort resulting from the absence of continuous footpaths, inadequate shading and poor walking conditions. Accessibility challenges were found to be more pronounced in the peripheral neighbourhoods, where residents were required to travel longer distances to access essential services. The survey further revealed a shortage of neighbourhood-level interaction spaces that could support community activities and social cohesion.

The findings also indicated that residents preferred a more walkable urban environment supported by well-designed pedestrian infrastructure, organized neighbourhood parks, shaded seating areas and community-oriented public spaces. These preferences highlight the need for integrated planning interventions that improve accessibility, strengthen neighbourhood-level social infrastructure and promote a healthier, more inclusive and livable urban environment.

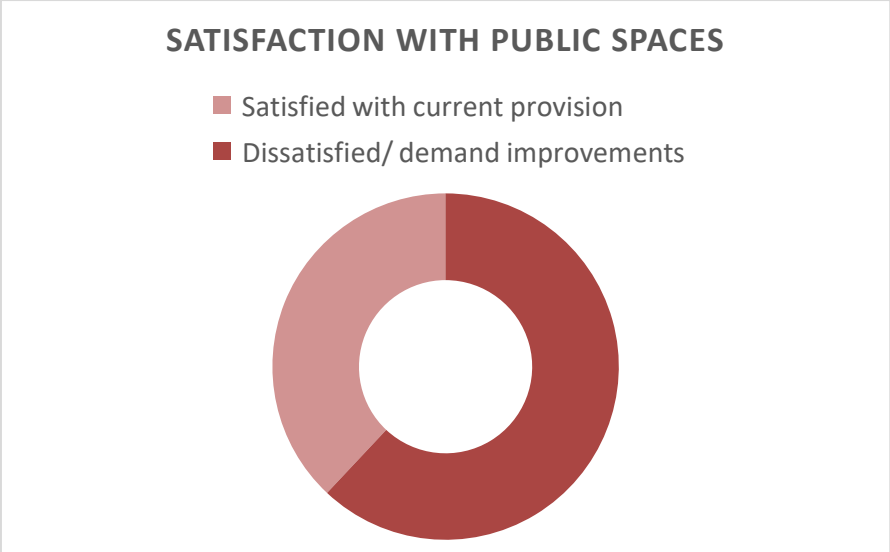

Figure 15: Respondents' Satisfaction with Existing Public Spaces *(Source: Author)*

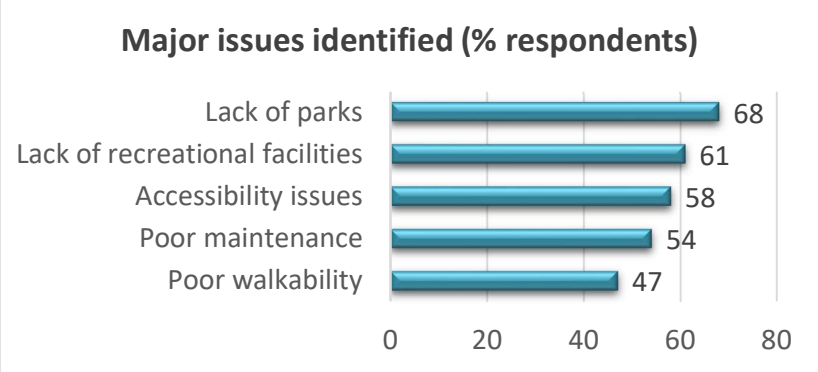

Figure 16: Major Issues Identified Through Primary Survey *(Source: Author)*

Key Findings

The study identified several important findings related to the accessibility, distribution and adequacy of social infrastructure within Jamner town. The spatial analysis revealed that healthcare facilities are predominantly concentrated within the urban core, providing comparatively better access to central neighbourhoods while limiting service availability in peripheral residential areas. Public open spaces were found to be fragmented and unevenly distributed, resulting in inadequate recreational opportunities for a significant proportion of the population. The assessment also highlighted deficiencies in walkability and pedestrian infrastructure, including discontinuous footpaths and limited pedestrian connectivity, which adversely affect access to essential services. Furthermore, the limited availability of neighbourhood-level recreational infrastructure has reduced opportunities for community interaction and active lifestyles. Collectively, these findings indicate a clear accessibility imbalance across the town and emphasize the need for integrated planning interventions that strengthen neighbourhood-level infrastructure, improve the spatial distribution of public open spaces and healthcare facilities, and enhance overall accessibility to promote a more equitable and livable urban environment.

Chapter 4

CASE STUDIES

4.1: Kadakola PHC, Mysore District (Small-Town Fringe Area)

Theme: Accessibility, Utilization & Service Gaps in a Small-Town PHC

Study Area: Kadakola is a small-town/peri-urban settlement located near Mysore City, Karnataka.

Background

Kadakola serves a population living in a small-town–rural transition area. The PHC is officially designated to serve nearly 20,000–30,000 population, which is typical of a small-town PHC. Researchers investigated whether residents could access services easily and whether the PHC fulfilled its basic IPHS norms (Anitha & Thimmaiah, 2017).

Methodology Used

The study adopted a mixed-method approach to evaluate the accessibility and performance of the Primary Health Centre (PHC) within its service catchment area. Primary data were collected through household surveys conducted across the PHC catchment to understand residents' experiences and healthcare accessibility. Structured interviews with users were undertaken to gather information on service utilization, travel patterns and user satisfaction. Walk-time and travel distance were estimated based on respondents' self-reported information to assess the ease of accessing healthcare facilities. In addition, field observation checklists were used to evaluate the condition of the infrastructure, including cleanliness, sanitation facilities and the physical condition of the building. These observations were complemented by a review of PHC records, including patient load and operational hours, to understand the facility's service capacity and overall performance.

Key Findings

The study revealed that access to the Primary Health Centre (PHC) was influenced not only by physical distance but also by the quality and safety of the walking environment.

Although most households were located within a distance of 1–2 km from the PHC, many residents preferred not to walk due to the absence of continuous footpaths, poor road conditions, and unsafe pedestrian stretches. The average walking time to the facility ranged between 10 and 20 minutes. These findings indicate that geographical proximity alone does not ensure accessibility; safe and comfortable pedestrian infrastructure plays an equally important role in determining healthcare access (Anitha & Thimmaiah, 2017).

The study also found that utilization of PHC services was relatively low despite its proximity to the community. A considerable number of residents preferred to seek treatment at private clinics located approximately 3–5 km away. The major reasons cited for this preference included frequent staff absenteeism, unavailability of essential medicines, and long waiting times at the PHC. These factors reduced public confidence in the facility and encouraged people to incur additional travel costs to obtain healthcare from private providers.

The assessment further highlighted significant adequacy gaps in the health infrastructure. The PHC lacked basic laboratory facilities required for routine diagnostic services and had an inconsistent supply of essential medicines. Basic amenities such as functional toilets and safe drinking water were either unavailable or poorly maintained. In addition, only one doctor was available on most working days, which was below the standards prescribed under the Indian Public Health Standards (IPHS). These deficiencies affected both the quality of healthcare services and the operational efficiency of the facility.

Another important finding was that the perceived quality and reliability of healthcare services strongly influenced people's healthcare-seeking behaviour. Even residents living close to the PHC often avoided using it because they considered the services to be unreliable. Factors such as inadequate staffing, irregular medicine availability, poor maintenance of facilities, and inconsistent service delivery reduced public trust. This demonstrates that improving accessibility alone is insufficient unless the quality and reliability of healthcare services are also enhanced.

Indicators This Study Used

The study evaluated healthcare accessibility and service adequacy using a combination of quantitative and qualitative indicators. Accessibility was assessed through travel time

and travel distance from households to the PHC. Service adequacy was measured using indicators such as staff availability, availability of essential medicines, working hours, and the condition of supporting infrastructure, including sanitation, cleanliness, toilets, and drinking water facilities. In addition, patient satisfaction was considered as an important indicator to understand users' perceptions regarding the quality, reliability, and overall effectiveness of healthcare services.

4.2: Narsampet Town, Telangana

Theme: Accessibility, Awareness & Quality in Small-Town Healthcare

Study Area: Narsampet is a small town in Warangal district, functioning as a mandal headquarters.

Background

A study conducted in Narsampet explored how much the local population knew about primary health services, how they accessed them, and what factors influenced Satisfaction (Swamy,2018). The context perfectly matches small towns-moderate population, limited facilities, and dependence on one main PHC.

Methodology Used

The study employed a mixed-method approach to evaluate the accessibility and utilization of healthcare services. Primary data were collected through a household survey involving 80 households during a health camp, using a structured questionnaire to assess residents' awareness of available healthcare services and their overall service experience. In addition, interviews were conducted with mothers, elderly residents and regular users of the Primary Health Centre (PHC) to understand their perceptions, healthcare-seeking behaviour and the challenges they faced while accessing health services. Field observations were also carried out to assess the physical condition of the PHC, including the building infrastructure, sanitation facilities and staff behaviour. The combination of these methods provided a comprehensive understanding of both the operational performance of the facility and the experiences of its users.

Key Findings

The study found that limited awareness of available healthcare services significantly reduced access to Primary Health Centre (PHC) facilities. Only 40–50% of the respondents were aware of important services such as vaccination schedules, maternal healthcare, and the entitlement to free medicines. Awareness levels were particularly low among women, which adversely affected the utilization of maternal and child health (MCH) services. These findings suggest that improving community awareness through health education and outreach programmes is essential for increasing the effective utilization of public healthcare services (Swamy, 2018).

Another important finding was that many residents preferred private healthcare facilities instead of the PHC, despite the higher cost. Private clinics were perceived as more convenient and efficient, leading people to bypass the government facility. The primary reasons for this preference included long waiting times, limited availability of doctors, and poor perceptions of the quality of care provided at the PHC. This indicates that service quality and efficiency strongly influence healthcare-seeking behaviour.

The assessment also revealed several deficiencies in the quality of infrastructure and services provided at the PHC. The facility suffered from poorly maintained and unclean premises, inadequate seating arrangements for patients, and an inconsistent supply of essential medicines. Basic amenities such as functional toilets and safe drinking water were either unavailable or non-functional. Furthermore, the absence of a waiting shed created discomfort for patients, particularly during adverse weather conditions. These shortcomings reduced the overall quality of healthcare services and negatively affected user satisfaction.

The study further highlighted socio-cultural differences in the perception of healthcare services among different population groups. Women and elderly respondents expressed greater concerns regarding personal safety, comfort, and the availability of basic amenities while accessing healthcare facilities. In contrast, male respondents placed greater importance on receiving timely treatment and shorter waiting times. These findings demonstrate that healthcare planning should address the diverse needs of different user groups to ensure equitable access and improved patient experiences.

Indicators used in this study

The study assessed healthcare accessibility and service quality using a range of user-based indicators. These included awareness of healthcare services, satisfaction with healthcare staff, availability of essential medicines, and the condition of supporting infrastructure such as cleanliness, sanitation, and toilet facilities. Operational performance was evaluated through waiting time, while perceived trust in the PHC was used as an indicator of community confidence in the reliability and quality of healthcare services.

4.3: Sitapur, Uttar Pradesh—Public Open Space Quality Study

Theme: Quality, Usability & Inclusiveness of Public Spaces

Study Area: Sitapur is a small town (Class II) in Uttar Pradesh.

Background

Sitapur has limited formal public open spaces. A study conducted by Tripathi (2022) focused on how residents used public spaces, especially informal open grounds, streets, and leftover plots.

Methodology Used

The study adopted a comprehensive field-based methodology to assess the quality and utilization of public spaces. Both formal and informal public spaces were mapped to understand their spatial distribution and functional role within the study area. Amenity checklists were used to evaluate the availability and condition of essential facilities such as shaded areas, seating arrangements, public toilets, lighting and safety measures. User interviews were conducted at different times of the day to capture variations in usage patterns, user perceptions and accessibility. In addition, field observations were undertaken to examine the activities and behaviour of different user groups, including women, elderly persons, children and shopkeepers, providing valuable insights into the inclusiveness, functionality and overall effectiveness of public spaces.

Key Findings

The study found that informal public spaces were used more frequently than formal parks for everyday social interaction and recreational activities. Places such as local markets, street corners, and open maidans attracted a higher number of daily users because they were easily accessible and integrated into residents' daily routines. In contrast, formal parks experienced relatively lower usage due to poor maintenance, inadequate facilities, and limited recreational opportunities.

The assessment further revealed that public spaces in the study area lacked essential amenities required for comfortable and inclusive use. Approximately 70% of the public spaces had no seating facilities, while nearly 80% lacked adequate street lighting. The availability of shaded areas was minimal, making outdoor spaces uncomfortable during hot weather. Additionally, no public toilets were available in any of the surveyed public spaces, limiting their usability, particularly for women, children, and older adults (Tripathi, 2022).

The study also highlighted that women and elderly residents were less likely to use public spaces due to concerns related to safety and accessibility. The absence of inclusive design features, inadequate pedestrian infrastructure, poor visibility, and insufficient street lighting discouraged these groups from visiting public spaces, especially during the evening hours. These findings emphasize the importance of incorporating universal accessibility and safety considerations into the planning and design of public open spaces.

Another significant finding was that the usability of public spaces was strongly influenced by the availability of shade, seating, and a safe environment. Spaces that provided these basic amenities recorded higher levels of user activity and longer durations of stay. The study observed that even modest improvements, such as installing benches, providing shaded areas, and improving lighting and pedestrian safety, substantially increased the attractiveness and use of public spaces. This demonstrates that relatively low-cost interventions can significantly enhance the functionality and social value of public open spaces.

Indicators used in this study

The study evaluated the quality and usability of public spaces using indicators such as availability of seating, street lighting, shade provision, public toilet facilities, pedestrian accessibility, safety and visibility, maintenance condition, and user activity levels. These indicators were used to assess the adequacy, inclusiveness, and overall effectiveness of public spaces in meeting the daily recreational and social needs of the community.

4.4: Karjat (Raigad District, Maharashtra)

Theme: Public Open Space Quality & Basic Health Infrastructure in a Small Maharashtra Town

Study Area: Karjat is a small municipal town (Class II/ III), located in Raigad district, Maharashtra.

Background

Karjat is a developing small town with rapid growth due to railway connectivity and its role as a service centre for surrounding villages. A study on small-town social infrastructure in Raigad district examined public open spaces, PHCs, and their adequacy against state and national guidelines (Deshmukh, 2020). The town faces typical small-town challenges: limited formal parks, uneven distribution of health services, and low maintenance.

Methodology Used

The study conducted in Karjat adopted a combination of field-based and user-oriented assessment methods to evaluate the adequacy and accessibility of public open spaces and healthcare infrastructure. Field visits were undertaken to inspect the existing public open spaces and the Primary Health Centre (PHC), while an amenity checklist based on URDPFI and UN-Habitat indicators was used to assess the quality, accessibility and functionality of public spaces. The adequacy of the PHC was evaluated using an IPHS-based assessment checklist, focusing on infrastructure and service standards. In addition, user interviews with local residents were conducted to understand their perceptions and

experiences regarding public facilities. A short questionnaire was administered to assess user satisfaction and accessibility, and simple walking-distance mapping was carried out to evaluate the ease of access to healthcare facilities and public open spaces within the town.

Key Findings

The study revealed that the availability of formal public open spaces in Karjat was highly inadequate, with only two formal parks located within the municipal limits. As a result, more than 85% of the population depended on informal public spaces, such as maidans, railway grounds, roadside gathering areas, and other open spaces, for recreation and social interaction. These informal spaces played a significant role in supporting daily community activities despite lacking planned infrastructure. The assessment identified several deficiencies in the formal public spaces, including the absence of public toilets, insufficient shaded areas, inadequate lighting, poor maintenance, and a lack of seating facilities. These shortcomings reduced the overall usability and attractiveness of the spaces. Furthermore, women and elderly residents were found to use public spaces less frequently due to concerns regarding personal safety and inadequate supporting infrastructure (Deshmukh, 2020).

The study also examined the accessibility of public open spaces and found that most residents reached their nearest gathering space by walking for approximately 10–15 minutes. However, the distribution of formal parks was uneven across the municipal area, resulting in several wards having no formal public open space. This unequal distribution limited equitable access to recreational facilities and increased residents' dependence on informal spaces for social and recreational needs.

The assessment of Karjat Primary Health Centre (PHC) indicated that the facility served a population well beyond its intended capacity by catering to both the urban population and the surrounding rural villages. The evaluation against Indian Public Health Standards (IPHS) identified several service gaps, including shortages of laboratory technicians and pharmacists, the availability of only a part-time medical officer, irregular supplies of essential medicines, and the absence of a dedicated waiting shed for patients. Although basic water supply and sanitation facilities were available, their quality remained limited.

Residents also reported long waiting times and restricted outpatient department (OPD) working hours, which negatively affected service accessibility and user satisfaction.

The study further highlighted community perceptions regarding the quality of public spaces and healthcare services. Public satisfaction with open spaces was generally low, with average satisfaction scores ranging from 1 to 2 on a five-point scale, primarily due to poor infrastructure and maintenance. Although satisfaction with the adequacy of PHC services was moderate, public trust in the facility remained low because of staff shortages, inconsistent medicine availability, and limited service quality. Consequently, many residents preferred private healthcare providers despite higher treatment costs, as they perceived them to offer faster and more reliable services.

Indicators Used

For Public Spaces

The study assessed the adequacy and usability of public open spaces using indicators such as availability of shade, seating facilities, street lighting, public toilets, safety and security, maintenance condition, walking distance from residential areas, and inclusiveness for different user groups. These indicators were used to evaluate the accessibility, comfort, and functionality of public spaces within the town.

For Health Facilities

The adequacy and performance of the Primary Health Centre were evaluated using indicators including availability of healthcare staff, supply of essential medicines, sanitation and cleanliness, building condition, water supply, outpatient department (OPD) working hours, and patient satisfaction. These indicators provided a comprehensive assessment of the accessibility, service quality, and operational efficiency of the healthcare facility.

4.5 Comparison

Table 12: Comparative Analysis of Relevant Case Studies

Case Study	Study Area (Small Town)	Domain	Methods Used	Key Findings	Indicators Observed	What I Can Use For My Study
1. Kadakola PHC (Anitha & Thimmaiah, 2017)	Kadakola, Mysore Fringe (Karnataka)	PHC accessibility & service utilization	Household survey, travel time reporting, facility audit, observation	Access depends on walkability; staff shortage; low medicine availability; people prefer private providers	Distance, travel time, staff, medicine, sanitation, waiting area	Travel-time based accessibility PHC adequacy checklist User trust & satisfaction questions
2. Narsampet (Swamy,2018)	Narsampet, Warangal (Telangana)	PHC awareness, access, satisfaction	Household/ community survey, perception questions, field observation	Low awareness; women's access lower; long waiting; poor perception of quality	Awareness, satisfaction, waiting time, toilets, staff behaviour	Awareness questions Gender-based perception Satisfaction scale Simple adequacy scoring
3.Sitapur Public Spaces (Tripathi, 2022)	Sitapur, Uttar Pradesh	Public space quality &usability	Amenity checklist, usage observation, interviews, mapping informal spaces	Informal spaces more used; lack of shade, seating, lighting; women avoid spaces	Seating, shade, lighting, safety, inclusiveness, cleanliness	Public space adequacy checklist Assess informal spaces Safety & usability indicators Inclusiveness items
4. Karjat (Deshmukh, 2020)	Karjat, Raigad (Maharashtra)	Public spaces +PHC assessment	Field audit, amenity scoring, questionnaire, walking-time estimate	Informal spaces heavily used; formal parks few; poor amenities; PHC overcrowded; basic WASH inadequate	Shade, seating, lighting, toilets, waiting area, PHC readiness	Walking-time access model Public space + PHC dual checklist WASH& waiting indicators

(Source: Compiled by Author from the reviewed literature)

Chapter 5

RESULTS AND DISCUSSION

5.1 Introduction

This chapter presents the major findings derived from the spatial analysis, accessibility assessment and primary survey conducted for Jamner town. The chapter discusses the existing condition of health infrastructure and public spaces and evaluates how their spatial distribution affects accessibility, livability and neighbourhood-level urban experience.
The chapter also interprets the identified infrastructure gaps and discusses their implications in the context of small-town planning and social infrastructure development.

5.2 Major Findings

The spatial and perception-based analysis revealed several important issues related to the distribution, accessibility and adequacy of social infrastructure within Jamner town. The findings indicate that healthcare facilities are predominantly concentrated within the urban core, resulting in comparatively better accessibility for central neighbourhoods while peripheral residential areas experience lower levels of service access. The analysis also revealed that public open spaces are fragmented and unevenly distributed, with a limited number of organized neighbourhood-level recreational facilities available to meet the needs of the growing population. Furthermore, deficiencies in pedestrian infrastructure, including discontinuous footpaths and inadequate walkability conditions, reduce the ease of accessing essential services and public spaces. The assessment also identified an imbalance in the spatial distribution of public infrastructure, leaving several peripheral neighbourhoods underserved in terms of healthcare, recreation and community facilities. Overall, these findings demonstrate that the existing pattern of infrastructure provision has created significant accessibility disparities across the town, highlighting the need for integrated and neighbourhood-level planning interventions to promote equitable service distribution and improve overall urban livability.

5.3 Healthcare Accessibility Issues

The assessment of health infrastructure highlighted that healthcare facilities are primarily concentrated within the central urban core of Jamner, providing comparatively better access to residents living in these areas. In contrast, peripheral residential neighbourhoods experience lower levels of accessibility and are required to travel longer distances to reach essential healthcare services. Consequently, residents from the outer parts of the town depend heavily on centrally located healthcare facilities, leading to congestion at major hospitals, increased travel time, greater dependence on public and private transportation, and noticeable inequalities in healthcare accessibility. The absence of neighbourhood-level healthcare support infrastructure further aggravates these challenges, particularly for elderly persons, women and low-income households who may face greater mobility constraints.

The study also identified deficiencies in the integration of accessibility planning around existing healthcare facilities. In several locations, pedestrian pathways were found to be inadequate, footpaths were discontinuous or absent, and shaded walking environments were limited. These conditions reduce pedestrian comfort and safety, discourage walking as a mode of access to healthcare services and ultimately affect the efficient utilization of existing health infrastructure. The findings emphasize the need for integrated planning interventions that improve pedestrian connectivity, strengthen neighbourhood-level healthcare provision and promote equitable access to healthcare services throughout the town.

5.4 Public Space Deficiency

Public-space analysis revealed that organized parks and recreational spaces are limited and fragmented within the town. Most public spaces are concentrated within selected central areas, while several residential neighbourhoods lack accessible recreational infrastructure. Existing open spaces are often underutilized, poorly maintained or disconnected from pedestrian networks.

The deficiency of organized public spaces has adversely affected opportunities for recreation, physical activity, community interaction and neighbourhood-level social engagement. Furthermore, the absence of shaded public spaces, adequate seating facilities

and other user-friendly amenities reduces the usability of these spaces, particularly for elderly persons and children. These findings indicate the need for a more equitable distribution of public open spaces, improved maintenance practices and enhanced pedestrian connectivity to ensure that recreational facilities are accessible, inclusive and capable of supporting the social and physical well-being of urban residents.

5.5 Walkability and Pedestrian Infrastructure

The walkability assessment revealed that pedestrian infrastructure within Jamner is inadequate across many parts of the town. Continuous footpaths, safe pedestrian crossings and shaded walking environments are absent along several internal roads, reducing the safety, comfort and convenience of pedestrian movement. As a result, residents are increasingly dependent on private vehicles even for short-distance trips, while vulnerable population groups such as children, elderly persons, women and persons with disabilities experience greater difficulty in accessing essential services.

The analysis further identified poor pedestrian comfort resulting from discontinuous pathways, limited public seating and the absence of well-planned walking environments. These deficiencies restrict opportunities for walking, reduce neighbourhood-level social interaction and negatively influence the accessibility of healthcare facilities, public open spaces and other community services. The findings highlight the need for pedestrian-oriented planning interventions that improve walkability, strengthen neighbour

5.6 User Perception Analysis

The primary survey findings indicated that residents experience several infrastructure-related challenges within their daily urban environment. Respondents consistently highlighted the lack of nearby recreational spaces, inadequate maintenance of existing public areas and deficiencies in pedestrian infrastructure, all of which reduce the quality and accessibility of social infrastructure. Accessibility difficulties were found to be more pronounced in peripheral neighbourhoods, where residents often travel longer distances to access healthcare facilities and public open spaces. The survey also revealed a shortage of neighbourhood-level community interaction spaces and organized public open spaces that could support recreation, social activities and community engagement.

Residents expressed a strong preference for a more walkable urban environment supported by continuous pedestrian pathways, shaded seating areas, community parks and accessible public spaces that cater to all age groups. These findings indicate that public spaces should be viewed not only as recreational assets but also as essential components of social infrastructure that strengthen neighbourhood interaction, promote healthier lifestyles and enhance the overall livability of the town.

5.7 Planning Implications

The findings of the study indicate the urgent need for integrated and accessibility-oriented planning approaches in small towns. The assessment demonstrates that the adequacy of social infrastructure cannot be evaluated solely on the basis of the number of facilities available; equal importance must be given to their accessibility, spatial distribution and ability to effectively serve the surrounding population. The results further emphasize that neighbourhood-level planning interventions are essential for achieving equitable service provision and improving overall urban livability. Accordingly, healthcare facilities and public open spaces should be planned as interconnected components of social infrastructure rather than as isolated urban amenities.

The study also underscores the importance of adopting Geographic Information System (GIS)-based infrastructure assessment and evidence-based planning approaches to support informed decision-making. Strengthening walkability, improving pedestrian connectivity and promoting inclusive public-space development are equally important for enhancing accessibility and encouraging greater use of public facilities. By integrating these planning strategies, neighbourhood-level interventions can significantly improve access to essential services, expand recreational opportunities, strengthen community interaction and ultimately enhance the overall well-being and quality of life of urban residents.

5.8 Deficiency Assessment

The analysis of healthcare facilities and public open spaces reveals that the primary challenge in Jamner is the uneven distribution of social infrastructure rather than its complete absence. Healthcare facilities are predominantly concentrated within the central urban area, resulting in relatively better service accessibility for residents located near the town core. However, peripheral and emerging residential areas experience comparatively

lower accessibility to these facilities.

A similar pattern is observed in the distribution of public open spaces. Existing parks are limited in number and concentrated within selected neighbourhoods, leaving several residential areas underserved. The lack of adequate recreational spaces restricts opportunities for physical activity, community interaction and social well-being.

The study also highlights deficiencies in pedestrian infrastructure and walkability, particularly in areas located away from major activity centres. Limited pedestrian connectivity reduces accessibility to healthcare facilities and public spaces, especially for children, elderly residents and non-motorised users.

Overall, the deficiency assessment indicates the need for a more balanced and neighbourhood-oriented approach to social infrastructure planning. The identified gaps form the basis for the planning interventions proposed in the subsequent chapter.

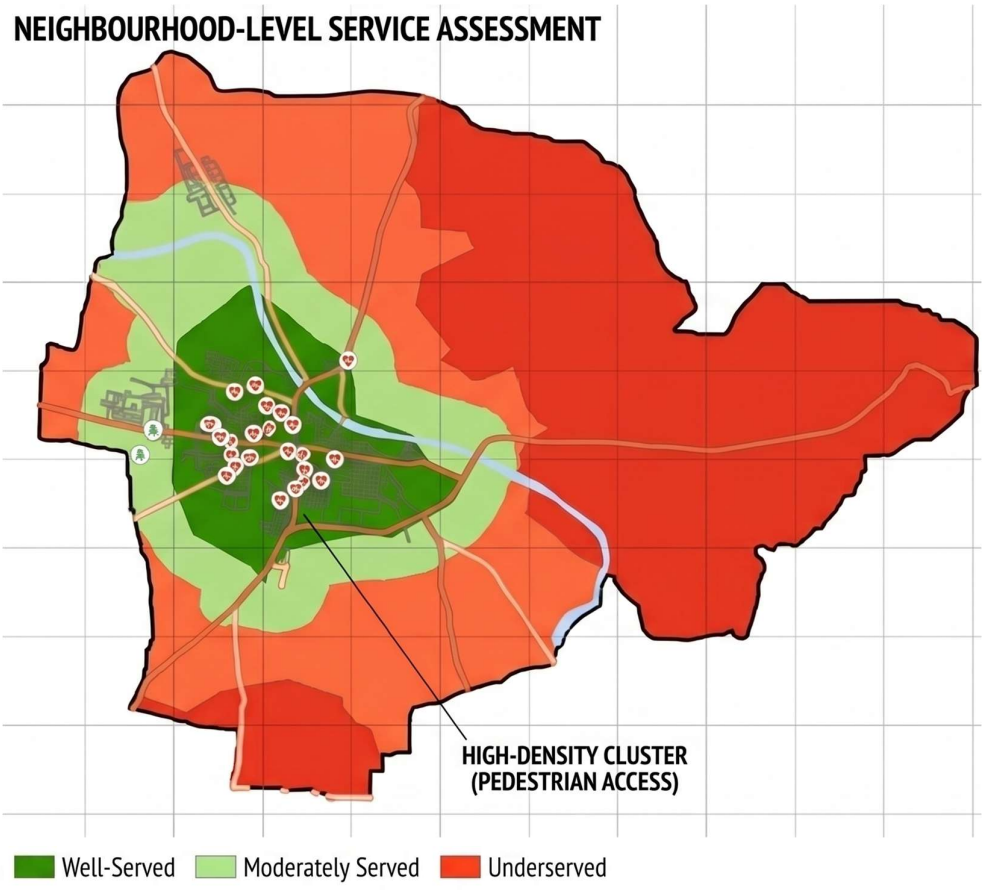

Figure 17: Spatial Equity Assessment of Social Infrastructure in Jamner *(Source: Author)*

Figure 17 illustrates the spatial distribution of social infrastructure services across Jamner. The

analysis reveals that health facilities and public open spaces are concentrated within the central part of the town, resulting in higher service accessibility in the core area. In contrast, peripheral areas, particularly towards the eastern side, exhibit lower levels of accessibility and limited availability of social infrastructure. The assessment highlights the presence of service gaps and uneven spatial distribution, indicating the need for decentralized planning interventions to improve accessibility and service coverage.

Chapter 6

PROPOSAL

6.1 Introduction

Based on the findings derived from the spatial analysis, accessibility assessment and user perception survey, this chapter presents the proposed planning intervention for improving neighbourhood-level social infrastructure within Jamner town. The proposal focuses on transforming an underutilized public open space into an integrated and health-supportive neighbourhood environment that enhances accessibility, walkability, recreation and community interaction. The intervention aims to strengthen the relationship between public spaces and social infrastructure while improving urban livability within the study area.

The proposal adopts a people-oriented planning approach that prioritizes accessibility, inclusiveness, walkability, environmental comfort and community interaction. By integrating these planning principles, the proposed intervention seeks to create a safe, equitable and multifunctional public environment that supports everyday social activities, promotes healthier lifestyles and improves access to essential neighbourhood amenities. The planning strategy is intended not only to address the identified infrastructure deficiencies within the selected site but also to serve as a replicable model for neighbourhood-level social infrastructure development in other underserved areas of Jamner.

6.2 Proposal Vision

The proposal envisions the development of an integrated neighbourhood-level social infrastructure hub that supports health, recreation, accessibility and social interaction within the residential precinct of Jamner. The proposed intervention seeks to create an inclusive public environment that responds to the identified deficiencies in the existing social infrastructure network while improving the quality of life of local residents.

The proposal aims to create inclusive and universally accessible public spaces, improve pedestrian accessibility and connectivity, enhance recreational opportunities for all age groups, and strengthen neighbourhood-level social interaction. It further emphasizes the development of a health-supportive urban environment through the provision of organized

public open spaces, shaded pedestrian pathways, adequate seating areas and community-oriented infrastructure. By integrating these elements, the proposal intends to encourage active lifestyles, promote social cohesion and establish a safe, accessible and vibrant neighbourhood environment that can serve as a model for future neighbourhood-level planning interventions in Jamner.

6.3 Proposal Objectives

The proposal has been formulated with the objective of addressing the key deficiencies identified through the spatial analysis and user perception survey while enhancing the overall quality and accessibility of neighbourhood-level social infrastructure. It seeks to improve neighbourhood accessibility and walkability by creating a safe, continuous and pedestrian-friendly environment that encourages active mobility. The proposal also aims to develop organized public and recreational spaces that cater to the needs of different age groups and provide opportunities for leisure, physical activity and community participation.

In addition, the intervention is intended to strengthen neighbourhood-level social infrastructure by enhancing community interaction and social engagement through the provision of inclusive public spaces and multifunctional community areas. The proposal further promotes a health-supportive urban environment by integrating green infrastructure, improving environmental quality and encouraging sustainable urban development. Emphasis has also been placed on creating flexible and multifunctional public spaces capable of accommodating recreational, cultural and social activities, thereby ensuring that the proposed neighbourhood hub remains accessible, inclusive and responsive to the diverse needs of the local community.

6.4 Site Selection Rationale

The proposed intervention site has been selected based on the findings of the accessibility assessment, infrastructure distribution analysis and user perception survey conducted within Jamner town. The analysis revealed that social infrastructure facilities are predominantly concentrated within the central urban area, resulting in comparatively lower accessibility levels in peripheral and emerging residential zones.

The selected site is strategically located within an area that can enhance accessibility to both

healthcare facilities and public open spaces while also serving nearby residential neighbourhoods. The location provides the opportunity to address identified infrastructure gaps and strengthen neighbourhood-level social infrastructure provision. In addition, the site is well connected to the existing road network, making it suitable for the development of integrated community facilities and recreational spaces.

The site was therefore selected to demonstrate how localized planning interventions can contribute towards improving overall social infrastructure accessibility, community well-being and quality of life within the town.

6.4.1 Town-Level Planning Intervention Framework

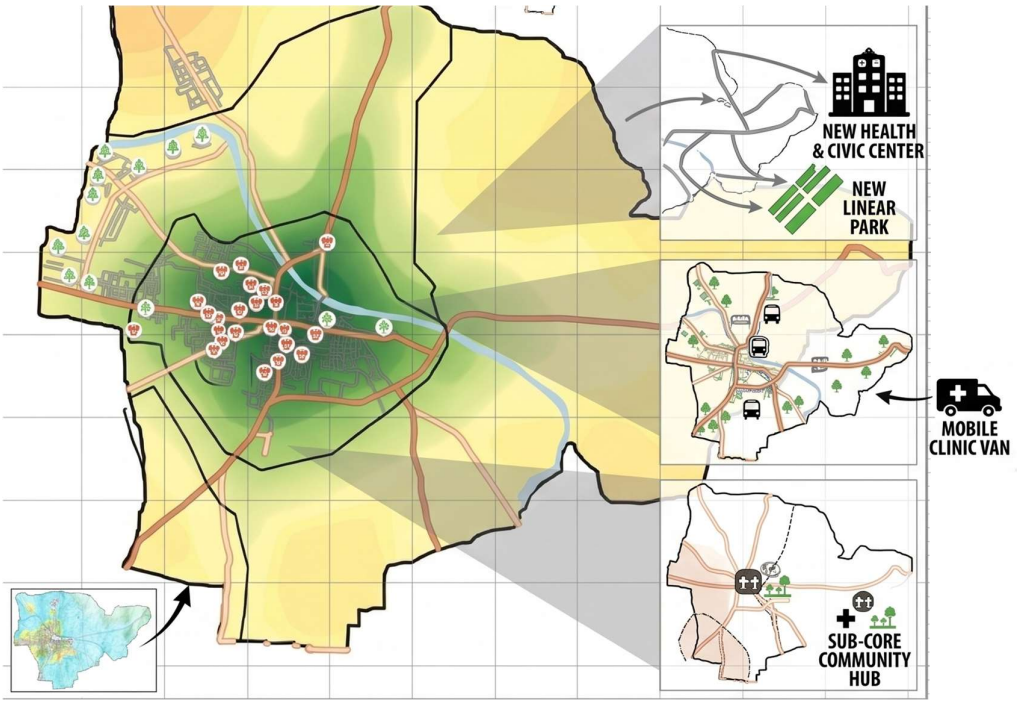

Figure 18: Proposed Social Infrastructure Intervention Framework for Jamner (Source: Author)

Figure 18 presents the proposed intervention framework developed in response to the identified social infrastructure deficiencies in Jamner. The framework translates the findings of the accessibility and gap analysis into a set of spatial planning interventions aimed at improving the distribution and accessibility of health infrastructure and public open spaces.

The analysis revealed a concentration of healthcare facilities and recreational spaces within

the central urban core, while peripheral neighbourhoods experience comparatively lower levels of service accessibility. To address this imbalance, a decentralized planning approach has been proposed. The framework recommends the development of neighbourhood-level social infrastructure nodes, strengthening of local public open spaces, enhancement of pedestrian connectivity and improvement of access to healthcare services within underserved areas.

The eastern sector of the town has been identified as a priority intervention area due to limited service availability and lower accessibility levels. Similarly, peripheral residential areas require neighbourhood-scale facilities that can reduce dependence on the town centre for daily social and recreational needs. The proposed intervention strategy also includes mobile healthcare services, community-level social infrastructure hubs and the development of new public spaces to improve spatial equity.

The Kasat Node proposal presented in the subsequent sections serves as a demonstration of how the proposed intervention framework can be implemented at the neighbourhood level. The model is intended to be replicable in other underserved locations across Jamner to support a more balanced and equitable distribution of social infrastructure.

The proposed planning intervention framework has been prepared based on the integrated assessment of healthcare facilities, public open spaces, road connectivity and identified deficiency zones within Jamner. The framework translates the analytical findings into a set of spatial planning interventions aimed at improving the adequacy, accessibility and distribution of social infrastructure across the town.

The analysis indicates that the central urban core possesses relatively higher accessibility due to the concentration of healthcare facilities, parks and major transportation corridors. However, peripheral areas, particularly the eastern expansion area and certain north-western neighbourhoods, exhibit comparatively lower levels of accessibility and service coverage. These areas have therefore been identified as priority intervention zones.

The intervention strategy adopts a decentralized approach by promoting the development of neighbourhood-level facilities, community spaces and recreational infrastructure within underserved areas. Proposed measures include the establishment of health and wellness facilities, neighbourhood parks, community hubs and improved pedestrian connectivity. The framework also emphasizes future growth management by identifying locations where social infrastructure can be integrated with anticipated urban expansion.

The proposed intervention framework serves as a bridge between the analytical findings

and the detailed site-level proposal. It ensures that planning recommendations are directly linked to identified deficiencies and contribute towards achieving equitable access to social infrastructure throughout Jamner.

6.5 Existing Site Condition

The existing site consists of an open and underutilized land parcel with limited organized recreational infrastructure despite its strategic location within the residential neighbourhood. Although the site has the potential to function as a community-level public space, it currently lacks the essential physical and functional elements required to support recreation, social interaction and neighbourhood activities. The absence of structured pedestrian circulation, shaded seating areas, organized activity zones and community-oriented infrastructure significantly limits the usability of the site and reduces opportunities for neighbourhood engagement.

The site assessment further revealed several deficiencies, including the underutilization of available open space, the absence of organized recreational infrastructure, discontinuous or missing pedestrian pathways, limited seating and shaded resting areas, poor landscape organization and the lack of multifunctional public spaces capable of accommodating diverse user groups and activities. These shortcomings highlight the need for a comprehensive planning intervention that transforms the existing site into an accessible, inclusive and well-organized neighbourhood social infrastructure hub capable of supporting recreation, community interaction and healthy urban living.

6.6 Planning Approach

The proposal adopts an integrated and neighbourhood-oriented planning approach that prioritizes accessibility, public interaction and environmental quality to address the deficiencies identified during the spatial analysis. The planning strategy emphasizes the creation of pedestrian-oriented movement networks that improve connectivity within the neighbourhood while ensuring safe and convenient access to public spaces and essential services. Equal importance is given to inclusive public-space design, ensuring that the proposed environment is accessible and usable by people of all age groups and abilities.

The proposal also incorporates multifunctional recreational spaces that accommodate a variety

of social, cultural and recreational activities, thereby encouraging greater community participation and neighbourhood interaction. By integrating health-supportive public environments with recreational facilities, green infrastructure and community-oriented spaces, the intervention seeks to create a vibrant, accessible and sustainable neighbourhood. This integrated planning approach is expected to enhance overall neighbourhood livability, promote healthier lifestyles and strengthen social cohesion while providing a replicable model for future neighbourhood-level development in Jamner.

6.7 Concept Development

The conceptual framework of the proposal is based on the idea of creating a "Community Interaction and Wellness Spine", which serves as the primary organizing element for movement, recreation and social interaction within the site. The proposed spine establishes a continuous and accessible public realm that connects different activity zones while encouraging pedestrian movement and neighbourhood engagement.

The concept integrates a well-defined pedestrian circulation network with flexible activity spaces, green buffer zones, recreational lawns and strategically located social interaction nodes to accommodate a variety of user groups and activities. Emphasis has been placed on creating an inclusive and accessible environment that promotes environmental comfort through landscape elements, shaded walkways and open green spaces. By strengthening neighbourhood connectivity and encouraging everyday social interaction, the conceptual framework aims to transform the site into a vibrant, health-supportive and multifunctional public space that enhances the overall livability of the surrounding residential area.

6.8 Proposed Zoning

The proposed zoning structure organizes the site into multiple activity and interaction zones.



Figure 19: existing unit (Source: Author))



Figure 20: proposed unit (Source: Author))

Assumption

- Approximate residential units within immediate catchment = 250–300 houses
- Average household size = 5 persons/household

(5 persons per household is commonly used from Census household size assumptions)

Population Calculation

Lower estimate

250 houses × 5 persons = 1,250 persons

Upper estimate

300 houses × 5 persons = 1,500 persons

Population Served

The proposed neighbourhood social infrastructure hub is estimated to serve approximately 1,250–1,500 residents residing within the immediate catchment area surrounding Kasat Node. The estimate is based on a visual assessment of approximately 250–300 residential units within the surrounding neighbourhood and an average household size of 5 persons per

household.

URDPFI Justification

For 1,500 population:

Required neighbourhood open space:

1 ha per 5,000 population

Therefore:

(1,500 / 5,000) × 1 ha = 0.30 ha

= 3,000 sq.m.

As per URDPFI Guidelines, a population of approximately 1,500 persons requires nearly 0.30 ha (3,000 sq.m.) of neighbourhood-level open space. The identified site provides an opportunity to accommodate recreational, social and health-supportive functions for the surrounding residential community.

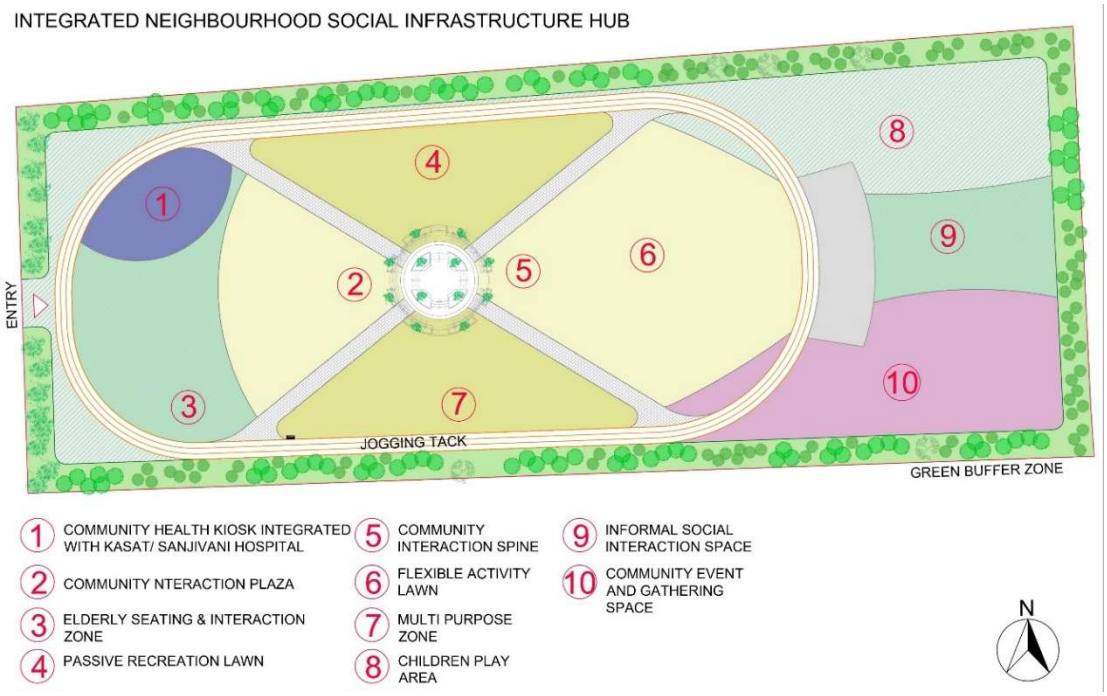

Figure 19: Integrated neighbourhood social infrastructure hub *(Source: Author)*

6.9 Accessibility and Walkability Strategy

Accessibility and pedestrian movement form the core of the proposed planning intervention. The strategy prioritizes the development of a safe, continuous and universally accessible

pedestrian network that connects all major activity areas within the site and enhances movement throughout the neighbourhood. A dedicated pedestrian circulation loop has been proposed to improve internal connectivity, while shaded walking pathways are incorporated to provide thermal comfort and encourage walking throughout the day.

The proposal also focuses on strengthening the internal movement network through barrier-free design principles, ensuring convenient access for children, elderly persons and people with disabilities. Seating areas and resting spaces are strategically integrated along pedestrian routes to improve user comfort and encourage longer use of the public realm. Collectively, these interventions establish a continuous pedestrian spine that links recreational spaces, community activity zones and green areas, thereby promoting neighbourhood-level interaction, improving accessibility and supporting a healthier and more walkable urban environment.

6.10 Public Space and Recreational Strategy

The proposal introduces a network of organized and multifunctional public spaces designed to support recreation, social interaction and community engagement within the neighbourhood. The planning strategy incorporates a variety of recreational components, including passive recreation lawns, multipurpose activity spaces, flexible community areas, informal interaction zones and dedicated gathering spaces. These elements are intended to accommodate a wide range of recreational, cultural and social activities while encouraging regular use of the public realm by residents.

The proposed public spaces have been planned to serve users of different age groups and abilities, ensuring that children, youth, adults and elderly residents have access to safe, inclusive and attractive recreational environments. The integration of open green spaces with flexible activity areas enhances the functionality of the site while promoting healthier lifestyles, community participation and neighbourhood cohesion. By providing a diverse range of recreational opportunities, the proposal aims to strengthen the role of public spaces as essential components of neighbourhood-level social infrastructure and improve the overall livability of the area.

6.11 Community Interaction Strategy

The proposal prioritizes neighbourhood interaction by creating inclusive and accessible public spaces that encourage social engagement and strengthen community cohesion. The planning strategy incorporates a range of social infrastructure elements, including a community interaction plaza, informal gathering areas, dedicated spaces for senior citizens, event and activity zones, and flexible recreational areas that can accommodate diverse community needs. These spaces are designed to support everyday social activities as well as cultural and neighbourhood events, thereby enhancing the social value of the proposed development.

By providing attractive and multifunctional public environments, the proposal encourages regular social interaction, neighbourhood engagement and active community participation among residents of all age groups. The inclusive design approach ensures that these spaces remain accessible and welcoming to children, youth, adults, elderly persons and people with disabilities. Collectively, these interventions strengthen neighbourhood identity, foster social cohesion and reinforce the role of public spaces as essential components of neighbourhood-level social infrastructure.

6.12 Expected Outcomes

The proposed intervention is expected to generate a range of social, environmental and spatial benefits by addressing the key deficiencies identified through the analysis of Jamner town. The neighbourhood-level planning approach is anticipated to improve accessibility by strengthening pedestrian connectivity and creating a more walkable urban environment. Enhanced pedestrian comfort, supported by shaded pathways, seating areas and barrier-free infrastructure, is expected to encourage active mobility and increase the use of public spaces by residents of all age groups.

The proposal also aims to expand recreational opportunities through the provision of organized and multifunctional public spaces that accommodate a variety of leisure, cultural and community activities. These interventions are expected to strengthen neighbourhood-level social infrastructure by promoting greater community interaction, social cohesion and public participation. In addition, the incorporation of green infrastructure and landscape elements will improve environmental quality by enhancing thermal comfort, increasing

vegetation cover and creating healthier public environments. Overall, the intervention is expected to contribute significantly to the development of inclusive, accessible and livable neighbourhoods while demonstrating how public spaces in small towns can function as integrated social infrastructure systems that support health, recreation and community well-being.

6.13 Proposal Outcome

The proposal transforms an underutilized public space into a multifunctional and neighbourhood-oriented social infrastructure hub. The intervention integrates accessibility, recreation, environmental quality and community interaction to create a health-supportive urban environment.

The planning approach emphasizes neighbourhood-scale development and demonstrates how integrated public-space planning can improve quality of life within small-town contexts.

The town-level analysis identified multiple underserved neighbourhoods and infrastructure-deficient areas. Kasat Node has been selected as a demonstration site to illustrate how neighbourhood-level social infrastructure interventions can be implemented. The planning framework can be replicated in other underserved neighbourhoods across Jamner.

Chapter 7

CONCLUSION

Urban livability is strongly influenced by the availability, accessibility and quality of social infrastructure. Health facilities and public spaces are important components of urban environments because they directly affect physical health, social interaction, accessibility and quality of life.

The study revealed that Jamner town demonstrates uneven distribution of healthcare facilities and fragmented public spaces. Most healthcare infrastructure is concentrated within the urban core, whereas peripheral residential areas experience lower accessibility and reduced infrastructure availability.

The analysis also identified that organized neighbourhood-level recreational spaces are limited within the town. Existing public spaces are fragmented, underutilized and inadequately connected with pedestrian infrastructure. Walkability conditions within many areas remain poor due to lack of continuous footpaths, shaded pathways and inclusive pedestrian environments.

The findings indicate that infrastructure quantity alone is insufficient for improving urban quality. Accessibility, spatial distribution and neighbourhood-level connectivity are equally important in creating inclusive and livable urban environments.

The study also highlighted the importance of GIS-based spatial analysis in identifying infrastructure gaps and supporting evidence-based planning approaches. Spatial mapping and accessibility analysis helped identify underserved areas and demonstrated the need for integrated planning interventions.

Based on these findings, the proposal developed within the study aimed to transform an underutilized public open space into a multifunctional neighbourhood-level social infrastructure hub. The intervention integrated:

- walkability,
- recreational infrastructure,
- green spaces,
- accessibility enhancement,
- and community interaction spaces.

The proposal demonstrated how neighbourhood-oriented public-space planning can

improve accessibility, strengthen social interaction and support healthier urban environments within small-town contexts.

Overall, the study concludes that integrated and accessibility-oriented planning approaches are essential for improving urban livability and social infrastructure conditions within emerging Indian towns.

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Annexure

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Questionnaire

Section A: basic information

Table 13: Section A: Basic Demographic Information

Q. No.	Question	Response Options
1	Age	☐ Below 18 ☐ 18–30 ☐ 31– 45 ☐ 46 – 60 ☐ 60+
2	Gender	☐ Male ☐ Female ☐ Other
3	Ward/ Locality	
4	Occupation	
5	Years of residence	☐ <1 year ☐ 1–5 years ☐ 5–10 years ☐ 10 + years

(Source: Author)

Section B: public open spaces

Usage & Accessibility

Table 14: Section B: Public Open Space Usage and Accessibility

Q. No.	Question	Response Options
6	Do you visit any nearby park/ open space?	☐ Yes ☐ No
7	Frequency of visits	☐ Daily ☐ Weekly ☐ Monthly ☐ Rarely
8	Walking time to nearest park	☐ < 5 min ☐ 5–10 min ☐ 10–15 min ☐ > 15 min

: *(Source: Author)*

Satisfaction with Public Space (Likert Scale: 1 =Very Poor, 5= Very Good)

Table 15: Public Space Satisfaction Ratings (Likert Scale)

Q. No.	Parameter	1	2	3	4	5
9	Cleanliness	○	○	○	○	○
10	Daytime safety	○	○	○	○	○
11	Night safety	○	○	○	○	○
12	Shade/trees	○	○	○	○	○
13	Seating availability	○	○	○	○	○
14	Lighting	○	○	○	○	○
15	Walking comfort/ path quality	○	○	○	○	○
16	Inclusiveness (women/ children/ elderly)	○	○	○	○	○

Q. No.	Parameter	1	2	3	4	5
17	Overall satisfaction	○	○	○	○	○

(Source: Author)

Section C: Health Facilities (PHC/ UPHC) Accessibility

Table 16: Accessibility to Health Facilities (PHC/UPHC)

Q. No.	Question	Response Options
18	Distance to nearest health facility	☐ < 1 km ☐ 1–3 km ☐ 3–5 km ☐ > 5 km
19	Usual travel mode	☐ Walk ☐ Cycle ☐ Two-wheeler ☐ Auto ☐ Other: _

(Source: Author)

Satisfaction with Health Facility (Likert Scale:1= Very Poor, 5= Very Good)

Table 17: Satisfaction with Health Facility Services (Likert Scale Assessment)

Q. No.	Parameter	1	2	3	4	5
20	Cleanliness	○	○	○	○	○
21	Waiting area comfort	○	○	○	○	○
22	Staff availability & behaviour	○	○	○	○	○
23	Medicine availability	○	○	○	○	○
24	Toilets & drinking water	○	○	○	○	○
25	Safety/ crowd control	○	○	○	○	○
26	Timings & service hours	○	○	○	○	○
27	Overall satisfaction	○	○	○	○	○

(Source: Author)

Section D: Livability Perception

Table 18: Perception of Livability and Basic Facilities

Q. No.	Question	Response Options
28	Do you feel your area has adequate basic facilities (parks + health)?	☐ Yes ☐ No ☐ Partially

Q. No.	Question	Response Options
29	Improvements you want	☐ More trees ☐ More seating ☐ Better safety ☐ Better health services ☐ More open spaces ☐ Better maintenance ☐ Other: _____

(Source: Author)

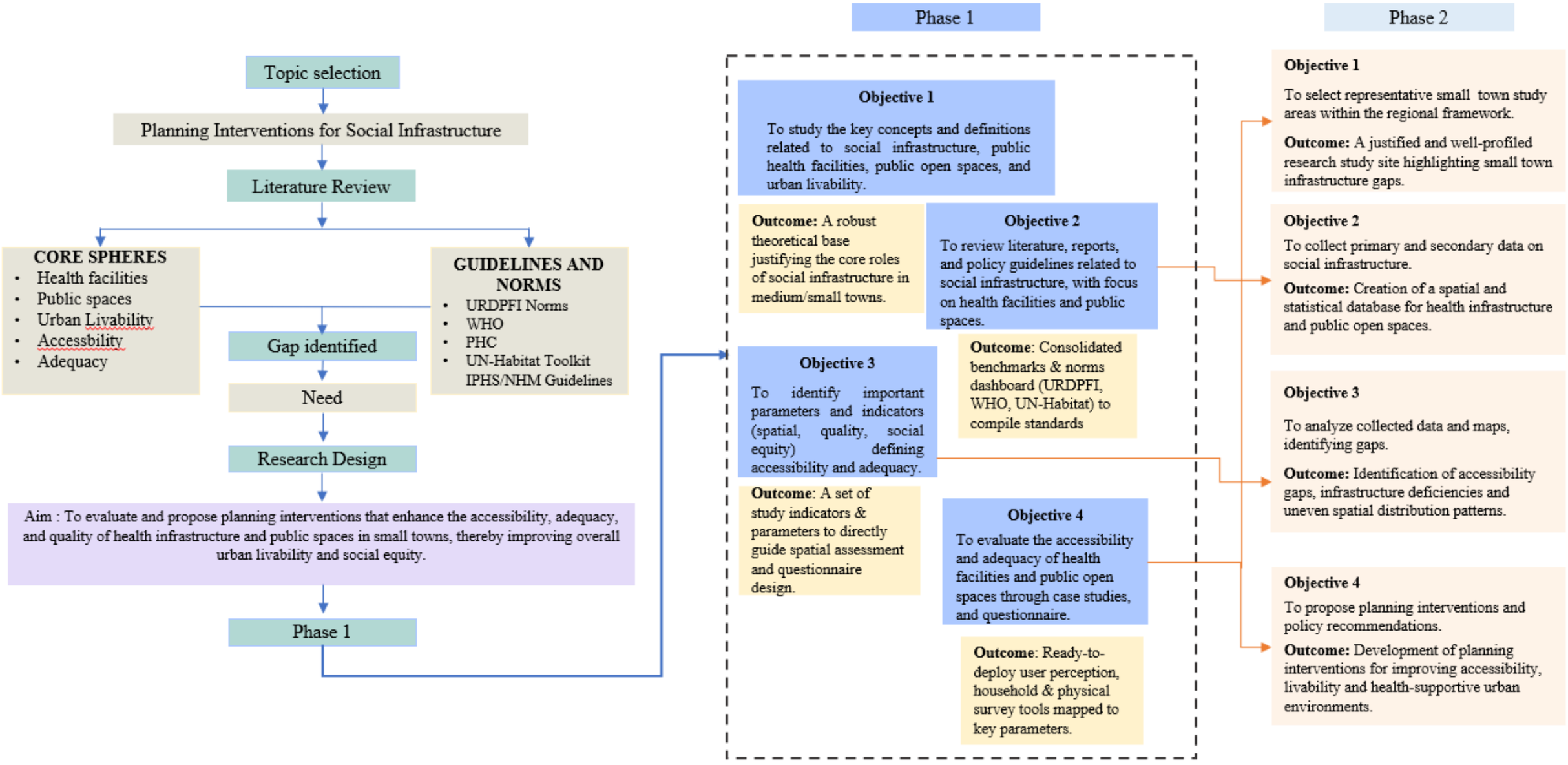
Section E: Open Feedback

Table 19: Resident Feedback on Improving Public Spaces and Health Services

Q. No.	Question	Response
30	Suggestions to improve public spaces or health facilities	_____ _____

(Source: Author)

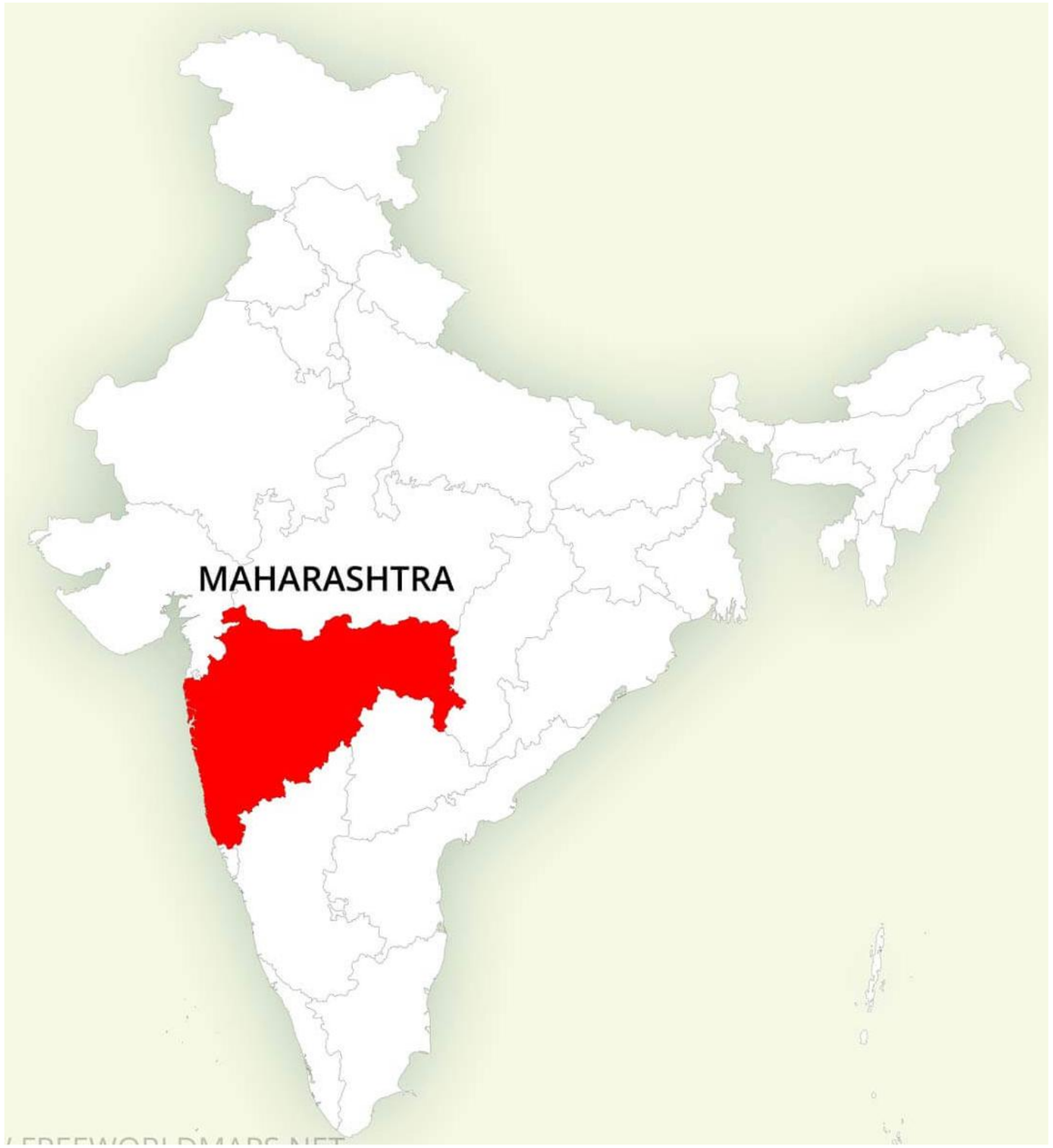
METHODOLOGY

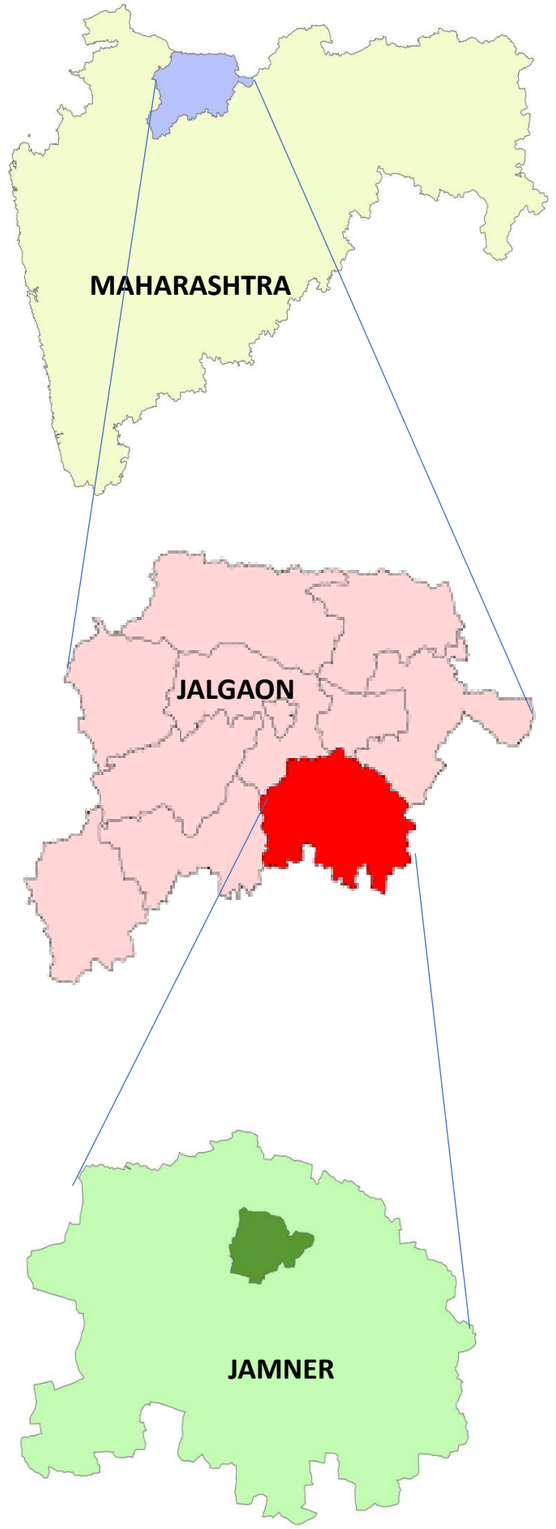


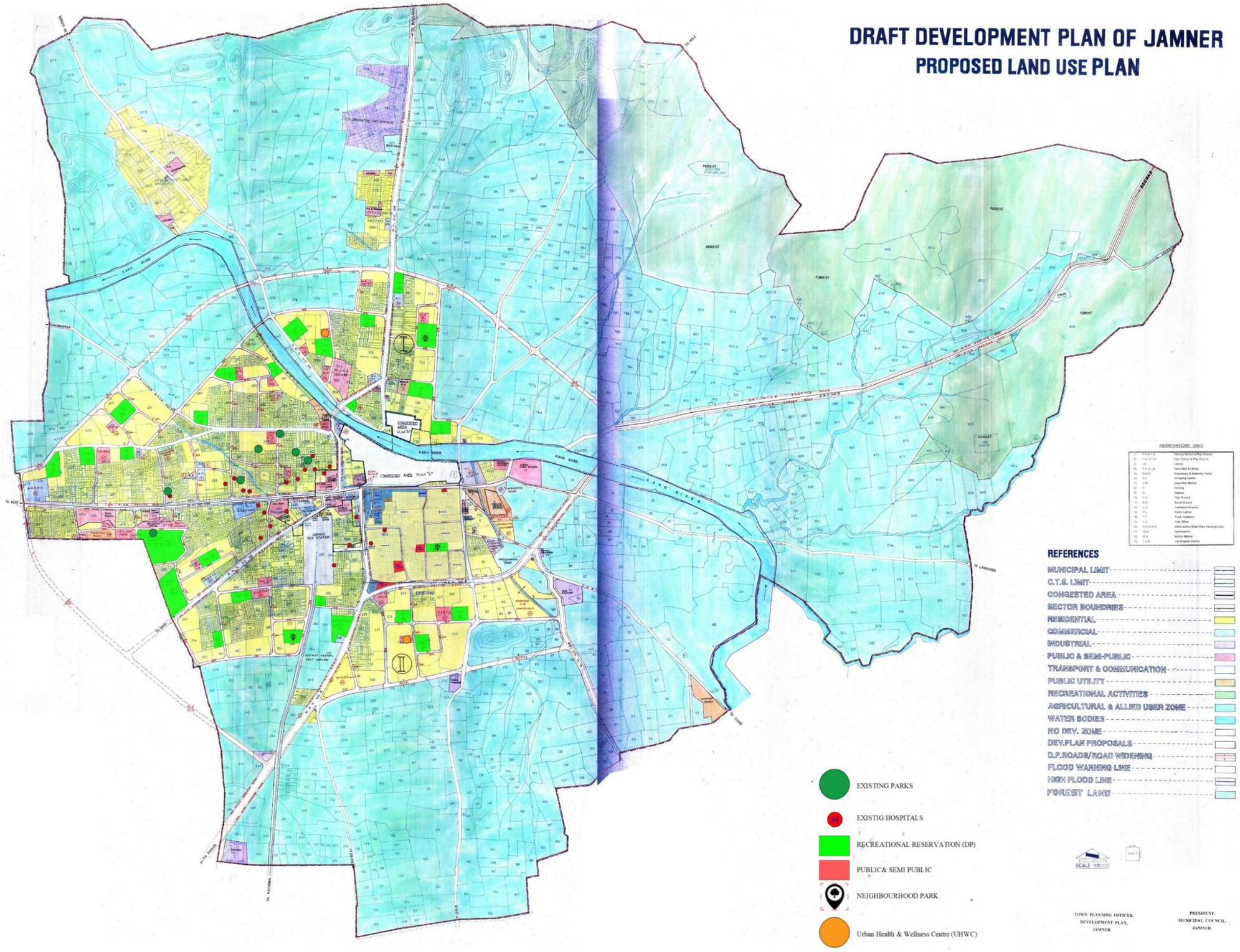
COMPARATIVE TABLE OF CASE STUDIES

Case Study	Study Area (Small Town)	Domain	Methods Used	Key Findings	Indicators Observed	What I Can Use For My Study
1. Kadakola PHC (Anitha & Thimmaiah, 2017)	Kadakola, Mysore Fringe (Karnataka)	PHC accessibility & service utilization	Household survey, travel time reporting, facility audit, observation	Access depends on walkability; staff shortage; low medicine availability; people prefer private providers	Distance, travel time, staff, medicine, sanitation, waiting area	Travel-time based accessibility PHC adequacy checklist User trust & satisfaction questions
2. Narsampet (Swamy,2018)	Narsampet, Warangal (Telangana)	PHC awareness, access, satisfaction	Household/ community survey, perception questions, field observation	Low awareness; women's access lower; long waiting; poor perception of quality	Awareness, satisfaction, waiting time, toilets, staff behaviour	Awareness questions Gender-based perception Satisfaction scale Simple adequacy scoring
3.Sitapur Public Spaces (Tripathi, 2022)	Sitapur, Uttar Pradesh	Public space quality &usability	Amenity checklist, usage observation, interviews, mapping informal spaces	Informal spaces more used; lack of shade, seating, lighting; women avoid spaces	Seating, shade, lighting, safety, inclusiveness, cleanliness	Public space adequacy checklist Assess informal spaces Safety & usability indicators Inclusiveness items
4. Karjat (Deshmukh, 2020)	Karjat, Raigad (Maharashtra)	Public spaces +PHC assessment	Field audit, amenity scoring, questionnaire, walking-time estimate	Informal spaces heavily used; formal parks few; poor amenities; PHC overcrowded; basic WASH inadequate	Shade, seating, lighting, toilets, waiting area, PHC readiness	Walking-time access model Public space + PHC dual checklist WASH& waiting indicators

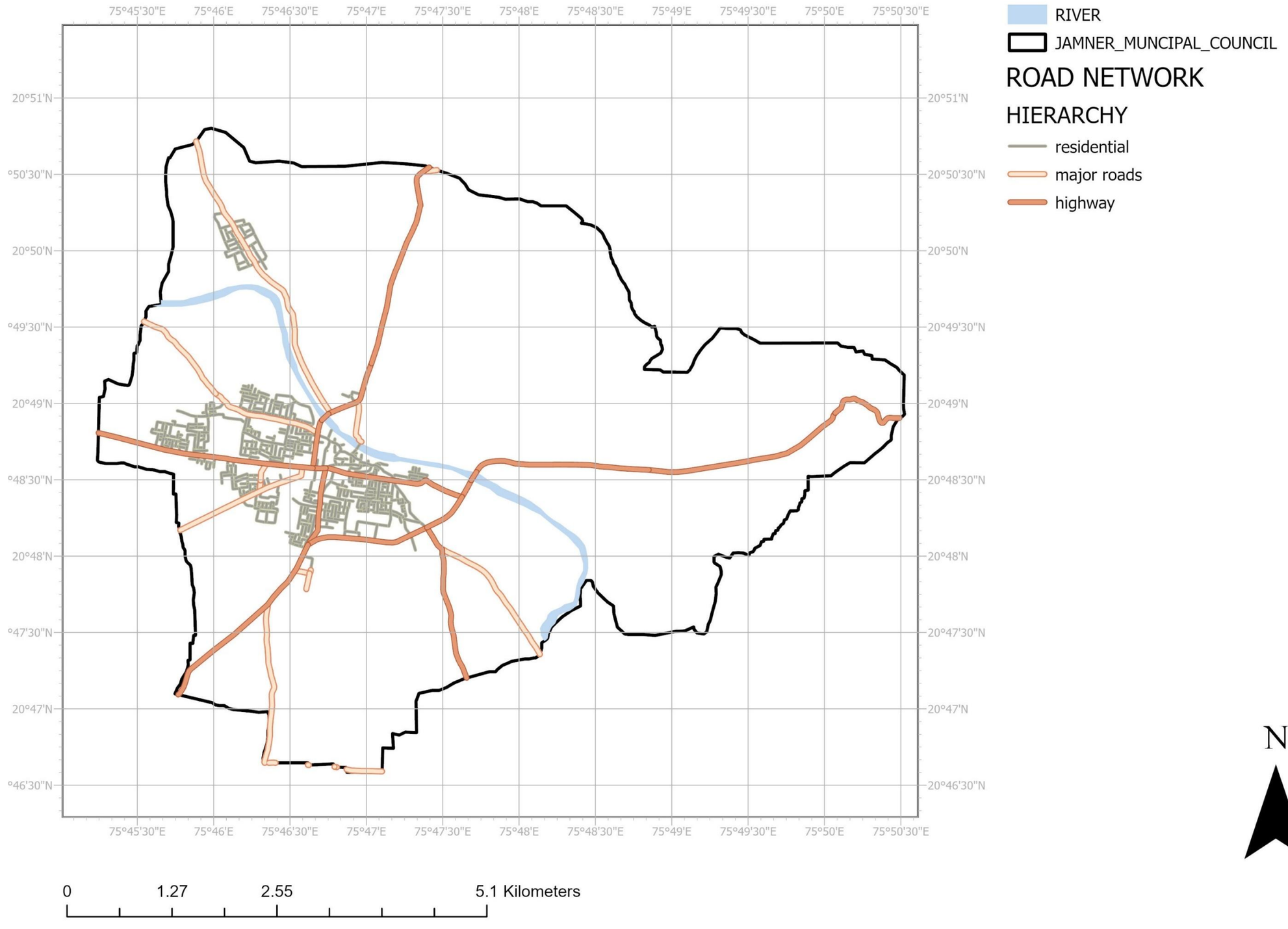
Location of Jamner in Jalgaon District, Maharashtra







Planning interventions for social infrastructure in small towns: a focus on health & public spaces, Pradnya Siddharth More 24209011111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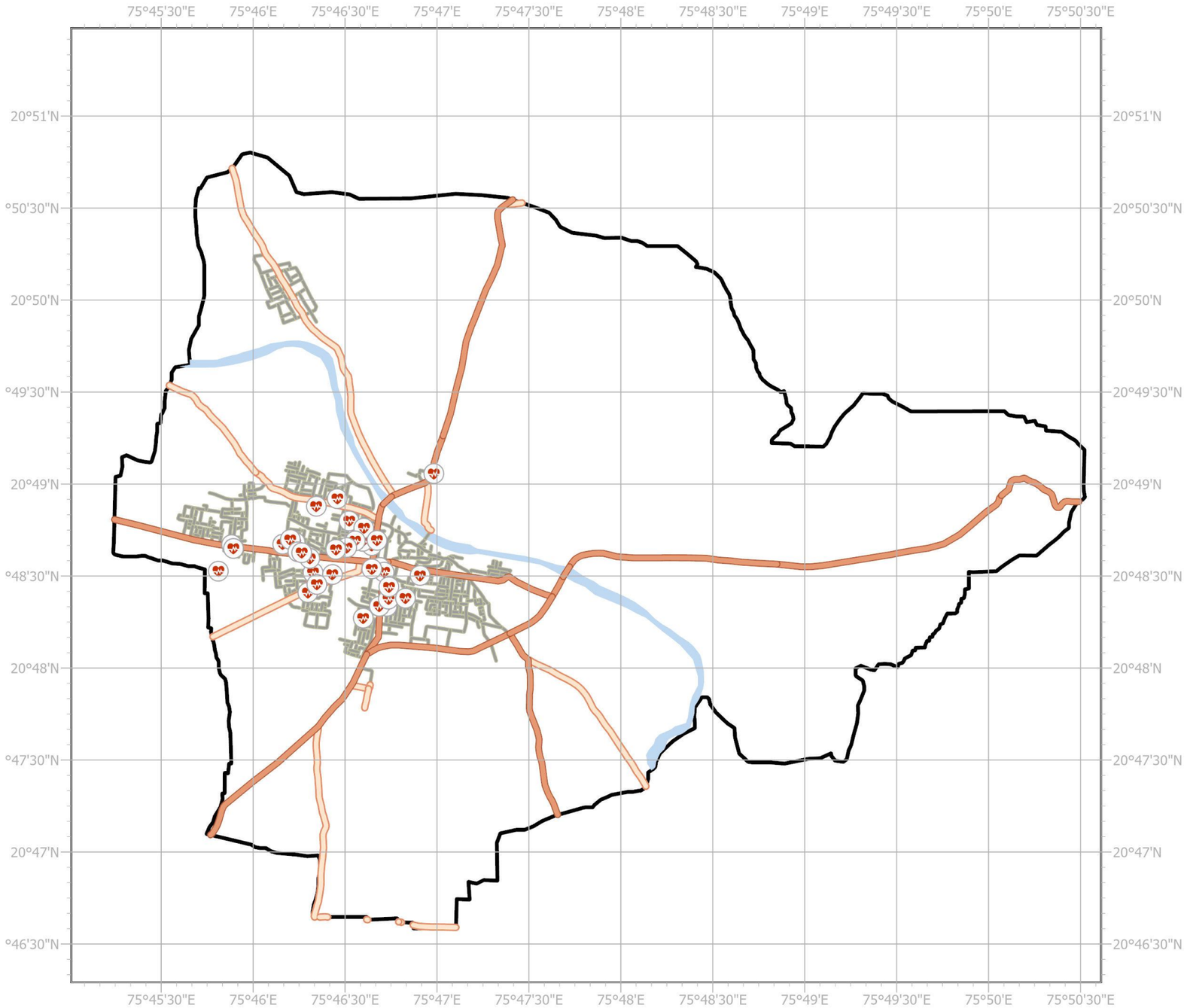
RIVER
JAMNER_MUNCIPAL_COUNCIL
ROAD NETWORK
HIERARCHY
residential
major roads
highway
N
0
1.27
2.55
5.1 Kilometers



RIVER

JAMNER_MUNCIPAL_COUNCIL

ROAD NETWORK

HIERARCHY

residential

major roads

highway

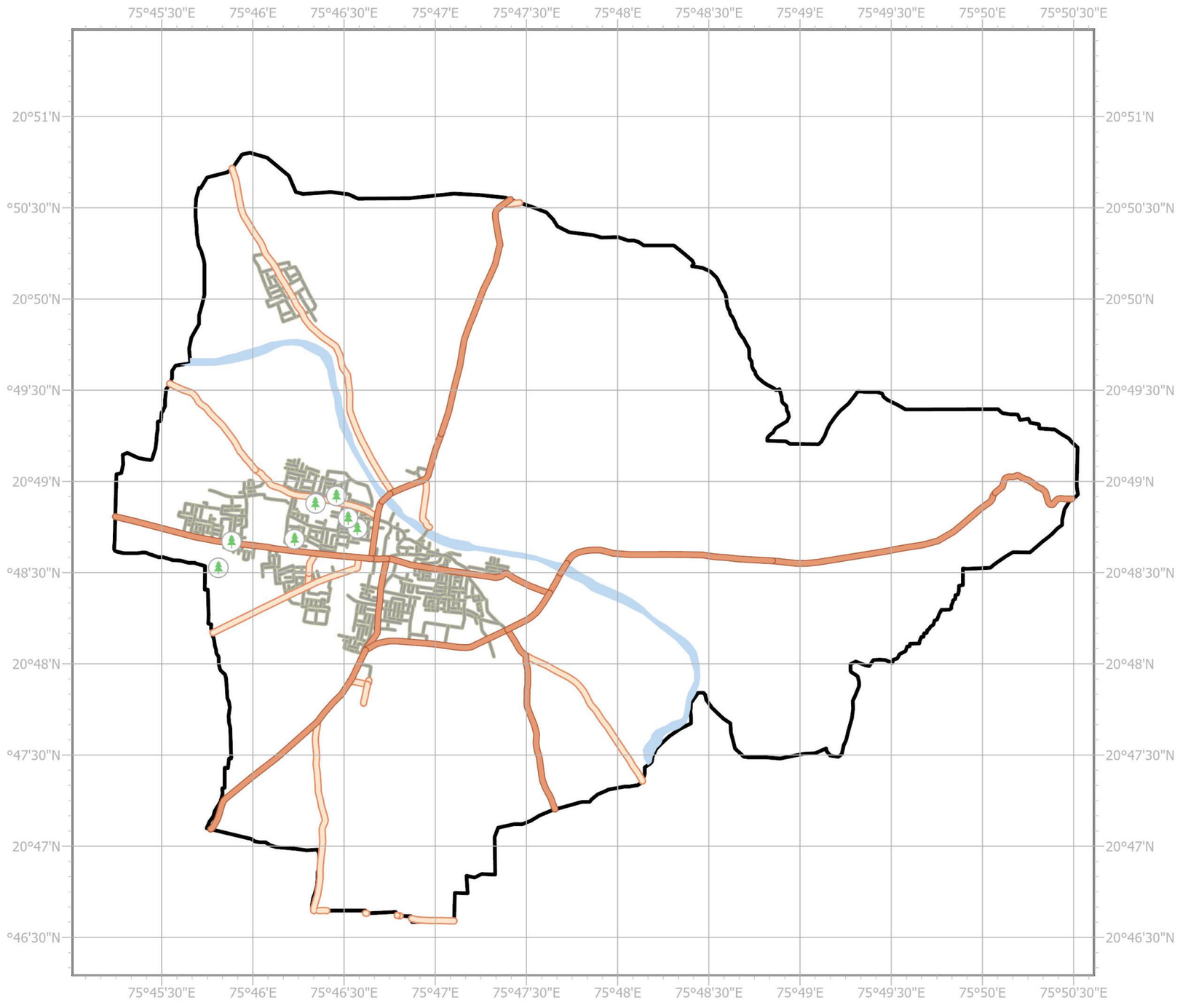
EXISTING INFRASTRUCTURE

DISTRIBUTION

hospitals

Global Maharashtra Hospital
Samarth Hospital (Accident & skin centre)
New Asha Hospital
Sanjivani hospital
Sona hospital and maternity home
Shiv Chhatrapati hospital
Meera hospital
R K Hospital
Vijayanand hospital
Siddhivinayak hospital
Ashirwad hospital
City hospital
Shri Leela hospital
Kamal hospital
Aai hospital
Saipushp hospital
Shree hospital
Kasat hospital
Kasat hospital
Srushti hospital
Dhanvantari hospital and nursing home
Nileshwari child hospital
Muktai hospital
Sai multi-speciality hospital
Sarjai clinic
Shobhna hospital
Mahajan accident hospital
Sub district hospital

N



RIVER

JAMNER_MUNCIPAL_COUNCIL

ROAD NETWORK

HIERARCHY

residential

major roads

highway

EXISTING INFRASTRUCTURE

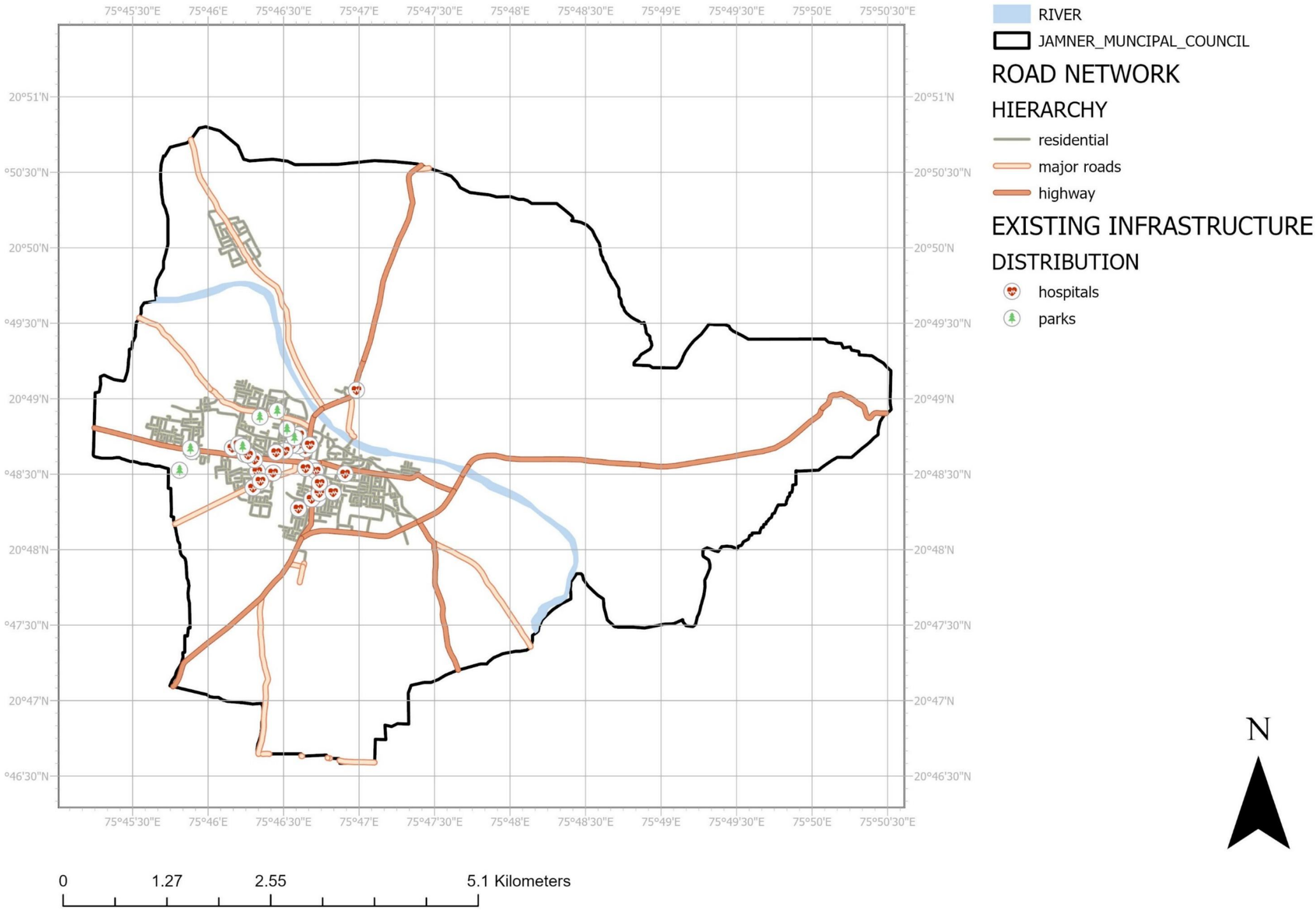
DISTRIBUTION

parks

Chhatrapati Shivaji Maharaj park
park in Girija colony
Santoshi mata temple park
Hiwarkheda ground
Kids playcentre- Jalgaon road
Tilokeshwar maharaj mandir park
Geeta dham park

N

0 1.27 2.55 5.1 Kilometers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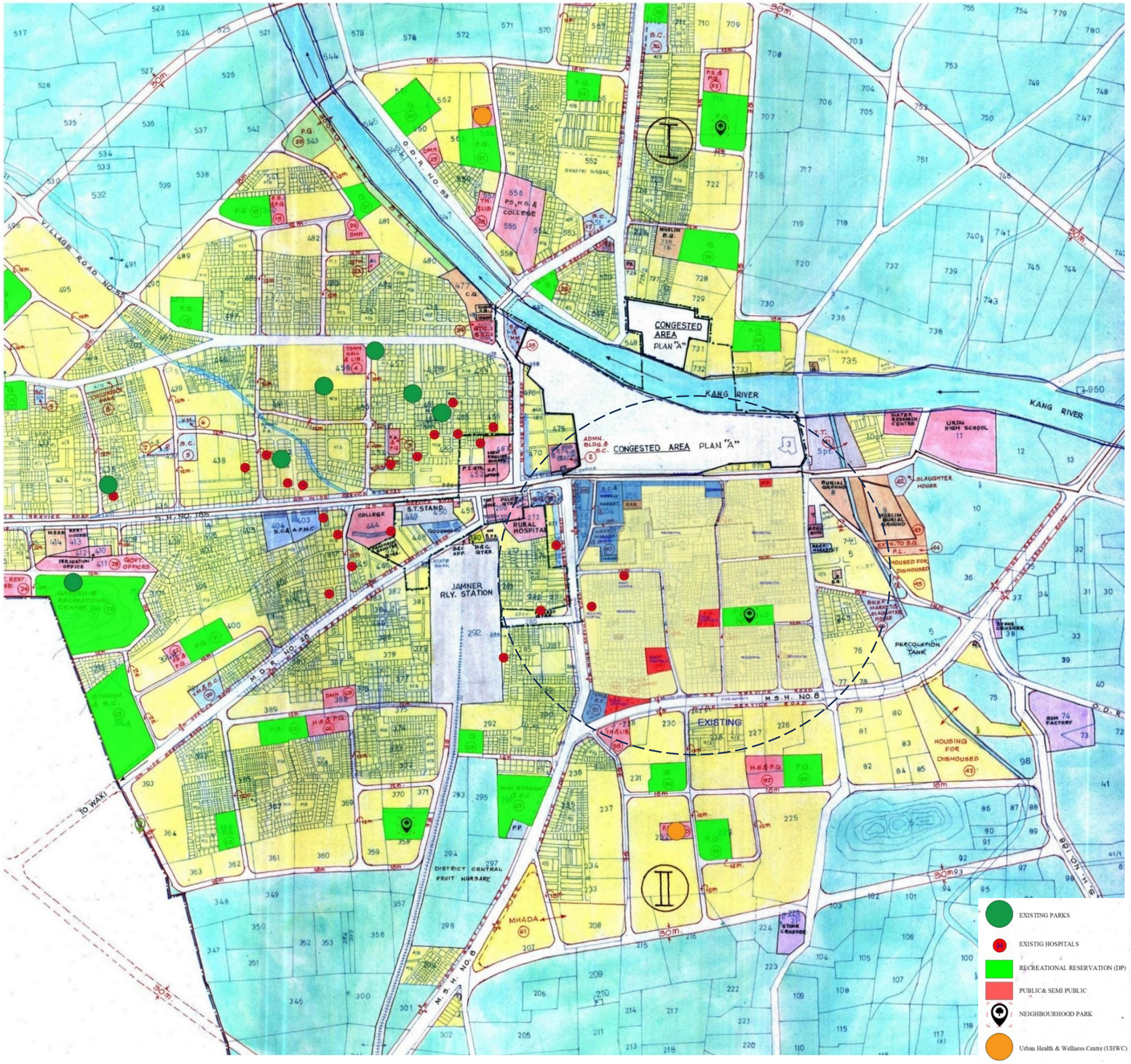


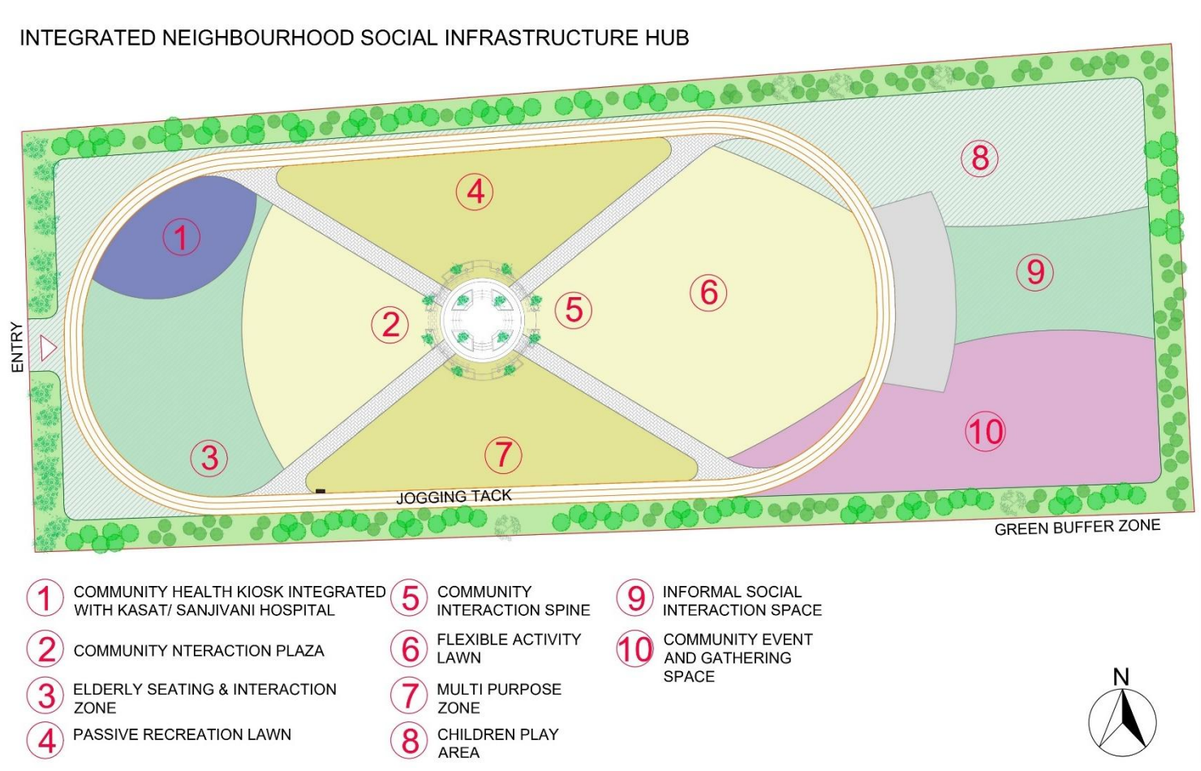
PROPOSED LAYOUT

Parameter	Value
Projected Population (2026)	**63,843**
Open Space Requirement	**638,430 sq. m**
DP Recreational Reservation	**599,652 sq. m**
Additional Requirement	**38,778 sq. m**

Although substantial recreational land has been reserved in the Draft Development Plan, an indicative deficit remains based on the projected planning population. The proposal therefore focuses on both improving accessibility and prioritizing the development of reserved recreational land.







Kasat neighbourhood social infrastructure hub

Site Information

- Kasat Development Node Area: 663,682 sq.m
- Proposed Hub Area: 13,700 sq.m
- Estimated Population Served: 1,250–1,500 persons

Catchment Assessment

- Approx. Residential Units: 250–300
- Average Household Size: 5 persons/household
- Population Served: 1,250–1,500 persons

Source: Census of India (2011), Google Earth Pro (2026) & Field Survey (2026).

URDPFI Assessment

- Standard: 1 ha open space / 5,000 population
- Required (1,500 persons): 3,000 sq.m
- Proposed: 13,700 sq.m

Inference

- Exceeds the minimum URDPFI requirement.
- Supports neighbourhood-level recreational, social and health-supportive activities.
- Serves as a prototype hub for replication at other priority neighbourhood nodes.